

# Can a Safety Net Subsidy Be Contained?

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In 1997 the U.S. Congress introduced legislation that would broaden opportunities for combining banks with nonbank financial and nonfinancial businesses.<sup>1</sup> There has been some concern, however, that such combinations would possibly allow a safety net subsidy that banks might receive to spill over to nonbanking companies affiliated with banks. In response to the concern, supporters of this reform have suggested various proposals to try to keep a subsidy within the bank itself.<sup>2</sup> Two mechanisms, in particular, have received considerable attention: the first would restrict nonbanking activities to bank holding company (BHC) subsidiaries and deny them to bank subsidiaries; the second would allow nonbank activities in bank subsidiaries but restrict intracompany transactions.<sup>3</sup>

In this article, I assess the potential of these proposals to contain any existing safety net subsidy, without evaluating the usefulness of the proposals for other purposes.<sup>4</sup> I explain how supervisory and regulatory policies that support

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<sup>1</sup> For example, one might imagine a large financial supermarket offering commercial banking, investment banking, and insurance services, together with some nonfinancial services, such as manufacturing.

<sup>2</sup> Discussions of such proposals can be found in Greenspan (1997), Helfer (1997), Kwast and Passmore (1997), Ludwig (1997), and Whalen (1997).

<sup>3</sup> Throughout this article a BHC subsidiary not owned by the bank will be called either a bank affiliate or a BHC subsidiary. A company owned directly by the bank itself will be called a bank subsidiary.

<sup>4</sup> Reasons for employing intracompany transaction restrictions are discussed more generally in Walter (1996).

the bank safety net may inadvertently subsidize banks. Further, I illustrate how banking organizations can themselves benefit by shifting a subsidy to affiliated institutions, potentially enlarging the subsidy in the process. Although banks *can* pass along a subsidy, restrictions may effectively prevent the subsidy from shifting to institutions affiliated with banks. Nonetheless, competition will tend to cause banks to shift a subsidy to bank borrowers and depositors.

## 1. THE POTENTIAL FOR A SAFETY NET SUBSIDY

There are three possible means of bank subsidy mentioned in most discussions: underpriced deposit insurance, an unpriced line of credit from the Federal Reserve (the Fed) discount window, and underpriced daylight overdraft loans from the Fed.<sup>5</sup> Additionally, a fourth subsidy, available to the largest banks, exists because of a government policy that protects (free of charge) uninsured creditors of banks considered “too-big-to-fail.” The following examines the four ways in which banks could be subsidized. Regulatory expenses borne by banks may equal or even exceed the total subsidy received by these four means. If that situation occurs, then, on net, banks receive no government subsidy.

### Underpriced Deposit Insurance

The Federal Deposit Insurance Corporation (FDIC) insures bank deposits against losses produced by bank failures. For its insurance protection the FDIC charges banks a premium. But does the insurance premium adequately compensate the FDIC for the risk it bears? In other words does premium income equal expected claims from bank failures? If not, deposit insurance subsidizes banks. The question can be broken down to two sub-questions. First, on average are premiums set appropriately? Second, does the premium rise commensurate with bank riskiness? If the answer to the first question is no, then the banking industry as a whole receives a subsidy from deposit insurance. Ultimately the subsidy comes from taxpayers since deposit insurance is backed by the full faith and credit of the government. If the answer to the second question is no, then risky banks receive a subsidy from deposit insurance, regardless of whether the banking industry as a whole receives a subsidy. In either case, the subsidy might be passed along to bank affiliates or subsidiaries. As discussed below, evidence on the first question is inconclusive. In contrast, the evidence on the second question indicates fairly clearly that the riskiest banks receive a subsidy from deposit insurance.

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<sup>5</sup> See, for example, Furlong (1997) and Helfer (1997), p. 13.

*Does the Banking Industry as a Whole Receive a Subsidy?*

In 1977 Robert Merton proposed a technique for estimating the fair deposit insurance premium based on a recent finding in the theory of finance. In his pathbreaking article, Merton demonstrated that the recently advanced Black-Scholes formula for options pricing could be applied to determining the actuarially fair premium for deposit insurance. The fair deposit premium here is the expected claims cost to the FDIC of providing the insurance guarantee. Using the techniques proposed by Merton, a number of analysts went on to estimate, empirically, this fair premium for samples of banks. By comparing these estimates with the FDIC's actual premia, analysts drew conclusions about the fairness of FDIC insurance premia. In other words, their findings purported to reveal whether deposit insurance subsidizes banks. Unfortunately, their results differ significantly depending on various maintained assumptions.

Using 1979 and 1980 bank accounting and stock price data, Marcus and Shaked (1984) found that "FDIC [premium] rates greatly exceed estimates of the fair value of the insurance derived from the . . . option-pricing model" (p. 446). These results imply that FDIC premiums were on average a tax on banks, not a subsidy. With 1983 data, Ronn and Verma (1986) use similar techniques but maintain different assumptions about interest rates and FDIC troubled-bank assistance policies. Their modifications lead to higher estimates of the fair premium. Specifically, they produce a weighted-average estimate of the fair premium that is close to, though slightly above, the premium actually collected by the FDIC.<sup>6</sup> Their estimates indicate that on average banks were receiving a subsidy, though a small one.

Pennachi (1987) argues that the FDIC's liability, and therefore the fair deposit insurance premium, depends on how much regulatory control supervisors exercise over bank capital levels. If supervisors are willing and able to require capital-deficient banks to add capital, the FDIC's insurance liability and the fair insurance premium will be relatively small. If supervisors are less willing or unable to require additions to capital, then the fair insurance premium is higher. Pennachi constructs a deposit insurance model incorporating "either the assumption that regulators have full control or no control" (p. 341), and he finds that the estimated fair premium depends crucially on this assumption. Under the full control assumption (implicitly adopted by Marcus and Shaked [1984]), Pennachi finds that the banks in his sample are consistently overcharged by considerable margins. But under the no-control assumption, banks are consistently undercharged by considerable margins. Since Pennachi did not attempt

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<sup>6</sup> Ronn and Verma's estimate of the fair deposit premium for the average bank in their 1983 sample of banks is 0.0808 percent (Table I). The FDIC's 1983 actual premium net of rebates was 0.0714 percent (FDIC 1995, p. 109).

to measure the extent of regulatory control, his model did not show whether banks received a subsidy from deposit insurance.

Using banking financial data from 1989, Epps, Pulley, and Humphrey (1996) estimated deposit insurance premia that would be fair (neither excessive nor deficient) for a sample of large banks. They found that the median fair deposit insurance premium was 0.0107 percent of deposits (1.07 cents per \$100).<sup>7</sup> This figure compares to the FDIC's premium that year of 0.0833 percent of deposits (8.33 cents per \$100). The finding suggests that banks were significantly overcharged for deposit insurance.

More recently, Whalen (1997) developed from the options-pricing model various estimates of the mean and median fair premium using 1996 banking data and assuming various closure thresholds. The closure threshold is that particular magnitude of the ratio of a bank's market value of assets divided by the value of liabilities at which supervisors close problem institutions. A closure ratio of one means that supervisors close banks just when they become insolvent, in other words, when liabilities are equal to assets. A ratio of 0.90 means banks are closed when remaining assets amount to only 90 percent of liabilities. Given closure ratios from 1.0 to 0.90, Whalen's estimate of mean fair deposit insurance premium rises from near-zero up to 0.30 percent (30 cents per \$100). His estimates of the median are between zero and 0.04 percent. The actual FDIC premium for most banks in 1996 was zero, so that the fair deposit premium is also a measure of the deposit insurance subsidy. Consequently, Whalen's subsidy estimates range from zero to 30 basis points, depending on the closure threshold assumed. Overall, Whalen concludes that the subsidy is small.

In summary, the studies produce widely varying conclusions about whether, on average, banks receive a subsidy from deposit insurance. As noted in Gorton and Rosen (1995, p. 1379, footnote 8), "empirical research has not reached a consensus on whether deposit insurance is underpriced."

### ***Do the Riskiest Banks Receive a Subsidy?***

Until 1993, the FDIC charged banks an insurance premium that varied only with the amount of bank deposits, so that the premium was insensitive to bank riskiness. Under this flat premium system, if rates were set such that, on average, banks were neither overcharged nor undercharged, the riskiest banks were subsidized and the least-risky banks taxed. The options-pricing research cited above produced uniform empirical evidence that the riskiest banks received a deposit insurance subsidy during the era in which the FDIC charged flat premiums.

In response to the Federal Deposit Insurance Corporation Improvement Act of 1991 (FDICIA), at the beginning of 1993 the FDIC replaced its flat insurance

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<sup>7</sup> Median fair insurance premium from Epps, Pulley, and Humphrey (1996), Table 1, p. 713.

premium schedule with premia that vary with a particular estimate of bank risk. With the change, FDIC premia depend on two measures of bank soundness: bank capital and the bank's grade on its latest safety and soundness examination. Higher premia are charged to banks with weak capital and poor examination grades, while lower premia are charged to banks with strong capital and high examination grades. Nonetheless, when Epps, et al. ran tests using rates that vary with bank risk, similar to the way FDIC premiums varied beginning in 1993, the riskiest banks received a subsidy from deposit insurance.

### **Discount Window Access**

While deposit insurance is perhaps the most obvious possible means of subsidy, other potential means exist. One is loans from the Federal Reserve. Fed discount window loans might provide a subsidy in two ways. First, banks might be subsidized simply because the rate charged on discount window loans is too low. In fact, the rate on discount window loans is typically set below interest rates on other comparable loans. For example, on average, from 1986 through 1996, the Fed's discount rate was 75 basis points below the federal funds rate, the rate banks charge on overnight loans to each other.<sup>8</sup> Yet, a portion of the difference between the federal funds rate and the discount rate is consumed by nonprice costs that the Fed imposes on banks borrowing at the discount window (Goodfriend 1983, pp. 343–48; Mengle 1993, p. 27). Further, discount window loans are typically collateralized by low-risk assets, while fed funds loans are unsecured (Mengle 1993, pp. 25–26; Goodfriend and Whelpley 1993, p. 9). Nevertheless, some of the difference between the discount rate and the fed funds rate may remain as a subsidy available to banks from discount window loans.

Second, whether or not a bank borrows from the discount window, having access to the window is valuable. Every bank has the privilege to borrow from the Fed to cover liquidity difficulties. In effect, banks have a standing line of credit with the Fed. The line of credit is beneficial because a bank's creditors know that, in the event of bank liquidity difficulties, funding is available. Banks' creditors charge a lower rate of interest than they would without this assurance. While nonbanks typically must pay a fee to maintain the guarantee of available credit, the Fed imposes no similar fee.<sup>9</sup> The free guarantee provides a subsidy.

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<sup>8</sup> Average annual federal funds rates and discount rates (Board of Governors 1989, 1992, 1995, and 1998b, Table 1.35).

<sup>9</sup> According to a search of recent news stories in the financial press, fees for such credit lines range from 5 to 20 basis points of the dollar amount of loan commitment. See, for example, Dunaief (1997) or Goodwin (1994).

### Fedwire Overdrafts

Access to the Federal Reserve's Fedwire payments system is another possible source of subsidy. Specifically, by running daylight overdrafts, banks may be able to borrow at below-market rates.<sup>10</sup>

Fedwire operates through bank reserve accounts held at the Federal Reserve. By shifting funds from one bank's reserve account to another bank's reserve account, the Fed provides a means by which banks make payments among themselves. Yet, for a Fedwire transfer to take place, the sending bank need not have sufficient funds in its account to cover the transfer. Banks' reserve accounts are allowed to have a negative balance during the day (a daylight overdraft) so long as the deficit is made up by the close of business.<sup>11</sup> Additionally, the Fed's Regulation J specifies that the receiving bank is guaranteed payment regardless of whether the overdraft is ultimately covered by the sending bank. In effect, the Fed makes an intraday loan to the sending bank, which is used by the sending bank to make payment to the receiving bank until the sending bank's reserve account returns to a positive balance. The amount of the loan is measured by the size of the overdraft. Such loans are valuable to banks since they mean that banks can hold fewer excess reserves and that they can invest fewer resources in assuring that Fedwire payments match Fedwire receipts throughout the day (Mengle, Humphrey, and Summers 1987). Typically, the dollar amount of daylight overdrafts of all banks is quite large. For example, in 1996, daylight overdrafts averaged \$46 billion per day (Board of Governors 1997b, p. 206).

The interest rate the Fed charges for these loans, its daylight overdraft fee, was zero until 1994 and remains low compared to short-term loan rates such as the fed funds rate. For example, since late 1997 the rate in annual terms has been 27 basis points, meaning 0.27 percent. This compares to an average fed funds rate of 5.46 percent in 1997 (Board of Governors 1998a,

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<sup>10</sup> Fedwire access could grant banks a small subsidy by one other means. When A uses his bank account to effect a \$100 payment to B, four parties must fulfill payment obligations in order for B to receive the promised \$100: (1) A must place \$100 in his bank account, (2) A's bank must provide the Fed with \$100, (3) the Fed must shift the \$100 to B's bank, and (4) B's bank must deposit \$100 in B's account. When A makes a \$100 payment to B using an account at a nonbank, for example, A's checkable account with his mutual fund, one additional party is added to the list of those involved in the payment stream. That party is the nonbank. The nonbank must provide \$100 to its bank, which then passes it on to the Fed. The remaining steps of the process, from step 3 on, transpire as before. The additional step is necessary because nonbanks do not have direct access to Fedwire. Banks' direct access to Fedwire grants them a slight advantage when competing with nonbanks for transaction accounts. One party, which might fail to meet its payment obligation, is removed from the payment stream. If Fedwire fees fail to offset the advantage, banks are subsidized by direct Fedwire access.

<sup>11</sup> Since 1986, the Fed has placed limits on the dollar amount of a bank's daylight overdrafts. The limits are set based on the bank's capital and its own assessment of its creditworthiness (Hancock and Wilcox 1996, Board of Governors 1994, and Richards 1995).

p. A23). The much lower rate on daylight overdraft loans implies a significant subsidy.<sup>12,13</sup>

### **Too-Big-To-Fail**

Finally, a type of subsidy available to a limited number of banks is that which emerges from a government policy that treats certain large banks as being too-big-to-fail (TBTF). In the event that one of these banks becomes insolvent, an infusion of capital may prevent or delay its failure. While stockholders may suffer losses, uninsured depositors and creditors are likely to be protected. Because it is impossible to predict with certainty which banks might receive government aid, the TBTF policy constitutes an implicit, ambiguous guarantee that is difficult to measure and price. Clearly TBTF banks will pay lower interest rates to uninsured depositors and creditors than smaller banks that will not receive such treatment.

The TBTF policy is motivated by a concern that the failure of one of the country's largest banks will create widespread financial problems. The financial problems could include (1) the failure of other banks that hold deposits with the initial failing bank, (2) runs on other banks, or (3) the collapse of payments systems.<sup>14</sup>

The manner in which the FDIC handled the 1984 insolvency of Continental Illinois National Bank and Trust Company illustrates the use of the TBTF policy. Continental was the seventh largest U.S. bank, with assets of about \$41 billion. The FDIC arranged a TBTF-policy rescue for Continental because of fears that if the agency allowed losses on Continental's uninsured deposits, other banks and financial institutions might face serious financial difficulties. Specifically, 2,300 banks held uninsured correspondent balances with Continental. For some of these banks, balances were large relative to capital. Further, there was concern that other large, troubled banks might succumb to runs by their uninsured depositors if such depositors at Continental suffered losses.

Continental's problems came to light in 1982 when the bank began suffering large and growing loan losses. A significant portion of the losses were on energy industry loans sold to Continental by Penn Square Bank of Oklahoma City, a bank that failed in July 1982. By early 1984, Continental's nonperforming loans had reached \$2.3 billion. In early May of that year, following widely

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<sup>12</sup> See Mengle, Humphrey, and Summers (1987), pp. 3–14, for a discussion of various alternative methods that might be used to estimate the appropriate (nonsubsidizing) overdraft fee.

<sup>13</sup> Many Fedwire payments and therefore daylight overdrafts are motivated by the prohibition of interest payments on corporate demand deposits and of interest on required reserves held with the Fed. One might argue that overdrafts do not represent a subsidy since they occur as banks or their customers attempt to avoid costly regulations. Yet, given the existence of the regulations, the bank can lower its costs by overdrafting, so it receives a subsidy.

<sup>14</sup> The possible problems caused by a large bank's failure are discussed in Wall (1993).

reported rumors of its impending insolvency, the bank began suffering deposit withdrawals by large uninsured depositors. Within ten days, these withdrawals amounted to \$6 billion. Since insured deposits accounted for only about \$3 billion of Continental's funds, continued runs by uninsured depositors would quickly close it down.

On May 17, 1984, the FDIC, along with a group of major U.S. banks, provided interim assistance in the form of a \$2 billion infusion, allowing Continental to continue operations. In July 1984, the FDIC implemented a permanent plan for assistance: a new management team would be installed, the FDIC would inject \$1 billion in capital, as well as purchase bad loans with a face value of \$5.1 billion for \$3.5 billion, and the Federal Reserve and major private banks would arrange a continuation of credit lines. Although Continental's shareholders lost most of their equity, Continental's creditors and depositors, both insured and uninsured, were protected from loss.<sup>15</sup>

The Federal Deposit Insurance Corporation Improvement Act of 1991 (FDICIA) established requirements restricting the ability of bank supervisors to employ the TBTF policy.<sup>16</sup> The policy can still be employed, however. Section 141 of FDICIA requires the FDIC to determine and employ the least-costly resolution method. Further, this section of the act prohibits the FDIC, when resolving a troubled bank, from protecting uninsured depositors and the bank's other creditors if doing so adds to the expense of resolution. Yet, section 141 grants an exception to these rules. The exception is when the FDIC determines that resolving the troubled bank without protecting uninsured depositors or creditors would have serious effects on economic conditions or financial stability, that is, in cases where the bank essentially is deemed TBTF. Only when the FDIC's Board of Directors, the Board of Governors of the Federal Reserve, and the Secretary of the Treasury in consultation with the President agree to the TBTF exception is that determination allowed. Any decision to employ TBTF is to be reviewed by the General Accounting Office and once employed, the FDIC must recover its losses from a special assessment on insured banks. Furthermore, section 142 of the act restricts the ability of the Fed to delay closure of failing banks through discount window loans (Wall 1993; 12 U.S.C.A. 347b).

