5 The President's Proposed Corporate Tax Reforms: A Move Toward Tax Neutrality

18 Factors Behind the Rise and Fall of Farmland Prices: A Preliminary Assessment

25 Weekly Money Announcements: New Information and Its Effects
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In This Issue . . .

Significant changes in the existing federal income tax laws have been proposed by the President. In the first article of this Review, "The President’s Proposed Tax Reforms: A Move Toward Neutrality," authors Dallas S. Batten and Mack Ott argue that the suggested reforms would increase production and national welfare.

Beginning with a simple illustration of how taxes can alter the allocation of economic resources, the authors demonstrate how the proposed reforms would reduce such allocative distortions. Batten and Ott argue that this aspect of the proposed tax reform has been overlooked in most critiques of the proposals, such critiques concentrating on macroeconomic impacts or the possible loss of subsidies to particular interest groups. The authors note also that removing subsidies and making the tax code relatively more neutral would improve the productivity of investment, measured by its before-tax rate of return.

In the second article of this Review, Michael T. Belongia applies a basic model of asset pricing to farmland in an attempt to determine the major factors explaining the ups and downs of land prices. In his "Factors Behind the Rise and Fall of Farmland Prices: A Preliminary Assessment," Belongia shows that expected future inflation, expected future net returns to farming and the ex ante real interest rate explain much of the variation in the growth of farmland prices through their 1981 peak.

To test the model’s validity in explaining the more recent behavior of farmland prices, an out-of-sample simulation experiment was performed for the 1982–85 period. The result of this exercise indicates that the model does poorly in explaining the recent decline in land prices, raising some doubt about the model’s validity in times of sharp land price declines. The author argues that this poor performance in explaining recent land price movements is more likely related to difficulties in measuring unobservable expectations than to weaknesses in the economic model.

The third article of this Review examines the theoretical effects and reviews the empirical findings on the impact of the weekly money announcement on financial markets. In "Weekly Money Announcements: New Information and Its Effects," Richard G. Sheehan presents three alternative hypotheses about why financial markets react to this announcement. Two of the hypotheses, the expected liquidity effect and the inflation premium effect, focus on expected changes in the money supply. The third hypotheses, in contrast, concerns the expected changes in money demand.

These three hypotheses are generally assumed to be competing explanations of why money announcements have an impact on financial markets. Sheehan demonstrates that, in fact, the three effects may be substitutes or complements. Only the expected liquidity effect by itself is consistent with all the empirical evidence. It is also possible, however, that all three effects have been present.
The President’s Proposed Corporate Tax Reforms: A Move Toward Tax Neutrality

Dallas S. Batten and Mack Ott

The President has proposed a significant change in the federal income tax law, The President’s Tax Proposals to the Congress for Fairness, Growth and Simplicity, (hereafter PTP). Included in PTP are proposed corporate business tax reforms that, in general, would lower the marginal tax rate on business income while broadening the corporate tax base. Because, on net, these proposals would increase the average tax rate on business income, they have been widely criticized as having deleterious effects on U.S. investment, employment and economic growth.1

By focusing on the negative macroeconomic effects, however, these critics have overlooked some of the proposed tax reform’s positive allocative effects. The President’s proposal would make tax rates across industries and activities more uniform and reduce the distorting influences of inflation, thereby diminishing the role of the tax structure in the allocation of productive resources.

The purpose of this article is to examine the allocative effects of the President’s proposal. We begin by describing the concepts of economic efficiency and tax neutrality, two important criteria for evaluating the reform. Then, the basic points contained in the President’s proposal are outlined and evaluated against these criteria.

ECONOMIC EFFICIENCY AND TAX NEUTRALITY

Fundamentally, economic efficiency means using resources in their highest valued activity. A simple example using the demand for and the supply of apples demonstrates the concept of efficiency and shows how competitive markets result in efficient resource use.2 The supply curve in figure 1 represents the minimum price that producers must receive if they are to supply a specific quantity of apples. This price is determined by the “opportunity cost” (the highest valued alternative use) of the resources used.

1See, for example, Rowen (1985), Sterngold (1985) and Yemma (1985).

2This example is simplified for illustrative purposes. It ignores the issues of externalities and imperfect competition. For a more complete discussion, see Hirshleifer (1980).
Figure 1
Efficient Production
Quantity and Price Determined by Market

The demand curve in figure 1 portrays the highest price consumers are willing to pay for any specific quantity of apples. The only price that is common to both the supply and demand curves ($P^*$) is called the “equilibrium” price; it is the only price at which the quantity demanded equals the quantity supplied ($Q^*$). This suggests that, at equilibrium, the value that people place on each apple equals the opportunity cost of the resources used to produce it. This is why the competitive market equilibrium represents an economically efficient allocation of resources.

Producing more ($Q_2$) or less ($Q_1$) apples than $Q^*$ would be inefficient. Either too many or too few resources would be allocated to apple production compared with other products that those resources could produce. The market will induce producers to provide exactly $Q^*$. If $Q_1$ apples were produced, consumers would be willing to pay only $P_1$ per apple, which is less than the cost of production ($P_2$); producers then would decrease output, lowering costs and releasing resources to other higher-valued uses. If $Q_2$ were produced, the adjustment would proceed conversely, with output rising and resources for apple production being bid away from other activities whose products were not as highly valued as apples.

Figure 2
Inefficient Production
Quantity and Price Distorted by Tax Subsidy

Taxes and subsidies change the allocation of resources if they alter the incentives confronting producers or consumers. In particular, some taxes or subsidies drive a wedge between the prices that consumers pay and producers receive. A tax on apple production — or on the resources used to produce apples — raises firms’ costs of production. This situation is depicted in figure 2 as the upward shift in the supply curve to $S_{tax}$ from its position without taxes or subsidies, $S$. As a result of the tax, the equilibrium price of apples rises to $P_2$ and the quantity produced (and sold) falls to $Q_1$; the economically efficient quantity of apples, $Q^*$, is no longer produced because the tax alters producer incentives. At $Q_1$, the value that people place on apples ($P_1$) exceeds the actual value of the resources used in apple production ($P_2$). The wedge, the difference between these values ($P_2 - P_1$), is the amount of the tax.

Likewise, subsidizing the production of apples (perhaps through use of tax preferences such as special deductions, credits or abatements) shifts the supply
curve to $S_{NA}$ in figure 2, resulting in more apples being produced ($Q_4$) than is economically efficient. At $Q_4$, the value of resources used to produce apples ($P_4$) exceeds the value that people place on apples ($P_3$). The difference ($P_4 - P_3$) is the amount of the subsidy and a measure of the economic inefficiency.

To summarize, taxes and subsidies cause economic inefficiency by affecting the quantity of the good produced. A tax on production results in too few resources employed in apple production, while subsidies motivate too many resources devoted to apple production. In either case, resources are wasted, the value of the economy's output is reduced and consumers are correspondingly worse off than if there had been no tax or no subsidy.

**Nonneutral Taxes: A Cause of Economic Inefficiency**

As we have seen, some taxes and subsidies distort resource use, causing inefficiency and making people worse off. Thus, a useful benchmark against which to evaluate both the existing tax system and the potential benefits of tax reform is an ideal, nondistorting “neutral” tax system. A neutral tax is one