For large, low-risk banks the TBTF subsidy is by definition quite small. Interest rates that uninsured depositors and other creditors charge such banks will be only slightly lower due to TBTF backing. In contrast, a large risky bank, one likely to suffer solvency troubles in the near future, will receive large benefits in terms of lowered interest rates if uninsured depositors and creditors believe the bank may be deemed TBTF.

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<sup>15</sup> Background on Continental's rescue from FDIC (1984), pp. 3–6, Sprague (1986), pp. 109–212, and U.S. Congress (1985), pp. 163–97.

<sup>16</sup> See Wall (1993) for a description of TBTF under FDICIA.

### Offsetting Costs

Regulatory costs to banks may offset any subsidy provided by these four means. As a result, there may be little net subsidy to leak, or spill over, from the bank.

As discussed in Whalen (1997), estimates of regulatory costs are rough at best. Nevertheless, the available estimates tend to be large relative to estimates of banks' subsidy from deposit insurance (no estimates have been made of the size of other sources of banks' subsidy). According to Whalen's estimates, regulatory costs exceed the deposit insurance subsidy for most banks.

Still, the available estimates of regulatory costs, including those used by Whalen, fail to separate fixed from variable regulatory costs. As a result, no estimates of the size of variable regulatory costs exist. Yet, while it might appear that no subsidy is available to leak if total regulatory costs exceed the gross subsidy, only variable costs are important to a bank when it decides whether it benefits by passing subsidized funds on to affiliates. In deciding whether to take advantage of a subsidy (and whether to pass it on to an affiliate) banks should care little about fixed costs, since they already have incurred these costs and must bear them regardless of the banks' choices, other than the choice to stay in business. Yet, fixed costs may account for a significant portion of total regulatory costs, as suggested by evidence that small banks have higher ratios of regulatory costs to deposits than do large banks.<sup>17</sup> If fixed costs are a large proportion of total costs, then the deposit insurance subsidy may well exceed variable costs.<sup>18</sup>

In summary, for individual banks and for the banking industry as a whole, it is difficult to measure accurately both the subsidy and the offsetting regulatory costs. The reasons for the difficulty are that (1) there are several means by which banks are subsidized, (2) the amount of the subsidy a bank receives from any of these means tends to increase with bank risk, which varies from bank to bank and over time, and (3) bank risk is inherently difficult for outsiders to measure. As a result, regulators cannot be sure whether a net subsidy might spill over from banks. If shifting the subsidy to affiliates benefits banking companies, making such shifts (subsidy leakage) likely, and if subsidy leakage has adverse consequences, then costly regulatory efforts to contain the subsidy may be worthwhile.

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<sup>17</sup> For a review of studies on the compliance costs of banking regulation, see Eliehausen and Lowrey (1997).

<sup>18</sup> For further discussion of fixed versus variable regulatory costs, see Kwast and Passmore (1997).

## **2. BENEFITS TO BANKING ORGANIZATIONS FROM SHIFTING A SUBSIDY**

The FDIC bears a portion of the default risk of any bank loan. When a bank fails, the FDIC, as insurer of deposits, takes over the failed bank's assets and liabilities. Because banks share with the FDIC the risk of default on their loans, banks' expected risk-adjusted rate of return on loans is higher than it would be without FDIC deposit insurance. The lower a bank's capital, and the greater the riskiness of its loan portfolio, the greater the risk borne by the FDIC, and the greater the deposit insurance enhancement to the bank's expected returns on loans. Unless the bank's expected return enhancement is completely offset by the FDIC's deposit insurance premium or by tighter supervisory and regulatory restrictions, the bank receives a subsidy.

While the subsidy accrues directly to the bank as higher loan returns than those received by an unsubsidized lender, one might equivalently think of the subsidy as accruing in the form of reduced funding costs. In the absence of deposit insurance, depositors would demand that their interest rate include a risk premium to compensate them for the chance that the bank's assets might default, rendering the bank incapable of repaying depositors. If deposit insurance premia do not likewise compensate the FDIC for this risk, then the bank is paying too little for its deposits in interest plus insurance premium expenses.

Like the subsidy from deposit insurance, similar subsidies—from TBTF, from access to the discount window, and from the ability to borrow from the Fed using daylight overdrafts—also increase with bank risk. The greater a bank's riskiness, the greater its reduction in interest costs from these sources.

If banks receive a subsidy allowing them to raise funds at below-market rates, banking companies can benefit by passing the advantage on to their nonbank subsidiaries (either bank affiliates or direct bank subsidiaries). By passing the subsidy on to these subsidiaries, BHC profits can be enhanced as their subsidiaries' costs decline. Costs incurred by subsidiaries decline when subsidized sources of funds replace market-priced sources. This benefit gives banking companies a strong incentive to replace market-priced funding with subsidized funding, in other words, to shift the subsidy to nonbanks. An example illustrates the holding company's benefit.

Imagine that because of the various subsidy sources banks can purchase funds at an interest rate 1/4 percent (25 basis points) lower than rates available to nonbanks. Imagine further that a bank holding company, Profitable Bancorporation, Inc., owns First National Bank. First National has deposits of \$10 billion on which it pays 5.0 percent interest. Profitable has recently acquired a securities dealing company, Securities One, making the latter a Profitable subsidiary and First National's affiliate. Securities One funds its dealing activities with a \$100 million debt issue for which it pays the market interest rate of 5.25 percent. Profitable's management quickly realizes that if First National

were to raise an additional \$100 million, which it then lent to Securities One, the latter's borrowing costs would decline by \$250,000. As a result, Profitable's income would rise by this same amount.

### **3. WHY CONTAIN A SUBSIDY?**

Perhaps the most important reason for containing a subsidy is to prevent its enlargement. An enlarged subsidy means increased costs for taxpayers and greater misallocation of resources.

The aforementioned example shows that Profitable Bancorporation benefits as it enlarges its subsidy by funding its nonbank subsidiary with subsidized deposits. While Bancorporation gains, however, taxpayers lose. First National can borrow at below-market rates because its deposit insurance is underpriced relative to the risk imposed on the FDIC. So the cost to taxpayers, who ultimately back the FDIC, is the additional uncompensated risk they must bear for the \$100 million First National raised to fund Securities One.

Another reason for containing the subsidy is to prevent nonbank affiliates from gaining the competitive advantage that leakage could impart. Nonbank access to subsidized funding, either through loans from the bank, or through the bank's equity investment in the nonbank, grants the nonbank an advantage not available to competitors who are not bank affiliated. The advantage encourages the growth of bank affiliates at the expense of other firms. Growth because of access to a subsidy, rather than because of some market advantage, is likely to lead to misallocation of resources.

### **4. THE TRANSFER OF SUBSIDIES WITHIN BANKING ORGANIZATIONS**

There are three potential avenues through which intracompany subsidy transfers may occur: mispriced intracompany loans or asset purchases; dividend payments; and equity investments made at less than a market rate of return. In each case, existing or proposed regulations impose restrictions that tend to limit the opportunity for intracompany subsidy transfer.

#### **Intracompany Loans and Asset Purchases**

As discussed earlier, the most straightforward method by which a BHC might transfer funds is to have the bank lend its subsidized funds to its affiliate. Still, there are numerous less-direct means by which funds might be transferred. The bank might purchase assets, say, from its affiliate at greater-than-market prices. The difference between the market price of the purchased assets and the intracompany price paid can amount to a subsidized funds transfer from the bank to its affiliate.

Yet, statutory and regulatory restrictions limit the ability of banks to transfer subsidies through loans and asset purchases. For example, section 23A of the Federal Reserve Act places quantitative limits on a bank's transactions with its affiliates, including transactions such as loans to affiliates or asset purchases from them. Section 23B of the act specifies that such transactions must be made on market terms.<sup>19</sup> In 1996, the Comptroller of the Currency extended 23A and 23B beyond bank affiliates to bank subsidiaries as well (Comptroller of the Currency 1997, p. 25). Likewise, in 1997, the Fed proposed extending 23A and 23B to include subsidiaries.<sup>20</sup>

### **Dividends**

While 23A and 23B restrict banks in their ability to lend or otherwise pass on their low-cost, or subsidized, funds directly to affiliates, still other means remain available. Banks could pass along subsidized funding through dividend payments.<sup>21</sup> Here's how. A bank could gather funds at subsidized rates and pass them to its affiliates and subsidiaries by paying dividends to the parent BHC. The parent might then pass the funds on to bank affiliates and subsidiaries by purchasing debt of these entities or through equity investments in them. In this way funds raised at subsidized rates could leak out to affiliates and subsidiaries and be substituted by the affiliate for more expensive, unsubsidized funding sources.

Though banks are able to pass along dividend payments, the law does limit the amount of these payments to their parent holding companies. For example, except when regulators grant exemptions, dividends of national and state-member banks are limited to no more than the sum of the current year's profits plus the past two years' retained profits.<sup>22</sup> While these limits might somewhat restrict the efficacy of dividends as a means of subsidy transfer, they cannot completely forestall such use. For a bank that is larger than its affiliated nonbank, the sum of several years' profits may amount to a large portion of the nonbank's liabilities. Consequently, the bank could provide a significant share of the affiliate's funding.

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<sup>19</sup> See Walter (1996) for a discussion of sections 23A and 23B and their purposes.

<sup>20</sup> The Fed proposal would define a bank subsidiary as an affiliate if the subsidiary is engaged in activities not permissible to the bank, in other words, nonbanking activities. Consequently, the same transaction limits that apply to bank affiliates would also apply to bank subsidiaries.

<sup>21</sup> Comptroller of the Currency Ludwig mentions bank dividend payments as a possible means of subsidy leakage in his statement on July 17, 1997 (Ludwig 1997). Also see Williams (1997).

<sup>22</sup> Board of Governors 1997a, section 4070.1.

**Equity Investments of Banks in Direct Subsidiaries**

Equity invested by a bank in its subsidiary, like intracompany loans, provides another vehicle for shifting banks' subsidized funds to the nonbank. By doing so, the BHC increases its subsidy.

Proposals that would allow nonbanking activities in BHC subsidiaries only, and prohibit them in bank subsidiaries, would largely exclude subsidy transfers via equity investment. Transfers are excluded because section 23A of the Federal Reserve Act allows banks to make only very limited equity investments in their holding company affiliates.

The Office of the Comptroller of the Currency (OCC) has implemented another method of preventing subsidized funds from passing through to nonbanks. For new nonbanking activities conducted in bank subsidiaries, the OCC requires that all equity invested by banks in subsidiaries be deducted from bank capital when calculating minimum capital requirements (Comptroller of the Currency 1997, p. 25). Ultimately, this means that, at least for banks with binding regulatory capital constraints, each dollar invested as equity in its subsidiary must come from corresponding equity invested in the bank by its stockholders. Since stockholders are not typically protected from loss by the safety net, they receive no subsidy that might be transferred to the bank.

Nevertheless, given the OCC's requirement, a subsidy might yet flow through bank equity investments in nonbank subsidiaries. Stockholders may come out better when a TBTF bank is rescued than if the bank is allowed to fail. Therefore they demand a lower rate of return from the TBTF bank. The result is that equity invested in the bank and passed on to the nonbank carries some subsidy. When the nonbank is owned by a BHC instead of a bank, equity is not funneled through the bank first, so it is granted no TBTF protection. For this reason the BHC structure may provide a somewhat tighter seal against subsidy leakage.

**5. THE ULTIMATE BENEFICIARIES OF A SAFETY NET SUBSIDY**

A fundamental point about a safety net subsidy to banks is that its incidence will be determined by conditions in the markets for bank loans and deposits. That is to say, competition among banks will tend to make borrowers and depositors (whether businesses or individuals) the ultimate beneficiaries of any safety net subsidy. The idea is that a per-dollar subsidy would have the effect of lowering the marginal cost of bank loans. And competition among banks would tend to induce them to pass this cost savings along. Even if restrictions on intracompany transactions and BHC structures succeed in preventing the transfer of a subsidy within a banking organization, competitive pressure will

tend to dissipate a subsidy in broader markets and will cause the subsidy to be enlarged.

To the extent that banking markets are imperfectly competitive, banks may capture some of the subsidy. But even in this case, the subsidy would be contained not by restrictions on intracompany transactions and structures but by the market power of banks. The following discussion focuses on the perfectly competitive case, using Figure 1 to show how supply and demand conditions in banking markets determine the size of the bank safety net subsidy in equilibrium and its distribution between bank borrowers and depositors.

A per-dollar-of-deposits safety net subsidy is equivalent to a negative sales (or ad valorem) tax.<sup>23</sup> One can analyze the effects of a safety net subsidy by applying a figure frequently used to analyze the effects of taxation.<sup>24</sup>

Figure 1 plots supply and demand conditions for a perfectly competitive banking industry. The horizontal axis measures the quantity of bank loans as well as the quantity of loanable funds that banks raise. The vertical axis measures the interest rate banks charge for loans and the per-dollar cost to banks of raising loanable funds. Banks' marginal cost of funds increases as they pay higher interest rates to attract more funds from depositors, leading to an upward sloping cost curve as depicted by MC. Banks' marginal cost depends not only on the interest rate they pay depositors but on other costs, such as deposit insurance premia, employees' salaries, and operating expenses. Borrowers' demand curve for loans is LD. The curve is downward sloping since borrowers will demand a larger quantity of loans as the loan interest rate declines. In competitive equilibrium the market price and quantity produced of a good are determined where the industry marginal cost curve (its supply curve) intersects the industry demand curve.<sup>25</sup>

Without a subsidy, the equilibrium is at point A. As noted earlier, there is no subsidy when fees and regulatory restrictions associated with the safety net are set just right. The introduction of a subsidy would shift banks' marginal cost curve down to MC' by a vertical distance equal to the amount of the subsidy, the distance between points A and C.

At the initial loan rate ( $I^*$ ) and quantity of loans ( $Q^*$ ) made by banks, the subsidy to the industry is the rectangle with height AC and length  $Q^*$ ; and the entire subsidy is contained within banks. However, this loan rate/loan quantity combination is not an equilibrium because the marginal revenue from a loan

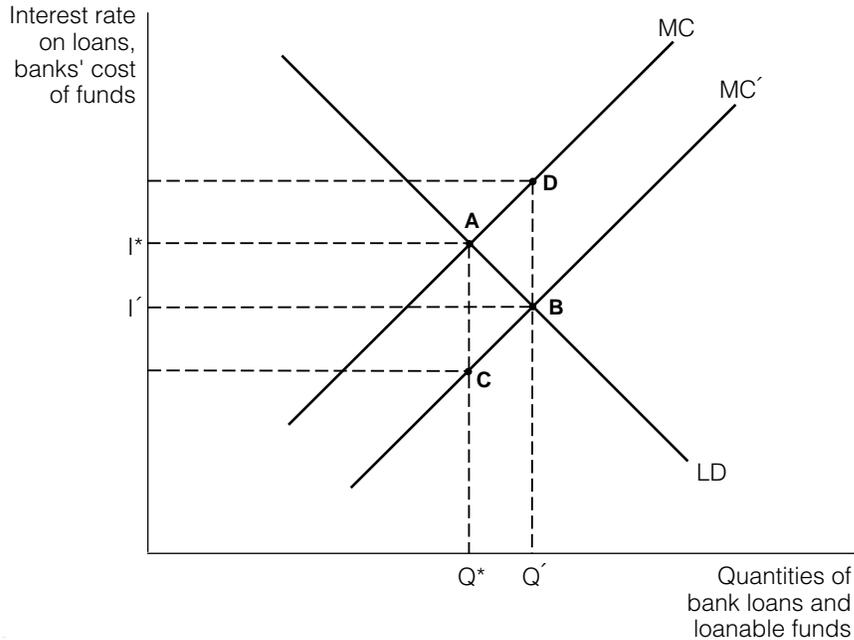
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<sup>23</sup> For a discussion of tax incidence in the context of banking, see Fama (1985).

<sup>24</sup> See Henderson and Quandt (1971), pp. 124–26, and Hirshleifer (1976), pp. 31–33, for discussions of the effects of taxation.

<sup>25</sup> Firms produce only when price is greater than or equal to average variable cost, so the only relevant portion of the marginal cost curve is at or above the average cost curve. When price is below average variable cost, each transaction produces a loss, and firms exit the industry. In the long run an industry's competitive equilibrium will occur where marginal and average costs equal price.

**Figure 1 Effects of a Subsidy**



exceeds its marginal cost, and each bank will see an opportunity to expand its profits by making more loans. As banks compete to make additional loans, they will bid down the loan interest rate, causing the subsidy to leak to borrowers. Further, banks must gather more deposits in order to add loans. To obtain more deposits, interest rates on deposits must increase, causing the subsidy to leak to depositors also. Ultimately competition will tend to move the banking industry to an equilibrium at point B where the loan interest rate equals the marginal cost of funds. At point B, competition among banks has caused the subsidy to be transferred completely to borrowers and depositors.

Competition among banks not only transfers the subsidy but also causes subsidy enlargement and thereby increased taxpayer exposure. In the new equilibrium at point B, the subsidy is the rectangle with height DB and length Q'. Since DB equals AC, and Q' is greater than Q\*, the subsidy has been enlarged.

The extent of the enlargement depends on the interest elasticity of loan demand and the sensitivity of marginal cost with respect to the quantity of loans made. An interest elastic curve is one for which a small change in the interest rate leads to a large change in quantity, so that when plotted as in the

figure, an elastic curve will be close to horizontal. Interest elasticity generally increases as the availability of substitutes increases. Take, for example, the demand curve for bank loans. If borrowers enjoy an array of good nonbank substitutes, the loan demand curve will be interest elastic. With nonbanks offering good substitutes for bank loans, banks will lose many loan customers to nonbanks if they raise loan rates slightly. Likewise, banks may capture a large quantity of loan business from their many nonbank competitors by lowering their interest rates slightly below those of nonbank competitors. In such an environment a subsidy's downward shift of the MC curve, leading banks to drop loan interest rates, induces a large increase in the quantity of subsidized loans. Similarly, with an elastic (relatively flat) MC curve, meaning an MC with little upward slope, the subsidy will cause an almost one-for-one decline in the interest rate on loans so that the quantity of subsidized loans will increase significantly.

In recent decades bank customers gained expanded access to substitutes for bank loans and for bank deposits. As a result, both MC and LD curves are likely to have become more elastic. While regulatory efforts may have limited any safety net subsidy that might accrue to banking, in an environment of elastic MC and LD curves, any subsidy that may remain will tend to be augmented as banks compete to enlarge subsidized lending.

The figure not only illustrates the determination of the ultimate size of any safety net subsidy, but also can be used to identify the group to which the subsidy will tend to flow. The group of bank customers, either borrowers or depositors, with the least elastic curve will receive the greatest interest rate benefit from any subsidy leakage. For example, if the demand for loans is fairly interest inelastic, and the MC curve is elastic, then any downward shift in the MC curve due to a subsidy will produce a large decline in the interest rate charged to borrowers and little increase in rates paid to depositors. On the other hand, if the MC curve is inelastic, most of the subsidy will flow to depositors.

Banking observers have long noted that small business borrowers may have few substitutes for bank loans. For this reason small business borrowers are sometimes called "bank-dependent." As such, the demand curve for small business loans might be expected to be fairly inelastic. Other borrowers and most depositors are likely to have more elastic curves given the presence of wide nonbank deposit substitutes. Consequently, banks may distribute subsidies more than proportionally toward their small business loan customers.<sup>26</sup>

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<sup>26</sup> A greater-than-proportional share of the subsidy can flow to a class of borrowers only if banks are able to segment their borrowers and charge different rates to each group.

## 6. CONCLUSION

Restrictions on intracompany transactions and requirements that limit nonbanking activities solely to holding company subsidiaries may effectively prevent a bank safety net subsidy from leaking to affiliates and subsidiaries. Nevertheless, banks operating in competitive markets may have little choice but to shift a subsidy to individual or business borrowers and depositors. So, if containing a subsidy is inherently difficult, it is particularly important that regulators limit the amount of any subsidy initially granted to banks. In practice, a bank safety net subsidy would go primarily to poorly capitalized banks. The best way to limit a subsidy is to subject the lending activities of poorly capitalized banks to close supervision and regulation. Unfortunately, it is more difficult and costly to closely supervise undercapitalized banks than to restrict certain types of transactions or affiliations. Still, a subsidy may be necessary to guard against systemic risk in banking. If so, then we should understand that the subsidy cannot be contained in the bank.

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## REFERENCES

- Board of Governors of the Federal Reserve System. *Federal Reserve Bulletin*, vol. 84 (March 1998a), p. A23.
- \_\_\_\_\_. *Federal Reserve Bulletin*, vol. 84 (January 1998b), p. A23.
- \_\_\_\_\_. *Commercial Bank Examination Manual*. Washington: Board of Governors, 1997a.
- \_\_\_\_\_. "Announcements," *Federal Reserve Bulletin*, vol. 83 (March 1997b), p. 206.
- \_\_\_\_\_. *Federal Reserve Bulletin*, vol. 81 (January 1995), p. A26.
- \_\_\_\_\_. *Guide to the Federal Reserve's Payments System Risk Policy*. Washington: Board of Governors, June 1994.
- \_\_\_\_\_. *Federal Reserve Bulletin*, vol. 78 (January 1992), p. A24.
- \_\_\_\_\_. *Federal Reserve Bulletin*, vol. 75 (January 1989), p. A24.
- Comptroller of the Currency. "Decision of the Comptroller of the Currency on the Application by Zions National Bank To Commence New Activities in an Operating Subsidiary." Washington: Office of the Comptroller of the Currency, December 11, 1997.
- Dunaief, Daniel. "Chase, Morgan, Citi Leading A \$1.2 Billion Loan for Honeywell," *American Banker*, March 17, 1997.

- Elliehausen, Gregory, and Barbara R. Lowrey. "The Cost of Implementing Consumer Financial Regulations: An Analysis of Experience with the Truth in Savings Act," Staff Study. Washington: Board of Governors of the Federal Reserve System, December 1997.
- Epps, T. W., Lawrence B. Pulley, and David B. Humphrey. "Assessing the FDIC's Premium and Examination Policies Using 'Soviet' Put Options," *Journal of Banking and Finance*, vol. 20 (May 1996), pp. 699–721.
- Fama, Eugene F. "What's Different about Banks?" *Journal of Monetary Economics*, vol. 15 (January 1985), pp. 29–39.
- Federal Deposit Insurance Corporation. *Annual Report*, 1995.
- \_\_\_\_\_. *Annual Report*, 1984.
- Furlong, Frederick. "Federal Subsidies in Banking: The Link to Financial Modernization," Federal Reserve Bank of San Francisco *Economic Letter*, No. 97–31 (October 24, 1997).
- Goodfriend, Marvin. "Discount Window Borrowing, Monetary Policy, and the Post–October 6, 1979 Federal Reserve Operating Procedure," *Journal of Monetary Economics*, vol. 12 (September 1983), pp. 343–56.
- \_\_\_\_\_, and William Whelpley. "Federal Funds," in Timothy Q. Cook and Robert K. LaRoche, eds., *Instruments of the Money Market*. Richmond: Federal Reserve Bank of Richmond, 1993.
- Goodwin, William. "Deals: Socal Edison Combining 18 Credit Lines into 1," *American Banker*, July 6, 1994.
- Gorton, Gary, and Richard Rosen. "Corporate Control, Portfolio Choice, and the Decline of Banking," *Journal of Finance*, vol. 50 (December 1995), pp. 1377–1420.
- Greenspan, Alan. Statement before the Subcommittee on Financial Institutions and Consumer Credit of the Committee on Banking and Financial Services of the U.S. House of Representatives, February 13, 1997.
- Hancock, Diana, and James A. Wilcox. "Intraday Management of Bank Reserves: The Effects of Caps and Fees on Daylight Overdrafts," *Journal of Money, Credit, and Banking*, vol. 28 (November 1996, Part 2), pp. 870–908.
- Helfer, Ricki. Testimony before the Subcommittee on Capital Markets, Securities and Government-Sponsored Enterprises of the Committee on Banking and Financial Services of the U.S. House of Representatives, March 5, 1997.
- Henderson, James M., and Richard E. Quandt. *Microeconomic Theory: A Mathematical Approach*. New York: McGraw-Hill Book Company, 1971.
- Hirshleifer, Jack. *Price Theory and Applications*. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1976.

- Kwast, Myron L., and S. Wayne Passmore. "The Subsidy Provided by the Federal Safety Net: Theory, Measurement and Containment." Finance and Economics Discussion Series. Washington: Board of Governors of the Federal Reserve System, Division of Research and Statistics and Monetary Affairs, December 1997.
- Lacker, Jeffrey M., and John A. Weinberg. "Takeovers and Stock Price Volatility," Federal Reserve Bank of Richmond *Economic Review*, vol. 76 (March/April 1990), pp. 29–44.
- Ludwig, Eugene A. Testimony before the Subcommittee on Finance and Hazardous Materials of the Committee on Commerce of the U.S. House of Representatives, July 17, 1997.
- Marcus, Alan J., and Israel Shaked. "The Valuation of FDIC Deposit Insurance Using Option-pricing Estimates," *Journal of Money, Credit, and Banking*, vol. 16 (November 1984, Part 1), pp. 446–60.
- Mengle, David L. "The Discount Window," in Timothy Q. Cook and Robert K. LaRoche, eds., *Instruments of the Money Market*. Richmond: Federal Reserve Bank of Richmond, 1993.
- \_\_\_\_\_, David B. Humphrey, and Bruce J. Summers, "Intraday Credit: Risk, Value, and Pricing," Federal Reserve Bank of Richmond *Economic Review*, vol. 73 (January/February 1987), pp. 3–14.
- Merton, Robert C. "An Analytic Derivation of the Cost of Deposit Insurance and Loan Guarantees: An Application of Modern Option Pricing Theory," *Journal of Banking and Finance*, vol. 1 (June 1977), pp. 3–11.
- Pennachi, George G. "A Reexamination of the Over- (or Under-) Pricing of Deposit Insurance," *Journal of Money, Credit, and Banking*, vol. 19 (August 1987), pp. 340–60.
- Richards, Heidi Willmann. "Daylight Overdraft Fees and the Federal Reserve's Payment System Risk Policy," *Federal Reserve Bulletin*, vol. 81 (December 1995), pp. 1065–77.
- Ronn, Ehud I., and Avinash K. Verma. "Pricing Risk-Adjusted Deposit Insurance: An Option-Based Model," *Journal of Finance*, vol. 16 (September 1986), pp. 871–95.
- Sprague, Irvine H. *Bailout: An Insider's Account of Bank Failures and Rescues*. New York: Basic Books, Inc., 1986.
- United States Code Annotated: Title 12, Banks and Banking*. St. Paul, Minn.: West Group, 1998.
- U.S. Congress. "Continental Illinois National Bank: Report of an Inquiry into Its Federal Supervision and Assistance." Staff Report to the House Subcommittee on Financial Institutions Supervision, Regulation and Insurance of the Committee on Banking, Finance and Urban Affairs, 99 Cong. 1 Sess., 1985.

Wall, Larry D. "Too-Big-To-Fail after FDICIA," Federal Reserve Bank of Atlanta *Economic Review*, vol. 78 (January/February 1993), pp. 1–14.

Walter, John R. "Firewalls," Federal Reserve Bank of Richmond *Economic Quarterly*, vol. 82 (Fall 1996), pp. 15–39.

Whalen, Gary. "The Competitive Implications of Safety Net-Related Subsidies," Office of the Comptroller of the Currency Economics Working Paper 97–9. May 1997.

Williams, Julie L. Remarks before the American Enterprise Institute for Public Policy Research, Washington, March 26, 1997.

# Arthur Burns and Inflation

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Robert L. Hetzel

Arthur Burns, Chairman of the Federal Open Market Committee (FOMC) of the Federal Reserve System (the Fed) from February 1970 until December 1977, was fiercely opposed to inflation. For the public, and especially for the business community, Burns embodied opposition to inflation. Nevertheless, during his tenure as head of the Fed, high rates of inflation became a pervasive fact of American life. How could that have happened?

The puzzle is especially striking as Burns became Chairman with an extraordinarily distinguished background as an economist. He had been president of the American Economics Association and had headed the prestigious National Bureau of Economic Research (NBER) since the late 1940s. As head of the NBER, Burns gained worldwide recognition as the leading scholar of the business cycle. Based on his work on the business cycle, he concluded that inflation itself sets in train forces that cause recession. As an economist, how did Burns think? How did he shape the data he studied into a coherent view of the world—a view that could lead him far away from the control of inflation?

## 1. EXPLAINING MONETARY POLICY

To explain monetary policy, one requires more than an understanding of the views of the Chairman of the FOMC. One must understand the general political and intellectual environment of the time as well. If Burns had been Chairman in another era, say, in the 1950s or 1990s, the environment, and therefore monetary policy, would have been quite different. So to attribute the inflation of the first part of the 1970s solely to Burns's leadership is wrong.

Monetary policy under Burns's FOMC was never as expansionary as vocal congressmen urged and, through 1972, was less expansionary than the Nixon Administration desired. In fact, throughout his tenure, monetary policy

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■ The views expressed herein are the author's and do not necessarily represent the views of the Federal Reserve Bank of Richmond or the Federal Reserve System.

was consistently less expansionary than desired by Keynesian economists, who represented mainstream economics. Indeed, at the time, Fed economists joked that policy must be on track because it was more expansionary than monetarists desired but more restrictive than Keynesians desired. The inflation of the 1970s represented the failure of an experiment with activist economic policy that enjoyed widespread popular and professional support. Burns was part of a political, intellectual, and popular environment that expected government to control the economy.

In the early 1970s, the political system and the economics profession agreed that 4 percent was a normal rate of unemployment. Both the political system and a majority in the economics profession accepted that the government was responsible for keeping the unemployment rate to 4 percent or less through activist monetary and fiscal policy. Burns accepted this consensus view. And he added a sense of urgency to it. At the time, the United States was riven by the socially divisive issues of race and the Vietnam War. When the unemployment rate rose in 1970 to 6 percent, Burns believed that the country needed a combination of policies that would simultaneously restore price stability and full employment.

In November 1970, the minutes of the Board of Governors show Burns telling the Board (Board *Minutes*, 11/6/70, pp. 3115–17) that

. . . prospects were dim for any easing of the cost-push inflation generated by union demands. However, the Federal Reserve could not do anything about those influences except to impose monetary restraint, and he did not believe the country was willing to accept for any long period an unemployment rate in the area of 6 percent. Therefore, he believed that the Federal Reserve should not take on the responsibility for attempting to accomplish by itself, under its existing powers, a reduction in the rate of inflation to, say, 2 percent. . . . he did not believe that the Federal Reserve should be expected to cope with inflation single-handedly. The only effective answer, in his opinion, lay in some form of incomes policy.

(The term “incomes policy” is a catchall expression for various forms of direct intervention by the government to control prices.) Those comments reflected a reading of the domestic situation that was particular to the time. Again, a different time would have yielded a different monetary policy.

To blame the inflation of the 1970s on an individual or on a group of individuals is too facile. At the same time, monetary scholars can still learn from the mistakes of individuals—in this case, they can comprehend how Burns understood the world as an economist. By doing so, they can put into place a piece of a larger puzzle, which when completed explains the inflation of the early 1970s.

Attributing policy failures to personal failures is a mistake that keeps one from learning. In this respect, it is helpful to view the high inflation of the 1970s as part of a learning process. The current consensus that central banks

are responsible for inflation would have been impossible to establish in the intellectual environment of the 1970s. However, the “learning” view itself is incomplete. It does not explain why inflation was low in the 1950s. Presumably the state of economics was not more enlightened in the ’50s than in the ’70s. Also, experience in itself does not make people wise. Economists need to examine and learn from historical experience to avoid repetition of mistakes.

Economists use models to learn about the world and to explain how it works. A model imposes a discipline by forcing the economist to explain cause and effect relationships within a framework that yields testable implications. When experience falsifies those implications, the economist must return to the model and examine its failures. The economist cannot “explain” the model’s failure to predict by assuming that the world’s underlying economic structure changes in an ongoing, unpredictable way. The evidence from Burns’s own words shows that he did not use such a model to predict inflation and, consequently, failed to learn from the inflationary experience of the 1960s and 1970s.

How did Burns view macroeconomic policy as an economist? Most generally, Burns had a credit view of monetary policy. That is, monetary policy worked through its influence on the credit market. However, monetary policy was only one factor affecting credit markets. At times, in its influence on inflation, monetary policy could be overwhelmed by other factors. More specifically, Burns had a real or nonmonetary view of inflation. That is, inflation could arise from a variety of sources other than just money. He believed that a central bank could cause inflation by monetizing government deficits but did not attribute inflation to that source in the early 1970s. Instead, he attributed it to the exercise of monopoly power by unions and large corporations.

If conventional monetary policy weapons were powerless to deal with these forces, then perhaps direct controls might work. Accordingly, President Nixon imposed wage and price controls August 15, 1971. The experience with such constraints offered a tailor-made experiment of Burns’s views. The controls worked as intended in that they held down wage growth and the price increases of large corporations (see Kesters [1975]). Nevertheless, inflation rose to double digits by the end of 1973. So Burns attributed inflation to special factors, such as increases in food prices due to poor harvests and in oil prices due to the restriction of oil production. However, special factors are by nature one-time events. In 1974, inflation should have fallen as the effect of these one-time events dissipated, but it remained at double-digit levels that year. Burns then blamed inflation on government deficits. Although those deficits were small in 1973 and 1974, Burns was able to make them look larger by adding in the lending of government-sponsored enterprises like the Federal National Mortgage Association.

For Burns, the source of inflation changed regularly. He believed this view only reflected the complexity of a changing world. As a consequence, he did

not have a model of inflation that could be contradicted by experience. Where did his views as an economist originate? They came most importantly from Wesley Clair Mitchell.

## 2. WESLEY CLAIR MITCHELL

To understand Arthur Burns, it is necessary to see him as standing astride two worlds in economics: an earlier American institutionalism and the now-dominant neoclassical school. Burns was the protégé of the American institutionalist and founder of the NBER, Wesley Clair Mitchell. While working on his Ph.D. at Columbia in 1930, he attracted Mitchell's attention. Burns became Mitchell's student and, later, his collaborator. In 1946, they published a comprehensive study of the business cycle, *Measuring Business Cycles*. A year before, when Mitchell retired, Burns had become director of research of the NBER. Both achieved worldwide recognition as preeminent scholars of the business cycle. In his thinking about the business cycle, Burns was greatly influenced by Mitchell's views.

As a student at the University of Chicago in the 1890s, Mitchell studied under Thorstein Veblen, John Dewey, and the anti-quantity theorists, J. Laurence Laughlin and Adolph Miller. Miller, who became one of the original members of the Board of Governors of the Federal Reserve System, was the staunchest defender of the real bills doctrine in the 1920s and 1930s. (According to the real bills doctrine, central banks maintain price stability by preventing the speculative extension of credit, not by controlling the quantity of money.)

Mitchell, an anti-quantity theorist himself, attacked the quantity theory in his book *History of the Greenbacks*. He observed that the gold value of greenbacks—the North's paper currency—fluctuated with the military fortunes of the North and concluded that their value depended not on the quantity in circulation, but rather on the probability that the North would redeem them in gold (Burns [1949] 1954). In this work, Mitchell first developed his central idea that business cycle dynamics derive from lags in the adjustment of prices of different classes of goods and factors of production and the effects of those lags on business profits. Goods prices rise faster than wages in economic recoveries but more slowly later on. The temporal lags in the adjustment of prices originate in institutional arrangements.

The resulting rise in profits in economic recoveries spurs investment. Later, a fall in profits depresses investment. Such profit variations cause cyclical fluctuations in economic activity by influencing the psychology of the businessman (Burns [1949] 1954). The business cycle is a self-propelling pattern of economic activity where the imbalances of one stage produce corrective forces that ultimately become the imbalances of the next stage. However, changes in

institutional arrangements mean that the nature of the cycle changes over time. Burns (1952, pp. 24–25) wrote of Mitchell's views:

The "system" rests on the proposition that the ebb and flow of activity depends on the prospects of profits. . . . As prosperity cumulates, costs in many lines of activity encroach upon selling prices, money markets become strained, and numerous investment projects are set aside until costs of financing seem more favorable; these accumulating stresses within the system of business enterprise lead to a recession of activity, which spreads over the economy and for a time gathers force; but the realignment of costs and prices, reduction of inventories, improvements of bank reserves, and other developments gradually pave the way for a renewed expansion of activity. Each phase of the business cycle evolves into its successor, while economic organization itself gradually undergoes cumulative changes. Hence, Mitchell believed, "it is probable that the economists of each generation will see reason to recast the theory of business cycles which they learned in their youth."

Mitchell assumed that government intervention is at times necessary to keep the imbalances of the business cycle from cumulating into a major depression or inflation. Burns wrote that Mitchell "repeatedly pointed to the shortcomings of our economic organization," a system which he found "defective" because it had "no effective means of checking depressions." Mitchell, he noted, eagerly followed "our own modest efforts at economic planning" under the aegis of the Council of Economic Advisers (Burns 1952, p. 48).

Burns praised Mitchell's description of the business cycle as having, better than all rival descriptions, passed "the practical test of accounting for actual business experience." He cited Mitchell's unsurpassed skill in tracing "the interlacing and readjustment of economic activities" as "one stage of the business cycle gradually evolves into the next" (Burns [1949] 1954, p. 81).

### **3. BURNS AS BOARD DIRECTOR AND POLICY ADVISER**

Burns's position as head of the NBER supplied him with a name recognition that led to appointments on numerous corporate boards of directors. "As director [of the NBER], Burns . . . was thrust into close contact with the business tycoons, the labor leaders and the foundation chairmen who served on the Bureau's board of directors. . . . He was now not only an eminent scholar, but a friend of people who had access to high places" (Viorst 1969, p. 126). Burns believed that his insights into the psychology of the businessman endowed him with an ability to understand the dynamic behind the business cycle.

After President Eisenhower took office in 1953, he made Burns head of the Council of Economic Advisers (CEA), which had fallen into disrepute as a consequence of the partisanship and advocacy of central planning by Truman's chairman, Leon Keyserling. Burns saved the CEA from extinction by a Congress which could have ended its funding. Burns, who took naturally to the

role of counselor to the President, said “he could feel himself coming down with ‘Potomac fever,’ becoming attached to the bustle of government crisis, being infected with a sense of his own importance” (Viorst 1969, p. 32).

Burns characterized his relationship with Eisenhower as “an extraordinary personal as well as professional friendship” (Hargrove and Morley 1984, p. 95). In their first meeting, Burns showed Eisenhower a set of graphs tracing the growth of government over time. Burns commented later that the President was so deeply interested that he arranged to give Burns a weekly appointment of a full hour with him (Hargrove and Morley 1984, p. 98).

Burns obviously relished the battles he won as head of the CEA through his personal influence with the President (Hargrove and Morley 1984, pp. 108–09):

I stayed in the office till 8:00 or so, then came home, had a late dinner, rested for an hour, and by 10:00 or 11:00 I would start working on the text of the [Economic Report of the President]. I stayed at it until around 3:00, 4:00 or 5:00 in the morning. . . . I got a phone call from George Humphrey [Secretary of the Treasury], who called the report “socialistic” and wanted it scrapped. . . . Finally the day arrived . . . when I was to submit the Economic Report for review by the Cabinet. . . . After I had summarized the report to the Cabinet, he [Nixon] spoke up and said, “It is a beautiful report. It gives the Republican administration a philosophy that it has lacked.” . . . Then Eisenhower thanked me for the report and said, “Arthur, what you presented here is of course a summary. . . . I want to read the report in its entirety. . . .” I got one of the most beautiful letters I have ever had from anyone, from Eisenhower . . . praising the report. . . . I made no effort to conceal my feelings, and for a time—when I saw Humphrey—I just looked the other way. . . . The trouble with Humphrey was that he didn’t know where his knowledge stopped and his opinions began.

Burns’s influence was significant in Washington, mostly because of his work on leading indicators done at the NBER and his ability to use them to predict economic activity, especially recessions (Hargrove and Morley 1984, p. 116):

I had warned Eisenhower, back in 1953, that a recession was developing. Once it became a matter of serious governmental concern, he said to me, “Arthur, you are my chief of staff in handling the recession. You are to report every week at a Cabinet meeting on where we are going and what we ought to be doing.” I remember him saying with enthusiasm . . . “Arthur, what a chief of staff you would have made during the war.” To Eisenhower, that was probably the highest compliment he could pay—he was a military man.

Fifteen years later, Nixon, who, like Eisenhower, recognized Burns’s expertise, asked him to become an adviser during Nixon’s 1968 presidential campaign. Upon assuming the presidency, Nixon put Burns in charge of development of the agenda for domestic legislation.

#### 4. BURNS'S VIEW OF THE BUSINESS CYCLE

As a microeconomist, Burns employed the tools of neoclassical price theory. As a macroeconomist, he largely ignored the working of the price system as a coordinating mechanism. Instead, he relied on the empirical regularities he derived from examining the cyclical behavior of a large number of statistical series. Burns believed he could integrate a vast variety of empirical observations about the business cycle using his knowledge of human psychology, while retaining an awareness of what is unique about each cycle (Viorst 1969, p. 123):

I suspect that some of my colleagues are unduly fascinated by economic instruments and have given insufficient attention to the workings of the business mind of America. I weigh that heavily in questions of policy. . . . before I judge whether some proposal is good or bad, I ask how the businessman is going to react. I've studied the businessman of America. He has his strengths and he has his weaknesses, but it is within the framework of his psychology that the economist in America must operate. . . . The well-being of the country . . . depends upon the favorable expectations of the investing class. . . . As I see it, the role of Government must be to shape policy to improve these expectations.

Like most other economists who came of age in the Depression, Burns held conventional views about the need to manage the economy (Burns 1973, pp. 792–93, and Burns [1946] 1954, p. 4, respectively):

Our economy is inherently unstable. . . . experience has demonstrated repeatedly that blind reliance on the self-correcting properties of our economic system can lead to serious trouble. . . . Flexible fiscal and monetary policies, therefore, are often needed to cope with undesirable economic developments.

The principal practical problem of our generation is the maintenance of employment, and it has now become—as it long should have been—the principal problem of economic theory.

Although Burns's views on the need to manage the economy were conventional, his views on *how* to manage it were unconventional, stressing the confidence of the businessman.

Burns organized his explanation of cyclical movements in economic activity around an extraordinarily detailed knowledge of the interrelationships among economic time series. He knew an overwhelming amount of detail about the business cycle. Such detail he had gleaned from his examination of the timing relationships between specific cycles of individual sectors and the general reference cycle. In his words, the business cycle is a “consensus of specific cycles” (Burns [1950] 1954, p. 111). Burns explained the cycle as a natural accumulation of imbalances that cause economic recoveries to turn into recessions. Those imbalances develop from the way costs overtake prices and depress profits (Burns [1950] 1954, pp. 127–28):

. . . as prosperity cumulates, unit costs tend to mount for business firms generally; and since in many instances selling prices cannot be raised, profit margins here and there will narrow. . . . Errors pile up as mounting optimism warps the judgment of an increasing number of businessmen concerning the sales that can be made at profitable prices.

Burns gave life to his factual descriptions of timing relationships over the cycle with descriptions of the subjective state of mind of key groups in the economy—consumers, workers, and businessmen. Alternating mood swings of the consumer and businessman drive the process of moving from recovery to recession. During expansion phases “firms will find their profit margins rising handsomely” and “people [have] a feeling of confidence about the economic future—a mood that may gradually change from optimism to exuberance. . . . The new spirit of enterprise fosters more new projects” (Burns 1969, pp. 27–28). However, rising costs erode profit margins and eventually turn expansion into contraction. Also, “overstocking and overbuilding . . . are likely to be bunched when enthusiasm has infected a large and widening circle of businessmen.” [then] “The stubborn human trait of optimism begins to give way. . . . Once many men begin to lose faith in themselves or in the institutions of their society, full recovery may need to wait on substantial innovations or an actual reduction in the stock of fixed capital” (Burns 1969, pp. 33, 41).

Generally, in recessions, the reversal of imbalances leads to a recovery. However, if such imbalances are not corrected, the economy may enter into a downward spiral leading to a depression. One could gain some idea of how eclectic Burns’s (1969, p. 36) explanation for business cycles is from his discussion of how such a spiral develops:

As a decline in one sector reacts on another, the economy may begin spiraling downward. . . . The likelihood that a depression will develop depends on numerous factors—among them, the scale of speculation during the preceding phase of prosperity, the extent to which credit was permitted to grow, whether or not the quality of credit suffered significant deterioration, whether any markets became temporarily saturated, how much excess capacity had been created before the recession started. . . .

## **5. MICROECONOMIC MANAGEMENT OF THE BUSINESS CYCLE**

Burns believed that as CEA chairman in the first Eisenhower term he had kept the economy out of a serious recession by mobilizing a whole arsenal of special measures to stabilize the economy. For Burns, the most important ingredient of successful countercyclical policy was to act early to maintain the optimistic psychology of businessmen. Burns ([1950] 1954, pp. 132–33) wrote:

To glimpse economic catastrophe when it is imminent may prevent its occurrence: this is the challenge facing business cycle theory and policy. . . . the crucial problem of our times is the prevention of severe depressions. . . . developments during “prosperity”—which may cumulate over one or more expansions—shape the character of a depression.

Burns (1957, pp. 30–31 and 69) recited a list of measures the Eisenhower Administration had taken under his leadership to forestall recession and wrote:

When economic clouds began to gather in the late spring of 1953, the government was alert to the possible danger of depression. . . . In its new role of responsibility for the maintenance of the nation’s prosperity, the federal government deliberately took speedy and massive actions to build confidence and pave the way for renewed economic growth. . . . This unequivocal declaration of tax policy, like the earlier moves in the credit sphere, was made when the unemployment rate was 2 1/2 percent. . . . The President recommended a broad program of legislation. . . . whenever the economy shows signs of faltering, the government must honor by its actions the broad principles of combatting recession which served us so well during the decline of 1953–54.

Burns’s understanding of the business cycle caused him to emphasize microeconomic tools to control unemployment and inflation. For example, Burns recommended the creation of productivity councils to lower inflation (U.S. Congress, 2/20/73, p. 409):

I have long believed that productivity councils working at the local level—community by community, establishment by establishment—can be very constructive. We tried them during World War II, and we achieved extraordinary success. I would like to see that effort carried out now on a comprehensive scale. There is enough good will in this country which, if mobilized, could produce significant results. It has not yet been mobilized.

Burns also recommended forced savings as a means of dealing with inflation (U.S. Congress, 6/27/73, p. 179):

I would look with some favor on a fiscal measure that does not quite fall in the tax category. This would be a plan for compulsory savings, but again of a flexible type. Let us say corporations would be required to put aside 10 percent of the amount of their corporate taxes. That sum would be locked up in the Federal Reserve in such a way that it could be released in the event of a downturn in the economy. In other words, my concept is that we ought to try to siphon off some purchasing power but we ought to do it in such fashion that we could reverse gears and do so rather quickly if the economic need arose.

Because Burns attached so much importance to fluctuations in investment, he campaigned regularly for a variable investment tax credit (Burns [6/6/73] 1978, pp. 157–58):

Throughout business cycle history, the major force making for economic instability has been the rather large fluctuations characteristic of business investment. . . . we must persist in the search for new and more refined tools of stabilization policy. Ideally, these measures should be of the kind that can be introduced or removed quickly and that will affect private spending decisions rather promptly. . . . I continue to believe that the concept of a variable tax incentive to business investment has merit.

Finally, after becoming FOMC Chairman, Burns wanted direct government intervention to hold down prices and wages (Burns [6/6/73] 1978, p. 156):

The persistence of rapid advances of wages and prices in the United States and other countries, even during periods of recession, has led me to conclude that governmental power to restrain directly the advance of prices and money incomes constitutes a necessary addition to our arsenal of economic stabilization weapons, to be used occasionally—but nevertheless vigorously—when needed.

Consistent with Burns's emphasis on using microeconomic tools was his de-emphasis of the direct, aggregate demand effects of macroeconomic (monetary and fiscal) policy. His 1957 book *Prosperity Without Inflation* conveys this theme, emphasizing as it does the near impotence of monetary policy. Burns held the conventional view of monetary policy as working through the cost and availability of credit. Moreover, according to Burns, the cost of credit has only a minimal effect on the decisions of businessmen, and financial innovation makes it hard for the Fed to control the availability of credit. Burns (1957, p. 46) wrote, "Many business firms are able to finance their requirements without any borrowing. . . . Interest charges are rarely a large element in business costs, and their practical importance has tended to become smaller as a result of high taxes."

Burns testified (U.S. Congress, 2/20/73, p. 400):

The proper role of monetary policy in the achievement of our national economic objectives is a comparatively modest one. Monetary policy can help to establish a financial climate in which prosperity and stable prices are attainable. But it cannot guarantee the desired outcome: the task is much too large.

Burns shared the conventional business and Keynesian view that monetary policy was an unduly blunt instrument for controlling inflation. Almost from the beginning of his tenure as Fed Chairman, he pushed for government intervention to restrain prices and wages (Burns [5/18/70] 1978, pp. 95, 98, and 99):

Another deficiency in the formulation of stabilization policies in the United States has been our tendency to rely too heavily on monetary restriction as a device to curb inflation. . . . severely restrictive monetary policies distort

the structure of production. General monetary controls . . . have highly uneven effects on different sectors of the economy. On the one hand, monetary restraint has relatively slight impact on consumer spending or on the investments of large businesses. On the other hand, the homebuilding industry, State and local construction, real estate firms, and other small businesses are likely to be seriously handicapped in their operations. When restrictive monetary policies are pursued vigorously over a prolonged period, these sectors may be so adversely affected that the consequences become socially and economically intolerable.

We are in the transitional period of cost-push inflation, and we therefore need to adjust our policies to the special character of the inflationary pressures that we are now experiencing. An effort to offset, through monetary and fiscal restraints, all of the upward push that rising costs are now exerting on prices would be most unwise. Such an effort would restrict aggregate demand so severely as to increase greatly the risks of a very serious business recession. . . . There may be a useful . . . role for an incomes policy to play in shortening the period between suppression of excess demand and restoration of reasonable price stability.

While Burns de-emphasized the direct effects of monetary and fiscal policy, he emphasized their psychological effects, especially on the confidence of the businessman and his willingness to invest. Likewise, Burns attached great importance to the psychological impact of the government deficit on these same two variables.

## 6. BURNS AS FOMC CHAIRMAN

A variety of beliefs shaped Burns's actions as Fed Chairman: his self-confidence in his forecasting ability; his concern for the fragility of economic recovery; and his fear of the adverse effect on business confidence of sharp increases in interest rates. Burns stressed the President's ability to influence the psychological mood of the public. He likewise stressed the role of the deficit in influencing the willingness of businessmen to invest. To make these views manifest, Burns wanted to remain widely influential within the administration.

Burns was confident of his ability to predict near-term economic activity. After all, he and Mitchell had developed the idea of leading indicators. Leonard Silk (1976, p. 31) wrote:

Arthur Burns's finest hour was the 1955 recovery. He forecast higher than all his staff. I asked one of his staff "How come?" and he said, "Well Burns has reasons we will never know." But [Paul] Samuelson thinks Burns's real reason was that the General Motors cars of that period had met a resonant response: "You could tell it from the cigarette smoke in the salesroom early in the autumn of '54."

In a similar way, Burns also predicted in 1976 that the contemporaneous economic recovery would be stronger than almost anyone else was predicting.

Burns believed that economic recoveries are fragile and must be nursed along by government policies. He wrote of the mix of strong and weak economic series that turns a recession into an economic recovery (Burns [1950] 1954, p. 113):

The substitution of one of these majorities for the other takes place gradually, and indeed follows a definite cyclical course. . . . Rising series are only a thin majority at the beginning of a business cycle expansion. Their number swells as aggregate activity increases, though expansion reaches its widest scope not when aggregate activity is at a peak, but perhaps six months or a year earlier. In the neighborhood of a peak, crosscurrents are the outstanding feature of the business situation.

For Burns, monetary policy influenced the state of the business cycle through the effect of interest rates on the psychology of the businessman. For that reason, he was not willing to raise interest rates sharply during economic recovery. Burns testified (U.S. Congress, 7/20/71, p. 256):

This March and April, the Federal Reserve System faced a dilemma. Information available at that time suggested that high rates of monetary growth might well persist under existing conditions in the money market. Interest rates, however, were already displaying a tendency to rise, and vigorous action to restrain monetary growth might have raised them sharply further. In view of the delicate state of the economic recovery, which was just getting under way, it seemed desirable to prevent the possible adverse effects of sharply higher interest rates on expenditure plans and public psychology.

Burns ([1947] 1954, p. 230) wrote that “Economics is a very serious subject when the economist assumes the role of counselor to nations.” With his long experience in government, as head of the CEA and later as informal adviser to Nixon, Burns took very seriously his role as “counselor.” He believed he had the knowledge that would aid the government when it intervened in the economy to prevent economic imbalances from cumulating in a destabilizing way and producing either prolonged recession or inflation. He could show how to control inflation without a prolonged recession. For Burns, the problem was that monetary policy constituted only one part of the arsenal of weapons he needed. He also wanted to influence another weapon in the arsenal, namely fiscal policy. Furthermore, he wanted aggressive special intervention by the President into the price and wage decisions of the private sector.

Burns’s penchant for government intervention reflected the importance he attached to strong leadership. He exercised a commanding presence. A magazine article on Burns commented that “Where Arthur sits, there is the head of the table.” By personality, Burns was a leader, and he wanted to inspire the President to be the kind of leader Burns believed the country needed. Although

the incomes policy Burns advocated in 1970 and the first half of 1971 lacked the legal sanctions of controls, it would, Burns believed, allow the President to lead. With leadership, the country could avoid a painful choice between inflation and unemployment.

Burns saw himself as playing a key role in prodding the government into leadership. A small, but telling, example is the reinstatement at Burns's initiative of sterilized foreign exchange intervention in the summer of 1972. Sterilized foreign exchange intervention changes neither the money stock nor interest rates but, for Burns, government action could have a galvanizing effect on markets. Burns told the FOMC (*FOMC Minutes*, 7/18/72, pp. 734–35):

. . . despite the atmosphere of unease that had prevailed in the international financial world for a good many months, the United States—the only nation capable of exerting effective leadership—had appeared to be playing a passive role, with no clear-cut policy or program. . . . he [Burns] had outlined certain principles of world monetary reform in his speech at the International Monetary Conference in Montreal last May. He had made that address reluctantly, since he would have preferred to have such a statement come from the Treasury Department. It had seemed necessary for him to speak out, however, because a certain hopelessness and despair had settled on international financial markets. His remarks had received world-wide acclaim, not because of their intrinsic merit, but because of the widespread hunger for leadership; they represented the first outgoing, constructive statement by a senior U.S. official indicating a willingness on this country's part to help in reestablishing monetary order. . . . There were times for blowing a trumpet within the halls of Government, and this was one of them. Those efforts had now produced results. . . . By demonstrating that the United States was prepared to cooperate with other nations in defending the Smithsonian parities, such operations could have a major impact on market psychology.

## 7. INFLATION AS A NONMONETARY PHENOMENON

Burns had an eclectic view of the causes of inflation. His earliest comprehensive treatment of inflation is *Prosperity Without Inflation*. Burns (1957, p. 7) stated that “There is . . . not one cause of the post-war inflation but many.” However, among the many factors, the most important was a wage-price spiral caused by expectations of inflation. “One of the main factors in the inflation that we have had since the end of World War II is that many consumers, businessmen, and trade union leaders expected prices to rise and therefore acted in ways that helped to bring about this result” (Burns 1957, p. 71).

Throughout his life Burns returned to the theme of a wage-price spiral driven by the expectation of inflation. The expectation of inflation arose from the public's belief that government would shield individual groups from competition. Shortly after he became Fed Chairman, Burns ([5/18/70] 1978, pp. 91–102) gave a speech to the American Bankers Association, where he stated:

. . . the root of the difficulty [inflationary bias] seems to be the broadening of the social aspirations that have been shaping our national economic policies, and especially the commitment to maintain high levels of employment and rapid economic growth. . . . Another source of inflationary pressure in recent years has been the rise of governmental expenditures for social welfare. . . . The present world-wide inflationary trend may thus be ascribed to the humanitarian impulses that have reached such full expression in our times.

After leaving the Fed, Burns gave a speech in 1979 called “The Anguish of Central Banking.” He said (Burns 1979, pp. 12, 13, and 21):

Once it was established that the key function of government was to solve problems and relieve hardships—not only for society at large but also for troubled industries, regions, occupations, or social groups—a great and growing body of problems and hardships became candidates for governmental solution. . . . Their [government programs] cumulative effect . . . was to impart a strong inflationary bias to the American economy. . . . The pursuit of costly social reforms often went hand in hand with the pursuit of full employment. . . . This weighting of the scales of government policy inevitably gave an inflationary twist to the economy, and so did the expanding role of government regulation. . . . My conclusion that it is illusory to expect central banks to put an end to the inflation that now afflicts the industrial economies does not mean that central banks are incapable of stabilizing actions; it simply means that their practical capacity for curbing an inflation that is driven by political forces is very limited.

Burns did not consider money to be a major independent influence on economic activity or inflation. For Burns, the fundamental determinant of economic activity was the confidence of businessmen. As a result, Burns emphasized not the rate of growth of money but its short-run velocity, which he believed reflected that confidence. At the December 1974 FOMC meeting, Burns stated (FOMC *Minutes*, 12/17/74, pp. 1312–14 and 1338):

The willingness to use money—that is, the rate at which money turned over, or its velocity—underwent tremendous fluctuations; velocity was a much more dynamic variable than the stock of money, and when no account was taken of it, any judgment about the growth rate of M1 was likely to be highly incomplete. . . . Fundamentally, velocity depended on confidence in economic prospects. When confidence was weak, a large addition to the money stock might lie idle, but when confidence strengthened, the existing stock of money could finance an enormous expansion in economic activity.

Money was important, but only as it affected interest rates. Burns saw monetary policy through the optic of credit markets. With interest rates being the measure of monetary ease or tightness, monetary policy could be restrictive even if money growth was rapid. Burns testified to Congress (U.S. Congress, 6/27/73, p. 185):

We began applying monetary restraint as early as March of 1972. This is reflected in interest rates. . . . I do not want to leave you with the impression that . . . we went much too far in the growth of the aggregates [in 1972]. I do not think we did.

In 1973 and 1974, as inflation rose sharply, Burns became sensitive to monetarist criticism of the Fed for allowing high rates of M1 growth. In 1973 and the first half of 1974, the FOMC, with Burns's encouragement, moderated the M1 growth. However, while acknowledging that inflation could not continue without rapid money growth, Burns challenged the monetarists by arguing that rapid money growth had followed inflation, rather than preceding it. Burns testified (U.S. Congress, 7/30/74, p. 257):

The current inflationary problem emerged in the middle 1960s when our government was pursuing a dangerously expansive fiscal policy. Massive tax reductions occurred in 1964 and the first half of 1965, and they were immediately followed by an explosion of Federal spending. . . . Our underlying inflationary problem, I believe, stems in very large part from loose fiscal policies, but it has been greatly aggravated during the past year or two by . . . special factors. . . . From a purely theoretical point of view, it would have been possible for monetary policy to offset the influence that lax fiscal policies and the special factors have exerted on the general level of prices. One may, therefore, argue that relatively high rates of monetary expansion may have been a permissive factor in the accelerated pace of inflation. I have no quarrel with this view. But an effort to use harsh policies of monetary restraint to offset the exceptionally powerful inflationary forces of recent years would have caused serious financial disorder and dislocation.

When Burns became Chairman of the FOMC in February 1970, economic activity had fallen for two months from its December 1969 cyclical peak. During the recession of 1970, inflation failed to decline. Burns drew the conclusion that the contemporaneous inflation arose primarily from a rise in wages due to the exercise of monopoly power by labor unions. In a speech before the American Economics Association, Burns ([12/29/72] 1978, pp. 143–54) stated:

The hard fact is that market forces no longer can be counted on to check the upward course of wages and prices even when the aggregate demand for goods and services declines in the course of a business recession. During the recession of 1970 and the weak recovery of early 1971, the pace of wage increases did not at all abate as unemployment rose. . . . The rate of inflation was almost as high in the first half of 1971, when unemployment averaged 6 percent of the labor force, as it was in 1969, when the unemployment rate averaged 3 1/2 percent. . . . Cost-push inflation, while a comparatively new phenomenon on the American scene, has been altering the economic environment in fundamental ways. . . . If some form of effective control over wages and prices were not retained in 1973, major collective bargaining settlements and business efforts to increase profits could reinforce the pressures on costs and prices that normally come into play when the economy is advancing

briskly, and thus generate a new wave of inflation. If monetary and fiscal policy became sufficiently restrictive to deal with the situation by choking off growth in aggregate demand, the cost in terms of rising unemployment, lost output, and shattered confidence would be enormous.

The Nixon Administration designed the wage and price controls program that began August 15, 1971, on the assumption that the monopoly power of labor unions was producing a cost-push inflation. Wage guidelines of 5.5 percent, along with strong productivity growth, did in fact restrain the growth of unit labor costs of corporations. The controls program allowed corporations to increase prices in line with increases in costs, but those prices were subject to strict limitations. Corporations had to pass a profits test before they could raise prices in response to higher costs. Large corporations had to receive explicit permission from the Cost of Living Council before raising prices. In fact, the controls program did keep the corporate price increases to a moderate pace (see Kusters [1975]). Controls did everything they were supposed to do, except prevent a rise in inflation. In 1973, the prices of commodities traded on world markets began to soar. Those prices were uncontrollable without strict export controls and rigid price ceilings accompanied by mandatory allocation schemes—measures that were unacceptable to the Nixon Administration.

Burns attributed the inflation that began in 1973 to a variety of special factors (U.S. Congress, 2/1/74, pp. 669–70):

In retrospect, it might be argued that monetary and fiscal policies should have been somewhat less expansive during 1972, but it is my considered judgment that possible excesses of this sort were swamped by powerful special factors that added a new dimension to our inflationary problem. . . . A major source of the inflationary problem last year was the coincidence of booming economic activity in the United States and in other countries. . . . Another complicating factor was the devaluation of the dollar. . . . disappointing harvests in 1972—both here and abroad—caused a sharp run-up in prices. . . . In short, the character of inflation in 1973 was very different from the inflation that troubled us in different years. A worldwide boom was in process; the dollar was again devalued; agricultural products, basic industrial materials, and oil were all in short supply.

Both Burns and the economists in the Nixon Administration believed that the special factors that were exacerbating inflation in 1973 would dissipate in 1974 and, consequently, inflation would decline. Nevertheless, inflation remained in the low double digits throughout 1974. For that reason, Burns remained a strong advocate of incomes policies to control inflation (U.S. Congress, 7/30/74, p. 258). However, on April 30, 1974, the President's authority to impose wage and price controls expired. The Cost of Living Council, which had administered the controls, disappeared at the same time. Even though Burns lobbied hard for reestablishment of an incomes policy, the price-controls program had become discredited in Congress. Also, the key economic policy-

makers in the incoming Ford Administration, in particular CEA chairman Alan Greenspan and Treasury Secretary William Simon, opposed incomes policies.

In the last half of 1974, with an incomes policy no longer viable and with inflation continuing unabated, Burns returned to the themes of government spending and deficits as the primary cause of inflation. He testified to Congress (8/21/74, p. 213), “The current inflation began in the middle 1960s when our government embarked on a highly expansive fiscal policy.” And again, Burns testified (U.S. Congress, 9/25/74, p. 119):

. . . special factors have played a prominent role of late, but they do not account for all of our inflation. For many years, our economy and that of most other nations has been subject to an underlying inflationary bias. . . . The roots of that bias . . . lie in the rising expectations of people everywhere. . . . individuals and business firms have in recent times come to depend more and more on government, and less and less on their own initiative, to achieve their economic objectives. In responding to the insistent demands for economic and social improvement, governments have often lost control of their budgets, and deficit spending has become a habitual practice. Deficit spending . . . becomes a source of economic instability . . . during a period of exuberant activity.

Burns told the FOMC, “While the U.S. inflation was attributable to many causes, a large share of the responsibility could be assigned to the loose fiscal policy of recent years” (FOMC *Minutes*, 5/21/74, p. 669).

The problem with Burns’s argument that the government’s fiscal laxness had caused inflation was that government deficits had not been especially large. As a percentage of GNP, the government (federal, state, and local) surplus or deficit (–) was 1.1 in 1969, –1.0 in 1970, –1.7 in 1971, –0.3 in 1972, 0.5 in 1973, and 0.2 in 1974. The deficits of 1970 and 1971 reflected the recession. Burns augmented the magnitude of the conventionally measured deficit by adding the borrowing of government-sponsored agencies like the Federal National Mortgage Association. However, economists challenged Burns on this point (see Walter Heller in U.S. Congress, 8/6/74, p. 248).

Ultimately, Burns attributed the effect of the deficit on inflation to its influence on the psychology of businessmen. Because the deficit symbolized a lack of government discipline, it lessened the willingness of businessmen to exert the discipline required to hold down wages and, as a consequence, prices. The importance that Burns placed on the psychological effects of the deficit are evident in his comments both at FOMC meetings and at congressional hearings. At one FOMC meeting, Burns made his point by taking a shot at the Keynesianism of the Board staff (Board *Minutes*, 12/16/74, p. 1261):

The Chairman then asked what the staff thought the net effect would be of a simultaneous decrease of, say, \$20 billion in both Federal expenditures and business taxes. In response, Mr. Pierce said the econometric model would indicate that such a policy was deflationary, on balance, because it would

result in a rise in savings. Chairman Burns observed that in his opinion the effects would be strongly expansionary rather than deflationary; a \$20 billion tax cut would create a wholly new environment for business enterprise, and businessmen would react by putting their brains, their resources, and the credit facilities to work. His disagreement with the staff on that point reflected a basic difference in interpretation of how the economy functioned and how fiscal stimulants and deterrents worked their way through the system.

According to Burns, a reduction in the deficit would both stimulate economic activity and reduce inflation. He testified to Congress (8/6/74, pp. 225–26 and 229):

If the Congress . . . proceeded to cut the budget . . . then confidence of business people, and of heads of our households, that the inflation problem will be brought under control would be greatly enhanced. In this new psychological environment, our trade unions may not push quite so hard for a large increase in wage rates, since they would no longer be anticipating a higher inflation rate. And in this new psychological environment, our business people would not agree to large wage increases quite so quickly. Therefore, these indirect effects of a cut in the Federal budget of \$5 [billion] or \$10 billion can in such an environment be vastly larger than what the mathematical models . . . suggest. . . . If this Congress were to vote this day . . . a cut of \$10 billion in spending, the stock market would revive promptly, the bond market would revive promptly, and short-term interest rates would move down promptly. . . . Forces . . . would be released within the private sector that would in time make more jobs for our people.

## 8. WAGE AND PRICE CONTROLS

Burns (1966, p. 61) had opposed wage and price controls in the 1960s as “a grim expedient that would indeed suppress inflation for a time, but at the cost of impairing efficiency as well as crushing economic freedom.” Why did he later change his views?

Burns believed that as chairman of the CEA under Eisenhower he had shown how to prevent a serious cyclical downturn. Having solved that problem, he wanted next to show how to lower inflation while maintaining economic expansion. Burns never viewed as inevitable the need for monetary policy to trade off between reducing inflation and maintaining growth. He saw himself as pursuing with equal vigor both the objectives of lowering inflation and of promoting economic growth. Burns used the expression “There is no need to be afraid of prosperity” to rally the FOMC to expansionary policies (*FOMC Minutes*, 8/15/72, p. 803). The same expression also surfaced in his congressional testimony (U.S. Congress, 2/20/73, pp. 402, 416):

We live in troubled times, and memories are still fresh of the damage produced by inflation during the later years of the 1960s. But there is no need to be

afraid of prosperity. . . . the objective of our monetary policy is, in the first instance, to sustain high levels of production and employment and, in the second place, not to contribute to inflationary pressures.

Burns rejected the idea of a tradeoff between inflation and unemployment because, he believed, inflation caused high unemployment. If, through presidential leadership, the United States were to mitigate the inflationary psychology that propelled inflation, economic activity would advance as inflation fell. At Burns's nomination hearings for the post of Fed Chairman, Senator Proxmire questioned Burns (U.S. Congress, 12/18/69, pp. 23–24):

**Proxmire:** Let me ask you about your views on the Phillips curve. . . . Many economists argue the only way to reduce inflation is to follow a policy which is going to result in some unemployment.

**Burns:** I think even for the short run the Phillips curve can be changed. I think we ought to be able in the years ahead to pursue when we need to a restrictive financial policy without significantly increasing unemployment.

(The Phillips curve expresses the relationship between inflation and measures of real economic activity such as real growth or the unemployment rate.)

Burns (1957, p. 17) believed that normal cyclical behavior entailed a rise of prices during expansions and a subsequent fall in contractions: “Experience both before and after 1933 suggests . . . that when expansions are long or vigorous, the price level tends to rise substantially, and that when contractions are brief and mild, the decline in the price level tends to be small.” Inflation and deflation were a characteristic of the cyclical behavior of economic activity, not monetary policy. When inflation failed to decline during the 1970 recession, Burns blamed the continued inflation on the aggressive exercise of monopoly power by unions.

Burns laid out his philosophy of managing the economy in a speech at Pepperdine College. He emphasized the importance of confidence for maintaining economic recovery, the way that inflation undermined that confidence, and the role that leadership from Washington could play in reducing inflation by altering the expectation that inflation was self-perpetuating. Burns believed that an incomes policy would engender a reduction in inflationary psychology, or expectations, as well as inflation itself. Such reduction would spur a vigorous economic recovery. Burns ([12/7/70] 1978, pp. 103–05 and 113–15) argued:

The role that confidence plays as a cornerstone of the foundation for prosperity cannot, I think, be overstressed. . . . If we ask what tasks still lie ahead, the answer I believe must be: full restoration of confidence among consumers and businessmen that inflationary pressures will continue to moderate.

[Inflation first arose because of] the imprudent policies and practices pursued by the business and financial community during the latter half of the 1960s [and because of the] mood of speculative exuberance. [More recently] the inflation that we are still experiencing is no longer due to excess demand. It

rests rather on the upward push of costs—mainly, sharply rising wage rates. Wage increases have not moderated.

In a society such as ours, which rightly values full employment, monetary and fiscal tools are inadequate for dealing with sources of price inflation such as are plaguing us now—that is, pressures on costs arising from excessive wage increases. . . . We should consider the scope of an incomes policy quite broadly. . . . We are dealing . . . with a new problem—namely, persistent inflation in the face of substantial unemployment—and . . . the classical remedies may not work well enough or fast enough in this case. Monetary and fiscal policies can readily cope with inflation alone or with recession alone; but, within the limits of our national patience, they cannot by themselves now be counted on to restore full employment, without at the same time releasing a new wave of inflation.

Burns campaigned publicly for an incomes policy because he believed that monetary and fiscal policy could not by themselves achieve his goal of a combined economic recovery and return to price stability. Shortly before the imposition of price controls, he testified before Congress (U.S. Congress, 7/20/71, p. 259):

. . . the present inflation in the midst of substantial unemployment poses a problem that traditional monetary and fiscal policy remedies cannot solve as quickly as the national interest demands. That is what has led me . . . to urge additional governmental actions involving wages and prices. . . . The problem of cost-push inflation, in which escalating wages lead to escalating prices in a never-ending circle, is the most difficult economic issue of our time.

Burns believed that the labor unions, through their exercise of monopoly power to push up wages, were blocking his attempt to lower inflation and stimulate economic activity. He attacked the monopoly power of corporations and unions (U.S. Congress, 2/20/73, p. 414, and 8/21/74, p. 219, respectively):

As for excessive power on the part of some of our corporations and our trade unions, I think it is high time we talked about that in a candid way. We will have to step on some toes in the process. But I think the problem is too serious to be handled quietly and politely.

. . . we live in a time when there are abuses of economic power by private groups, and abuses by some of our corporations, and abuses by some of our trade unions.

More than anyone else, Burns had created widespread public support for the wage and price controls imposed on August 15, 1971. For Burns, controls were the prerequisite for the expansionary monetary policy desired by the political system—both Congress and the Nixon Administration. Given the imposition of the controls that he had promoted, Burns was effectively committed to an expansionary monetary policy. Moreover, with controls, he did not believe that expansionary monetary policy in 1972 would be inflationary.

In 1957 Milton Friedman wrote Burns a nine-page letter that criticized Burns's manuscript *Prosperity Without Inflation* for confusing monetary policy with credit policy. (Burns did not alter the manuscript.) Friedman (1957) argued that one should consider the effect of the money stock on nominal expenditure and prices independently of the operation of the credit market:

. . . it is striking that changes in the stock of money have had very similar effects under widely different institutional arrangements for bringing about changes in it, some under which the credit market was of minor importance. . . . the evidence persuades me that this old fashioned, fairly direct linkage between the stock of money and flows of outlays is empirically more important than the Keynesian linkage between investment and other outlay flows that underlies the credit policy approach you adopt—though I was almost reconciled to seeing Keynes conquer central bankers I now feel like saying “et tu, Brute!” . . . Where . . . these lectures can do a great deal of harm . . . is your taking its [monetary policy's] effects to operate solely through the “credit” market. If this is right, then any other device for affecting “credit” will do as well, such as investment controls, and the like; and, indeed, will be better since they will enable you to affect what you want to directly, not indirectly.

Friedman's analysis was prophetic. If the behavior of prices does not depend on money, but instead depends on factors specific to particular markets, then direct controls are an effective way to constrain inflation.

## 9. CONCLUDING COMMENTS

Burns did not consider monetary policy to be the driving force behind inflation. He believed that inflation emanated primarily from an inflationary psychology produced by a lack of discipline in government fiscal policy and from private monopoly power, especially of labor unions. It followed that if government would intervene directly in private markets to restrain price increases, the Federal Reserve could pursue a stimulative monetary policy without exacerbating inflation. Almost from the beginning of his tenure as Fed Chairman, Burns lobbied for government intervention in private wage and price setting. When such measures were enacted into wage and price controls on August 15, 1971, he became willing to continue the expansionary monetary policy that had begun early in 1971.

The fundamental divide in monetary economics is whether the price level is a monetary or a nonmonetary phenomenon. If the price level is a monetary phenomenon, it varies to endow the nominal quantity of money with the real purchasing power desired by the public. The central bank is *the* cause of inflation.

If the price level is a nonmonetary or real phenomenon, its behavior possesses multiple, changing causes. Direct intervention by government in the price

setting practices of the public can lower inflation. Such intervention permits a more expansionary monetary policy designed to lower unemployment and stimulate real growth.

Burns conducted monetary policy on the assumption that the price level is a nonmonetary phenomenon. The Congress and the administration, public opinion, and most of the economics profession supported that policy. The result was inflation. That inflation eventually led to the present consensus that the control of inflation is the paramount responsibility of the central bank.

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## REFERENCES

- Board of Governors of the Federal Reserve System. *Minutes of the Federal Open Market Committee*, 7/18/72, 8/15/72, 5/21/74, 12/16/74, and 12/17/74.
- \_\_\_\_\_. *Minutes of the Board of Governors*, 11/6/70.
- Burns, Arthur F. "The Anguish of Central Banking." Per Jacobsson Lecture, Sava Centar Complex, Belgrade, Yugoslavia, September 30, 1979.
- \_\_\_\_\_. "Some Problems of Central Banking," 6/6/73, reprinted in *Reflections of an Economic Policy Maker: Speeches and Congressional Statements, 1969–1978*. Washington: American Enterprise Institute for Public Policy Research, 1978.
- \_\_\_\_\_. "The Problem of Inflation," 12/29/72, reprinted in *Reflections of an Economic Policy Maker: Speeches and Congressional Statements, 1969–1978*. Washington: American Enterprise Institute for Public Policy Research, 1978.
- \_\_\_\_\_. "The Basis for Lasting Prosperity," 12/7/70, reprinted in *Reflections of an Economic Policy Maker: Speeches and Congressional Statements, 1969–1978*. Washington: American Enterprise Institute for Public Policy Research, 1978.
- \_\_\_\_\_. "Inflation: The Fundamental Challenge to Stabilization Policies," 5/18/70, reprinted in *Reflections of an Economic Policy Maker: Speeches and Congressional Statements, 1969–1978*. Washington: American Enterprise Institute for Public Policy Research, 1978.
- \_\_\_\_\_. "Money Supply in the Conduct of Monetary Policy." *Federal Reserve Bulletin*, vol. 59 (November 1973), pp. 791–98.
- \_\_\_\_\_. "The Nature and Causes of Business Cycles," in Arthur F. Burns, *The Business Cycle in a Changing World*. New York: National Bureau of Economic Research, 1969.

- \_\_\_\_\_. *The Management of Prosperity*. New York: Columbia University Press, 1966.
- \_\_\_\_\_. *Prosperity Without Inflation*. New York: Fordham University Press, 1957.
- \_\_\_\_\_. "New Facts on Business Cycles," 1950, reprinted in Arthur F. Burns, ed., *The Frontiers of Economic Knowledge*. Princeton: Princeton University Press, 1954.
- \_\_\_\_\_. "Wesley Mitchell and the National Bureau," 1949, reprinted in Arthur F. Burns, ed., *The Frontiers of Economic Knowledge*. Princeton: Princeton University Press, 1954.
- \_\_\_\_\_. "Keynesian Economics Once Again," 1947, reprinted in Arthur F. Burns, ed., *The Frontiers of Economic Knowledge*. Princeton: Princeton University Press, 1954.
- \_\_\_\_\_. "Economic Research and the Keynesian Thinking of Our Times," 1946, reprinted in Arthur F. Burns, ed., *The Frontiers of Economic Knowledge*. Princeton: Princeton University Press, 1954.
- \_\_\_\_\_. "Introductory Sketch," in Arthur F. Burns, ed., *Wesley Clair Mitchell: The Economic Scientist*. New York: National Bureau of Economic Research, 1952.
- Friedman, Milton. Letter to Arthur Burns, Burns folder, Hoover Institute, 1957.
- Hargrove, Erwin C., and Samuel A. Morley. *The President and the Council of Economic Advisers*. London: Westview Press, 1984.
- Kosters, Marvin H. *Controls and Inflation: The Economic Stabilization Program in Retrospect*. Washington: American Enterprise Institute for Public Policy Research, 1975.
- Silk, Leonard. *The Economists*. New York: Avon Books, 1976.
- U.S. Congress. "Review of the Economy and the 1975 Budget." Hearings before the House Committee on the Budget, 93 Cong. 2 Sess., 9/25/74.
- \_\_\_\_\_. "The Federal Budget and Inflation." Hearings before the Senate Budget Committee, 93 Cong. 2 Sess., 8/21/74.
- \_\_\_\_\_. "Examination of the Economic Situation and Outlook." Hearings before the Joint Economic Committee, 93 Cong. 2 Sess., 8/6/74.
- \_\_\_\_\_. "Federal Reserve Policy and Inflation and High Interest Rates." Hearings before the House Committee on Banking and Currency, 93 Cong. 2 Sess., 7/30/74.
- \_\_\_\_\_. "Oversight on Economic Stabilization." Hearings before the Subcommittee on Production and Stabilization of the Senate Committee on Banking, Housing and Urban Affairs, 93 Cong. 2 Sess., 2/1/74.

\_\_\_\_\_. “How Well Are Fluctuating Exchange Rates Working?” Hearings before the Subcommittee on International Economics of the Joint Economic Committee, 93 Cong. 1 Sess., 6/27/73.

\_\_\_\_\_. “The 1973 Economic Report of the President.” Hearings before the Joint Economic Committee, Part 2, 93 Cong. 1 Sess., 2/20/73.

\_\_\_\_\_. “The 1971 Midyear Review of the Economy.” Hearings before the Joint Economic Committee, 92 Cong. 1 Sess., 7/20/71.

\_\_\_\_\_. “Nomination of Dr. Arthur F. Burns.” Hearings before the Senate Committee on Banking and Currency, 91 Cong. 1 Sess., 12/18/69.

Viorst, Milton. “The Burns Kind of Liberal Conservatism.” *New York Times Magazine*, November 9, 1969, pp. 30–131.

# National Productivity Statistics

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Roy H. Webb

Many people now enjoy levels of prosperity that would have been barely imaginable a few hundred years ago. That remarkable achievement can be viewed through the lens of productivity statistics that give quantitative estimates of output per unit of input. By studying productivity, analysts can improve their understanding of the causes of national prosperity and economic growth. Since different definitions of productivity are widely used, this article reviews the most important ones used in the United States. The article also contains a brief sketch of the historical behavior of productivity and then warns readers about potential pitfalls in using productivity statistics. Finally, the background material is used to address questions concerning the recent behavior of productivity statistics.

## 1. WHAT EXACTLY IS PRODUCTIVITY?

Simply stated, productivity is output per unit of input. Actually calculating a number can be somewhat more complicated. Suppose that we can agree that aggregate national output is adequately modeled by using a Cobb-Douglas production function

$$Y_t = A_t K_t^\alpha L_t^{1-\alpha}, \quad (1)$$

where  $Y$  is aggregate output,  $K$  is the capital stock,  $L$  is labor input,  $t$  is a time-period index,  $\alpha$  is a number between zero and one, and  $A$  will be discussed later. For national productivity statistics, an obvious starting point is to take an estimate of aggregate output such as real gross domestic product (GDP) from the National Input and Product Accounts (NIPAs). On the input side, the first

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requirement is to measure labor input, such as the number of workers or the number of hours worked.

The Bureau of Labor Statistics (BLS) currently publishes three categories of productivity estimates, which in terms of equation (1) are simply of the form  $Y/L$ . The most widely cited category is published quarterly and takes an output measure from the NIPAs for a large sector of the economy. *Business product* is the portion of real GDP produced by the business sector, and thus excludes production from the household sector, the foreign sector, and the government sector. *Nonfarm business*, naturally, is business product minus farm production. Product of *nonfinancial corporations* further excludes production by financial firms and by proprietorships and partnerships. Also, as part of its quarterly estimates, the BLS publishes productivity statistics for the manufacturing sector. In 1992, business product accounted for 76 percent of GDP, nonfarm business product was 75 percent of GDP, nonfarm nonfinancial corporate business product was 52 percent of GDP, and manufacturing product was 17 percent of GDP. Since the only input considered is hours worked, these estimates are often described as *labor productivity*. Most of the data on employee-hours comes from the BLS's establishment survey, although for some workers other sources are used.

The BLS publishes a second category of estimates annually, using a more comprehensive definition of inputs into the production process; the result is referred to as *multifactor, or total-factor, productivity* and is represented by the term  $A$  in equation (1). The statistic is estimated by dividing product of a broad sector by an input index that is a weighted average of two indexes, one of labor inputs and the other of capital inputs. The index of labor inputs can be thought of as a quality-adjusted labor index; for broad sectors it is calculated as a weighted average of employee-hours for several groups of workers. The groups are defined by sex, level of education, and amount of experience. The capital input index is a weighted average of capital services from many different categories of structures, equipment, inventories, and land.

In both the quarterly and annual estimates, productivity in the narrow manufacturing sector is calculated using input and output measures that differ from the measures used to estimate productivity in the broader sectors. Manufacturing productivity is therefore not strictly comparable to the broad-sector estimates. For multifactor productivity, manufacturing labor input does not receive the demographic adjustments that the labor input receives for broader sectors. In addition to labor and capital, manufacturing's aggregate input index includes purchases of energy, other raw materials, and business services. Those additional items are crucial, since purchased inputs account for the bulk of manufacturing costs. With regard to output, the manufacturing measure is gross output, excluding shipments within the manufacturing sector. In contrast, for the broader sectors, output represents value added; accordingly, the value of material inputs is subtracted from gross output.

The BLS publishes a third category of estimates for particular industries. In this category, they estimate labor productivity for 150 specific industries, again using a different methodology from the other two categories. Multifactor productivity is also calculated for a smaller number of industries. The BLS first estimated industry productivity in 1898 in response to congressional concerns over the employment effects of labor-saving technology. Today, the choice of which industries to cover depends on data availability and therefore is heavily tilted toward manufacturing. Nonetheless, the BLS estimates productivity for important industries outside manufacturing, including mining, communications, banking, trade, and transportation. In these industry estimates, output indexes measure gross output and are taken from census surveys. The labor input is measured by employee-hours, without demographic adjustments. For multifactor productivity calculations, capital services and intermediate purchases supplement the labor input.

In order to supplement the BLS productivity estimates, many analysts construct their own numbers. Since GDP and population estimates are available for relatively lengthy time spans for many countries, GDP divided by population is often used as a rough estimate of labor productivity. Either the numerator or the denominator of this output-per-person ratio can be refined. Most importantly, instead of population, one could use the labor force, employment, or employee-hours. Many analysts also construct their own estimates of multifactor productivity. The main requirement is to have a method to construct an input index; in equation (1), for example, the input index is  $K^\alpha L^{1-\alpha}$ . By constructing one's own multifactor productivity index, an analyst can include the most relevant factors of production. Thus one might distinguish between skilled and unskilled labor or between privately owned and government-owned physical capital. Finally, industry productivity estimates have often been constructed directly from the NIPA measures of output by sector, which by definition represent value added rather than gross output.

## 2. POTENTIAL PITFALLS AND MEASUREMENT ISSUES

Any meaningful interpretation of national productivity statistics must account for the following potential pitfalls.

(1) Current estimates of productivity understate both its level and rate of growth. That bias reflects a basic difficulty in estimating real output. Real GDP, for example, is estimated by taking spending for over 1,000 separate categories, adjusting each spending estimate for price change, and summing the resulting estimates of real expenditure. The weak link in this chain is the adjustment for price change. Current procedures systematically overstate changes in prices and thereby understate both levels and rates of change of real GDP and productivity.

How large is the bias? A large volume of research has produced credible estimates for a large fraction of GDP; biases for a few items are mentioned below.

(a) Consumer spending accounted for 68 percent of GDP in 1996. A panel of experts (Boskin 1996) estimated that the rate of increase in the Consumer Price Index (CPI) was overstated by 1.1 percent per year in the mid-1990s. A large part of that bias is due to two related factors: inadequately accounting for the benefits of new goods that are not included in the CPI and inadequately accounting for the changing quality of items included in the CPI. When statisticians prepare estimates of real GDP, most prices for consumer spending are taken from the CPI, so much of that bias is carried over into the deflator for consumer spending.<sup>1</sup> One category of spending that does not use a price from the CPI is financial services such as checking accounts. Nominal amounts here are deflated by a procedure that *assumes* zero productivity growth. In contrast, the BLS productivity estimate for the banking industry found that productivity grew at a 2.0 percent annual rate from 1979 to 1990.

(b) Spending for nonresidential structures accounted for 3 percent of GDP in 1996. In many cases no price index has been constructed for deflating spending on these items, so a proxy such as an input price index is used. One analyst (Pieper 1990) estimates that this procedure tends to overstate new construction prices by at least 0.5 percent per year. Robert Gordon (1996a) noted that the official productivity index for construction has either declined or grown slowly for decades. The measured productivity level in U.S. construction has thus fallen by an implausible two-thirds relative to the Canadian productivity level in construction.

(c) Spending for producers' durable equipment accounted for 7 percent of GDP in 1996. A major study of a wide variety of evidence led Gordon (1990) to conclude that the implicit price deflator for producer durables overstated inflation in this category by 2.9 percent. Again, the main problem is that many of the prices of individual items come from producer price indexes that make inadequate allowance for new goods that are excluded from the indexes and for changes in quality of goods included in the indexes. The size of the bias is now probably less than

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<sup>1</sup> The CPI in 1997 was based on the goods and services consumers bought during 1982, 1983, and 1984. The implicit price deflator for consumer spending in the NIPAs, however, is based on the recent pattern of goods and services purchased, and that pattern changes each year. This difference in 1997 caused the CPI to overstate inflation by a greater amount than did the GDP price index for consumer spending. In 1998, the CPI will use an updated bundle of goods and services that, for a time, should narrow the difference between rates of change of the two indexes.

Gordon found, however, due to important methodological changes by the statistical agencies.

(d) A large part of government services consists of employee compensation, which accounted for 10 percent of GDP in 1996. Construction of real output in this category again *assumes* zero productivity growth. In contrast, productivity in a large number of federal civilian programs is estimated to have grown at a 1.5 percent annual rate (Kendrick 1991).

In short, current estimates of the level and growth rate of real GDP are biased downward by a substantial amount, and therefore estimates of productivity that are based on GDP are similarly biased, including all the BLS measures. These problems are not unique to the United States but are inherent in every country's statistical program. The major difficulty is that taking estimates of current dollar spending and disentangling real output and prices is difficult in an economy with rapid innovation. Nonetheless, research within statistical agencies and by academic economists has identified promising approaches for addressing some of the problems. An outstanding example is the research that led to quantifying the changing quality of computers in the United States. This change, implemented in the mid-1980s, had such large consequences that it led to the introduction of a new statistical formula, chain weighting, into the NIPAs in the 1990s. Both changes have substantially improved our understanding of the behavior of economic activity over the last few decades. What is lacking is the funding needed for additional basic research, for applied research on the practical methods needed to implement potential improvements for routine production of statistics, and for additional surveys to gather more raw data. Improving the quality of any product can be costly, and economic statistics are no exception.

(2) Growth rates of productivity are highly variable when measured over short periods of time. Moreover, rates measured over lengthy periods move predictably with the business cycle. Consequently, high rates of productivity growth usually accompany high rates of output growth, often near the beginning of cyclical expansions. Unfortunately, pundits may seize on a short period of rapid growth in output and productivity and proclaim that the trend rate of productivity growth has risen; later in the cycle it will become obvious that productivity is still near its old trend. When questioning whether the trend has shifted, it is best to look at a complete business cycle or longer. In the current cycle one might compare the latest productivity data with data from 1990, the year in which the peak of the last business cycle occurred, or 1989, the year in which some measures of the level of productivity peaked.

(3) Extra caution is required when using productivity estimates for individual segments of the economy. Partitioning the economy introduces an additional source of error into output and productivity statistics due to the difficulty of distributing inputs and outputs across sectors in a meaningful way. For example,

in the BLS industry studies of labor productivity, output is measured as gross value and thus inputs from other sectors are excluded. Therefore, increased outsourcing of services in a particular manufacturing industry would appear as higher measured productivity in that industry even if overall labor productivity did not change for all firms combined. But even when outsourcing is taken into account, as in the BLS multifactor productivity measures for manufacturing, a more subtle difficulty emerges. Suppose prices and quantities were measured accurately for manufacturing but that unmeasured quality improvements led to overestimates of price increases for business services. The real quantity of services used by the manufacturing sector would then be understated, and manufacturing productivity would be overstated.

### 3. HOW HAS PRODUCTIVITY BEHAVED OVER TIME?

Many economic historians believe that sustained productivity growth is a relatively recent phenomenon.<sup>2</sup> Further, if one concentrates on the relatively recent period in which sustained productivity growth has been evident in many nations, one can see a distinct tendency for the world's productivity to accelerate over time. This tendency is illustrated in Table 1 with data on per capita real GDP for several countries from 1820 to 1989. Before discussing the data, note that productivity statistics are currently not estimated as accurately as we would like. Moreover, as one moves back in time, the quality of the estimates deteriorates. A historian estimating GDP for an economy in the nineteenth century has only a small fraction of the data that is currently available to national product statisticians. Also, the quality of data can vary across countries. One particular problem is with countries that have large sectors where market forces of supply and demand are suppressed; for those countries, the market value of real output of the nonmarket sector is difficult to estimate.

Even with these qualifications, the data can be useful. In particular, one can note the extent to which productivity growth has risen. Consider first the countries leading in productivity. For most of the nineteenth century the United Kingdom had the highest level of productivity in the world, with a productivity growth rate of 1.2 percent from 1820 to 1890. In the twentieth century the United States has had the highest level of productivity, with a growth rate of 2.0 percent from 1913 to 1989. Next, consider two "growth miracles."<sup>3</sup> From 1950 to 1973, Japan's productivity level increased by a factor of almost 6, which resulted in an 8.0 percent annual rate of productivity growth. Over a longer

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<sup>2</sup> Jones (1988), for example, distinguishes between the last 1,000 years and the rest of mankind's existence.

<sup>3</sup> These are not the only examples that could have been mentioned; other countries have had similar periods of rapid growth as well.

**Table 1 Real Output per Capita**

	1820	1870	1890	1913	1950	1973	1989
United States	1,219	2,244 [1.2]	3,101 1.6	4,846 2.0	8,605 1.6	14,093 2.2	18,282 1.6]
United Kingdom	1,450	2,693 [1.2]	3,383 1.1	4,152 0.9	5,651 0.8	10,079 2.5	13,519 1.9]
Germany	902	1,251 [0.7]	1,660 1.4	2,506 1.8	3,295 0.7	10,124 5.0	13,752 1.9]
Japan	609	640 [0.1]	842 1.4	1,153 1.4	1,620 0.9	9,524 8.0	15,336 3.0]
Taiwan			564	608 [0.3]	706 0.4	2,803 6.2	7,252 6.1]
China	497	497 [0]	526 0.3	557 0.2	454 −0.5	1,039 3.7	2,538 5.7]
India	490	490 [0]	521 0.3	559 0.3	502 −0.3	719 1.6	1,093 2.7]
Latin America <sup>a</sup>	570	785 [0.3]	998 1.2	1,350 1.3	2,180 1.4	3,661 2.5	4,033 0.6]
Africa <sup>b</sup>	400	400 [0]	400 0	580 1.6	1,044 1.2	1,656 1.9	1,660 −0.3]

[Entries in brackets represent average annual rates of change from the preceding entry.]

<sup>a</sup>Average for Argentina, Brazil, Chile, Colombia, Mexico, and Peru.

<sup>b</sup>Average for Cote'd Ivoire, Ghana, Kenya, Morocco, Nigeria, South Africa, and Tanzania.

Notes: The figures in this table are from Maddison (1994), Table 2.1. Entries are per capita GDP, stated as dollar amounts at 1985 U.S. relative prices. Entries for Africa from 1820 through 1913 are described by Maddison as rough guesses.

period, 1950–89, Taiwan boosted productivity by a factor of 10, which led to a 6.2 percent annual rate of productivity growth. Such rapid rates of growth are simply not evident in pre–World War II data. Also, note productivity growth in the world's two most populous nations. Productivity stagnated in China and India for over a century but is now growing. All in all, productivity growth for countries containing much of the world's population, at varying stages of industrialization, has become distinctly faster. That trend, however, is not universal, with Africa being an important exception.

Two periods of productivity growth in the United States are now considered. Figure 1 illustrates per capita real GDP since 1869. Despite large departures during the Great Depression and World War II, this estimate of

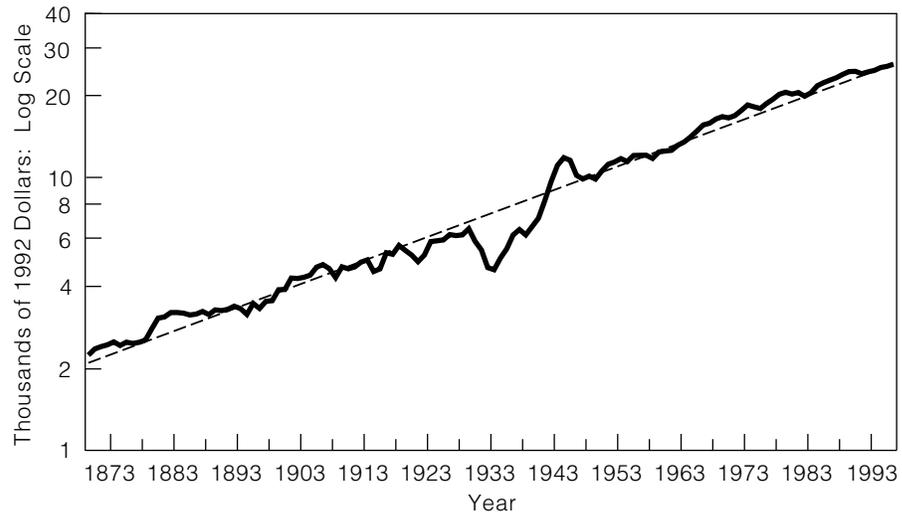
productivity remains remarkably close to a trend of 2.0 percent annual growth.<sup>4</sup> That estimate, however, uses population as a loose proxy for labor input. Another view looks at post–World War II data that incorporate a more explicit measure of labor input, employee-hours. For more than two decades, the trend rate of productivity growth has been substantially lower than it was early in the postwar period. For example, multifactor productivity for nonfarm business, seen in Figure 2, rose at a 1.9 percent annual rate from 1948 to 1973 but only rose at a 0.1 percent rate from 1973 to 1994. Similar declines are evident in most other measures of productivity. As shown in Table 1, per capita output growth simultaneously declined in other mature industrial economies. Moreover, data for the current business cycle reveal no sustained pickup in the rate of productivity growth. For example, hourly output of nonfarm business grew at a 1.1 percent rate, both from 1973 to 1989 and from 1989 to 1997.

Since productivity growth leads to higher material standards of living, its apparent slowing has become the focal point of a large volume of analysis. There are several possible explanations, but before considering them, it may be helpful to consider the ultimate sources of productivity growth. If one looks at simple labor productivity, then physical capital accumulation and improved education appear to account for a substantial portion of measured productivity growth. The accumulation of physical and human capital has been extensively studied and quantified, and its contribution to the growth of labor productivity is not controversial. Additional sources of productivity growth include scientific and engineering advances, the realization of economies of scale, improvements in the management of organizations, and the shift in employment from low- to high-productivity sectors of the economy; these have been less well quantified, but the importance of each is also not controversial. Finally, a broad array of conditions apply to nations as a whole and can affect productivity growth. These include the effectiveness of the rule of law in predictably protecting property rights, the level and predictability of tax rates, the incentive effects of particular taxes and subsidies, the extent and methods of government regulation of business practices, the ability of a nation's system of financial institutions to channel funds to productive investment opportunities, and the extent to which monetary policy achieves low, stable rates of inflation over time. The exact importance of each item in this latter set is open to considerable debate.

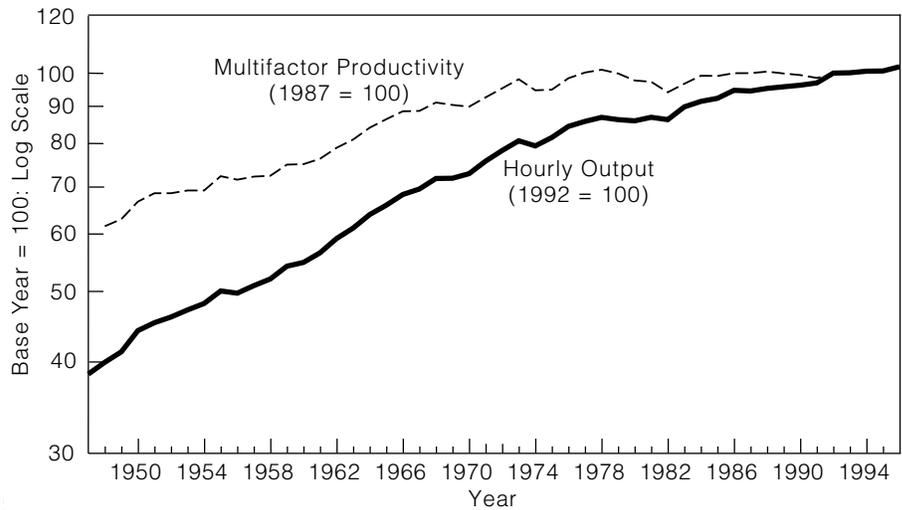
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<sup>4</sup> The measure of GDP used in the figures in this article differs in an important respect from that used by Maddison (1994). Whereas Maddison's GDP data were constructed using a fixed base period, official data are now constructed using a chain-weighted index for real GDP. One effect of that difference is to slightly increase growth rates over long periods of time, such as in Figure 1.

**Figure 1 Real GDP Per Capita**



**Figure 2 Nonfarm Business Sector: Hourly Output and Multifactor Productivity**

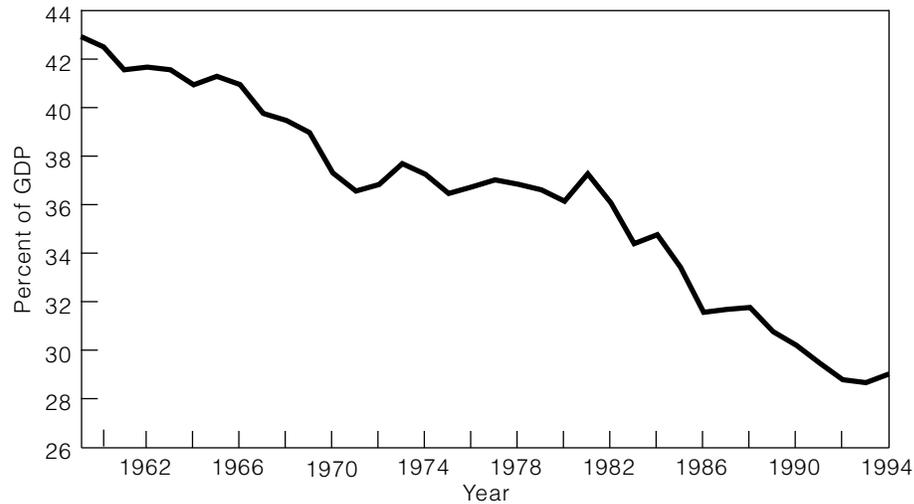


#### 4. DOES MISMEASUREMENT EXPLAIN RECENT PRODUCTIVITY BEHAVIOR?

Why did the trend rate of productivity growth in the United States and in other mature industrial economies slow in the early 1970s? Because it is difficult to measure productivity accurately, it is tempting to blame measurement problems (see, for example, Nakamura [1997]). In order for measurement problems to be convicted of that crime, however, analysts must dispel several reasonable doubts. Exactly what measurement problem suddenly worsened in the late 1960s or the early 1970s? And why did it affect all mature industrial economies simultaneously? The data in Table 1, for example, indicate that growth of per capita output declined in the United States, the United Kingdom, Germany, and Japan. Other productivity measures show an even more dramatic slowing. Until such questions can be answered, many observers will regard as unproven the hypothesis that an accurate estimate of productivity growth did not slow, even though measured productivity growth did. This conclusion also applies to a variant of the mismeasurement view, namely that while true productivity growth did slow in the 1970s and 1980s, it has rebounded in the 1990s, although that rebound is not being properly measured.

Zvi Griliches (1994) presented some evidence on the plausibility of the mismeasurement view. He classified output into sectors that were relatively “measurable,” such as manufacturing, and “unmeasurable,” such as finance. He then noted that the fraction of output in measurable sectors had declined over time. Figure 3 uses his classification to illustrate how the fraction of output from well-measured sectors has declined from 43 percent in 1959 to 30 percent in 1994. From one perspective, output *has* been getting more difficult to measure, since the poorly measured fraction has increased by 13 percentage points. But from another perspective, output has *always* been difficult to measure, since even in 1959 well-measured output was less than half of total output. For a quantitative assessment of the two views, consider the following numerical example. Suppose that productivity actually grew at a 5 percent annual rate in both the measurable and unmeasurable sectors but that it was incorrectly estimated as zero in the unmeasurable sector. Overall productivity growth would then have been estimated at 2.15 percent in 1959 and 1.50 percent in 1994. Thus even these large numerical values that almost certainly overstate the case would explain only part of the productivity slowdown.

Slifman and Corrado (1996) examined the measurement problem in a different manner. They found that labor productivity in nonfarm business had the expected slowing: it grew by 2.8 percent from 1960 to 1973 but only 1.1 percent from 1973 to 1996. But in the nonfarm corporate sector (which accounts for slightly over three-fourths of nonfarm business) productivity growth changed little, rising at a 1.8 percent rate from 1960 to 1973 and a 1.6 percent rate from 1973 to 1996. The difference in aggregate productivity behavior reflects the

**Figure 3 “Well-Measured” Output**

Note: Gross domestic product for the (1) Agriculture, Forestry, and Fishing, (2) Mining, (3) Manufacturing, (4) Transportation, (5) Communications, and (6) Electric, Gas, and Sanitary Services industries as a percentage of total gross domestic product.

nonfarm noncorporate sector, composed of proprietorships and partnerships, in which measured labor productivity rose at a 4.8 percent rate in the earlier period but fell at a 0.9 percent rate in the later period. Moreover, the profitability of that sector did not deteriorate even as productivity fell. Thus it appears that this relatively small part of the economy plays a disproportionately large role in overall productivity developments and lends credence to the mismeasurement view. At the same time, it is hard to imagine what form of mismeasurement accounts for the dramatic change. Also, the data that Slifman and Corrado presented do not rule out the possibility that the high growth of noncorporate productivity before 1973 was an aberration.

A final possibility of increased mismeasurement around 1973 is raised by the increased efforts to limit emissions of pollutants. The labor and capital used to reduce pollution is included in national economic statistics, but benefits like cleaner air and water are omitted. As a result, increased pollution-control efforts will reduce measured output and therefore measured productivity. While this argument is unassailable in principle, one may question its quantitative impact. For example, pollution abatement and control expenditure has typically been less than 2 percent of GDP. Also, the largest investments have been made by firms in measurable industries, mostly where the productivity slowdown has been less pronounced (the electric utility industry is a notable exception).

## 5. OTHER EXPLANATIONS OF SLOWER PRODUCTIVITY GROWTH

If mismeasurement is not the whole story, then what explains slower productivity growth? Several possible explanations are presented in this section.

### Energy Prices

A large increase in the price of energy was initially a prime suspect. In the 1970s, for example, many authors, such as John Tatom (1979), attributed much of the productivity slowdown to oil-price increases. The appeal of that hypothesis was in part due to the correspondence of two events: first, energy prices rose rapidly in 1973–74, and second, the year 1973 is often taken to be the dividing point between high- and low-productivity growth periods.<sup>5</sup> Interest in that explanation waned following the failure of productivity to accelerate after oil prices declined in the 1980s.

### Institutional Sclerosis

Mancur Olson (1988), however, presented a view that could give some importance to energy-price shocks despite the events of the 1980s. He proposed that major shocks, such as oil-price increases, can interact with rigidities in political systems to magnify the impact of shocks and also can cause the effects of shocks to persist for long periods of time. The simple story is that a shock that disturbs the status quo can lead political interest groups to spend resources to influence the distribution of output rather than use those resources to produce output. To the extent that country's political system is dominated by coalitions engaged in such behavior, the country is said to exhibit institutional sclerosis. In essence, Olson explains the productivity slowdown by a combination of initial shocks, including oil-price increases in the 1970s, magnified and propagated by sclerotic political systems in large, industrial economies including the United States.

Two papers provide some support for portions of Olson's view. Lars Ljungqvist and Thomas Sargent (1996) present a theoretical analysis, along with numerical calibration, of features of a prototypical European welfare state. They found that the labor market's adjustment to external shocks can be extremely lengthy and that indirect effects of a shock can be substantial; both are part of Olson's story. Also, Richard Vedder (1996) found a negative correlation between labor productivity growth and spending by the U.S. government for economic regulation. One would expect to see a negative correlation if regulations were introduced primarily to affect the distribution of income. The

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<sup>5</sup> Although it is conventional to take 1973 as the watershed year, by the late 1960s some analysts were discussing a slowing of productivity growth that had become evident.

argument would be stronger, however, if accompanied by an effort to assess the benefits of the regulations for which costs were extensively tallied.

In Olson's view, effects of positive shocks are also magnified and propagated through time. For example, a positive shock to a sclerotic economy could initially be amplified due to a rising fraction of new, successful ventures. The positive effects, including higher growth and a lower price level, would then persist as the degree of sclerosis in the economy declined. That decline would be a consequence of individuals finding it more profitable to engage in productive activity than in seeking to influence the political process.

### **Technical Change and Learning**

One of the striking features of the post-1973 period has been the falling cost of computing and the resulting widespread use of computer power. From 1973 to 1996, real gross investment in computers and peripheral equipment increased by a factor of 892 as the price of computing power fell by a factor of 44. The coincidence of this technological explosion and falling productivity growth has puzzled many observers. In an attempt to reconcile the two, Andreas Hornstein and Per Krusell (1996) note that people may need substantial amounts of learning in order to use computers effectively. After modifying a standard model to require that learning accompany a technological change, they find that a technological change can boost output growth in the long run, even though it causes an initial period of lower productivity. In addition, they argue that the use of computers may be especially efficient at increasing the quality of goods produced. Given the difficulties of accounting for quality improvement in economic statistics, they conclude that growing computer use may worsen the measurement problem and obscure any rebound in productivity. Griliches (1994) emphasizes that point by noting that the unmeasurable sector accounts for fully three-quarters of new computer investment. Also, Baily and Gordon (1988) present evidence on substantial investments in computing that produce unmeasured convenience to consumers in several specific areas.

A complementary theme, proposed by Paul David (1990), identifies parallels between the recent adoption of the computer and the adoption of electric power a century ago. In each case the technology improved rapidly over a fairly long time, and the technology gradually moved into widespread use. Even more intriguing was the pronounced slowing in aggregate productivity growth during 1890-1913, when the world's two leading economies, the United States and Britain, rapidly increased their use of electricity. David attributed much of the delay between the introduction of electricity and improved productivity to a lag in designing manufacturing facilities that made optimal use of electric motors and later a lengthy delay before it became profitable to replace older facilities. He also noted that electrification led to higher-quality products that would be mismeasured in economic statistics; for example, electric light greatly improved

the quality of illumination, but that effect is ignored in conventional statistics.<sup>6</sup> In short, here is a historical example of a revolutionary new technology that significantly raised output in the long run, although the introduction may have temporarily depressed measured productivity.

### **Research and Development**

To better understand the role of technology on output growth, analysts have long studied national spending on research and development (R&D) as a proxy for general scientific and engineering advances. Gordon Richards (1997) has incorporated data on R&D spending into a statistical model designed to study long-run growth. In many ways the model is standard, although it differs from most by allowing for small increasing returns to scale for all factors of production taken together. More significantly, he departs from the norm by distinguishing computers from other physical capital stocks and making the efficiency of R&D a function of computer quality, which in his model depends inversely on the price of computers. One conclusion from his analysis is that R&D added 1.2 percent to annual labor productivity growth in the 1960s, but only 0.5 percent from 1973 to 1990, thereby explaining a substantial portion of the productivity slowdown. Moreover, he found that labor productivity growth increased in the 1990s, and he projects that increase to continue, with labor productivity growth peaking at 1.8 percent around 2010 (versus 1.1 percent in the early 1990s).

### **An Optimistic Summary**

The bits of evidence presented above can be combined into a consistent optimistic scenario. The productivity slowdown was a real phenomenon, although its severity is overstated by biased economic statistics. The relative growth of the unmeasurable sector is partly responsible for the overstatement. Furthermore, it is plausible that computers—especially in the unmeasurable sector—have boosted quality in ways that confound traditional measurement. For one example, computers have allowed development of several new diagnostic techniques that have made medical treatment much more effective, including computerized tomography (CT) scanners. Trajtenberg (1990) has shown that while the price of a CT scanner, which would be included in a producer price index or a GDP price index, increased by a factor of 2.5, its quality-adjusted price index

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<sup>6</sup> William Nordhaus (1997) provides fascinating details on the provision of lighting throughout history. Most relevant to David's (1990) hypothesis, Nordhaus focuses on the cost of providing what consumers want, namely a given amount of illumination, and contrasts that with the traditional price-index practice of valuing items like lamps and fuel. The difference between the two approaches is striking. Whereas the traditional index increased by a factor of three from 1800 to 1992, the true index fell by a factor of 1,000! He further estimates that real output growth has been underestimated by 0.036 percent per year due to bias in price indexes for lighting alone.

fell by a factor of more than 1,400.<sup>7</sup> In short, the growing use of computers, especially in industries for which output is most difficult to measure, explains why the mismeasurement of productivity could have increased around the time of the reported slowdown of productivity growth.

Analysts who subscribe to this view expect productivity growth to be higher in the immediate future. First, part of the measured decline was simply measurement error. Second, the Hornstein-Krusell-David argument would suggest that although growth has been temporarily depressed, it is nonetheless set to rebound. A similar prediction comes from Richards's (1997) statistical analysis, based on different data. And Olson (1988) provides a rationale for even temporary positive developments to have counterintuitively large and long-lasting effects.

Since a key part of the optimistic scenario is a high rate of return to R&D, it may be helpful to consider why many economists might find that assumption plausible. The U.S. economy has become increasingly open to international trade and investment over the last half century because of lower tariffs, quotas, and other legal barriers to trade. Also important have been large declines in unit costs of transportation and communication and a shift in the composition of items traded from bulk commodities, such as steel, to services and physically smaller items, such as semiconductors. Why does openness matter? Many would argue that the U.S. economy has a comparative advantage in generating new ideas and incorporating them into tradeable products. Expanded trade therefore would be expected to raise demands for new research, for educated workers to apply that research, and for computer usage. A higher demand for new research would lead to a higher rate of return on new research. And as workers shifted into highly valued research-intensive activities, productivity would rise.

### **A Less-Optimistic Scenario**

Not all analysts subscribe to the optimistic scenario presented above. For example, Robert Gordon (1996b) has argued that total-factor productivity growth in the United States increased at an annual rate of 0.5 percent or less in much of the nineteenth and early twentieth centuries and at an annual rate of 1.5 percent from 1915 to 1965. Since 1965 it has reverted back to growth at an annual rate of 0.5 percent or less. To him, the rapid growth from 1915 to 1965 is unusual. He believes it is due to a few major technological developments, including the electric motor, the internal combustion engine, communication technology, and mass entertainment, which includes radio, movies, and television. In his view, the computer has not had as much of an impact as these earlier developments.

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<sup>7</sup>Of course, as the better scanner lowers the cost or improves the quality of medical care, consumer welfare increases and a cost-of-living index for consumers would fall.

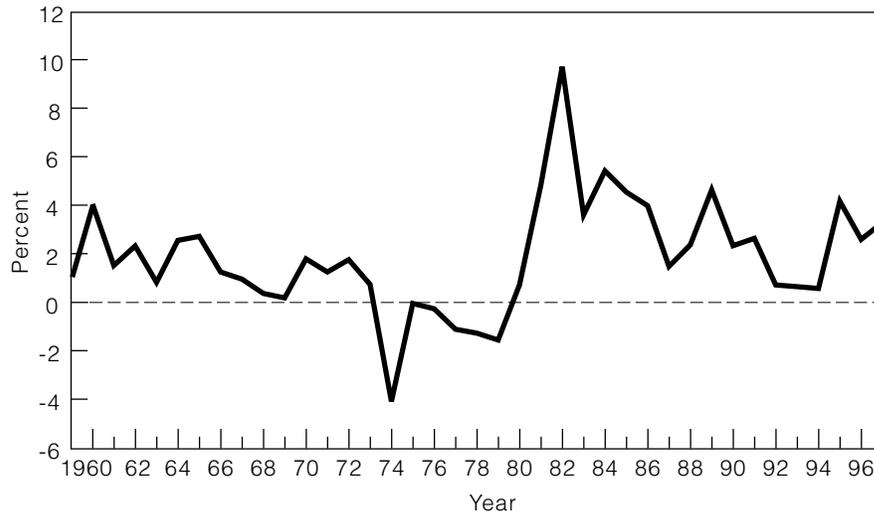
He therefore believes that at least 1 percentage point of the productivity slowdown is real and should not be expected to improve. To support his position, he suggests the thought experiment of comparing the rise in the standard of living of the average American between 1915 and 1955 with the rise between 1955 and 1995. He finds the former to be a period of substantial improvement, with an average person's daily life literally transformed, but the latter period to have comparatively little fundamental change.

An important part of Gordon's (1996b) argument involves a small contribution of computers to productivity growth. Supporting evidence comes from Daniel E. Sichel (1997), who examined the impact of computers on growth and found little evidence of a substantial impact. He noted that computer hardware represents only a small part of the nation's capital stock; that conclusion does not change even if software is correctly measured and added to the analysis. Also, he argued that improvements in office automation and information processing equipment did not begin with the computer but have been occurring for over a century. A wide variety of equipment was adopted, including punched-card tabulators, mechanical calculators, and electric typewriters. He therefore sees the growing use of computers as a continuation of a trend rather than a discrete technological shift. In addition, Sichel made the case that mismeasured output growth does not account for his results.

Charles Jones (1997) took a different approach. He identified two important factors, other than capital accumulation and technology, that have had major impacts on U.S. economic growth. First, median years of schooling for adults rose from 9.3 years in 1950 to 12.0 years in 1967 and then to 12.8 years in 1993. Second, the fraction of the labor force consisting of scientists and engineers engaged in R&D rose from 0.26 percent in 1950 to 0.72 percent in 1967; after a subsequent fall it has risen to 0.78 percent in 1993. For both, the substantial slowing of improvement after 1967 is striking. Jones's analysis uses a fairly conventional statistical model that incorporates increasing levels of both education and research and allows for modestly increasing returns to scale. In that model, increases in education or research can boost the steady-state level of output or productivity, but once the steady state is achieved, there is no effect on growth rates. He observes that both the amount of schooling per person and the nation's research effort must eventually stabilize, and he concludes that as they stabilize in the future, output growth will slow. Accordingly, he calculates that productivity growth will also slow to an annual rate of 0.6 percent.

## **6. RESOLVING THE DIFFERENT VIEWS**

The controversy over slowing productivity growth may remind the reader of the old line that if all the economists in the world were laid end to end, they wouldn't reach a conclusion. In this case, the importance of the problem has led

**Figure 4 Realized Real Interest Rates**

economists to explore possible explanations, but the lack of definitive data has prevented a consensus from emerging. More research would clearly be helpful. In particular, it would at least be useful to have bounds on the probable amount of bias in price, output, and productivity statistics for several benchmark years. With such bounds in hand, one could look at interrelations among macroeconomic statistics for indirect evidence on whether either the optimistic or the pessimistic scenarios could be ruled out.

To illustrate the value of such bounds, consider the behavior of real interest rates. Figure 4 shows the movements over time of one measure of ex post real rates, the one-year Treasury rate for each January minus the next 12-month percentage change in the consumer price index, excluding volatile food and energy prices (core CPI). Economic theory states that real rates should move with productivity growth; thus, for example, if the trend rate of productivity growth were to increase, that would tend to raise real interest rates.<sup>8</sup> Now suppose that we knew that there was no ongoing change in the amount of bias

<sup>8</sup> Of course, other factors also affect interest rates. In the figure, at least part of the downturn in the 1960s and 1970s reflected the slow adjustment of expectations and institutions to an inflationary monetary policy, and the upward spike in 1982 represents the shift to a disinflationary monetary policy. One also could adjust for other items that could have affected interest rates, such as the business cycle or fiscal policy.

in the core CPI.<sup>9</sup> One could then look for a trend in real rates. The absence of a downward trend would contradict the pessimistic story.

One could look at other relationships as well, such as real wages tracking the trend in productivity growth. The point is to have some bounds on movements of measurement biases over time; naturally, the tighter the bounds, the sharper the inferences that can be made. Also, the normal course of research will reveal which of the empirical studies mentioned above can withstand tests of replication by different authors and checks for robustness of the results to minor specification changes. And normal research will either tighten the theoretical work that is loosely specified or point out any internal inconsistencies discovered. Then we will better understand the productivity experience of the last half century.

## 7. FOR ADDITIONAL INFORMATION

The *Monthly Labor Review*, published by the BLS, often contains articles on the behavior of productivity and the preparation of productivity statistics. In addition, it contains tables that display recent data from each of the productivity programs.

The BLS also periodically publishes the *BLS Handbook of Methods*. This is an invaluable document for anyone wanting an in-depth explanation of the procedures used by the BLS to calculate economic statistics. Chapters 10 and 11 deal with productivity and were important sources for the preparation of this article.

The BLS makes a large volume of historical data and news releases available on the Internet (<http://www.bls.gov>). Some of its publications are also available at its web site, including the *Handbook of Methods*.

Since the output portion of productivity statistics comes from the National Income and Product Accounts, readers may find it helpful to consult the *Survey of Current Business* for articles about the preparation of GDP and related statistics. A convenient source of methodological articles from that publication is the web site of the Bureau of Economic Analysis (<http://www.bea.doc.gov>).

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<sup>9</sup> If the bias in measuring the CPI were increasing, that would bias estimates of real interest rates downward.

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## REFERENCES

- Baily, Martin Neil, and Robert J. Gordon. "The Productivity Slowdown, Measurement Issues, and the Explosion of Computer Power," *Brookings Papers on Economic Activity*, 2:1988, pp. 347–431.
- Boskin, Michael J. "Toward a More Accurate Measure of the Cost of Living," Final Report to the Senate Finance Committee of the Advisory Commission to Study the Consumer Price Index, December 4, 1996.
- Bureau of Labor Statistics. *Handbook of Methods*. Available: <http://www.bls.gov/homhome.htm>.
- David, Paul A. "The Dynamo and the Computer: An Historical Perspective on the Modern Productivity Paradox," *American Economic Review*, vol. 80 (May 1990), pp. 355–61.
- Gordon, Robert J. "Problems in the Measurement and Performance of Service-Sector Productivity in the United States," Working Paper 5519. Cambridge, Mass.: National Bureau of Economic Research, March 1996a.
- . "Comments," in Ben S. Bernanke and Julio J. Rotemberg, eds., *NBER Macroeconomics Annual 1996*. Cambridge, Mass.: MIT Press, 1996b, pp. 259–67.
- . *The Measurement of Durable Goods Prices*. Chicago: University of Chicago Press, 1990.
- Griliches, Zvi. "Productivity, R&D, and the Data Constraint," *American Economic Review*, vol. 84 (March 1994), pp. 1–24.
- Hornstein, Andreas, and Per Krussel. "Can Technology Improvements Cause Productivity Slowdowns?" in Ben S. Bernanke and Julio J. Rotemberg, eds., *NBER Macroeconomics Annual 1996*. Cambridge, Mass.: MIT Press, 1996, pp. 209–59.
- Jones, Charles I. "The Upcoming Slowdown in U.S. Economic Growth," Working Paper 6284. Cambridge, Mass.: National Bureau of Economic Research, November 1997.
- Jones, E. L. *Growth Recurring: Economic Change in World History*. New York: Oxford University Press, 1988.
- Kendrick, John W. "Appraising the U.S. Output and Productivity Estimates for Government—Where Do We Go from Here?" *Review of Income and Wealth*, Series 37 (June 1991), pp. 149–58.
- Ljungqvist, Lars, and Thomas J. Sargent. "The European Unemployment Dilemma." Manuscript. Federal Reserve Bank of Chicago, 1996.

- Maddison, Angus. "Explaining the Economic Performance of Nations, 1820–1989," in William J. Baumol, Richard R. Nelson, and Edward N. Wolff, eds., *Convergence of Productivity: Cross National Studies and Historical Evidence*. New York: Oxford University Press, 1994.
- Nakamura, Leonard I. "Is U.S. Economic Performance Really that Bad?" Manuscript. Federal Reserve Bank of Philadelphia, 1997.
- Nordhaus, William D. "Do Real Output and Real Wage Measures Capture Reality? The History of Lighting Suggests Not," in Timothy F. Bresnahan and Robert J. Gordon, eds., *The Economics of New Goods*. Chicago: University of Chicago Press, 1997, pp. 29–66.
- Olson, Mancur. "The Productivity Slowdown, the Oil Shocks, and the Real Cycle," *Journal of Economic Perspectives*, vol. 2 (Fall 1988), pp. 43–70.
- Pieper, Paul E. "The Measurement of Construction Prices: Retrospect and Prospect," in Ernst R. Berndt and Jack E. Triplett, eds., *Fifty Years of Economic Measurement*. Chicago: University of Chicago Press, 1990.
- Richards, Gordon R. "An Econometric Model with Endogenous Technological Advance: Implications for Productivity and Potential Growth." Manuscript. Washington: National Association of Manufacturers, 1997.
- Sichel, Daniel E. *The Computer Revolution: An Economic Perspective*. Washington: Brookings Institution Press, 1997.
- Slifman, L., and C. Corrado. *Decomposition of Productivity and Unit Costs*. Occasional Staff Studies 1. Washington: Board of Governors of the Federal Reserve System, November 1996. Available: <http://www.bog.frb.fed.us/pubs/oss>.
- Tatom, John A. "The Productivity Problem," *Federal Reserve Bank of St. Louis Review*, vol. 61 (September 1979), pp. 3–16.
- Trajtenberg, Manuel. "Product Innovations, Price Indices and the (Mis)Measurement of Economic Performance," Working Paper 3261. Cambridge, Mass.: National Bureau of Economic Research, February 1990.
- Vedder, Richard K. *Federal Regulation's Impact on the Productivity Slowdown: A Trillion-Dollar Drag*. Policy Study 131. St. Louis: Washington University, Center for the Study of American Business, 1996.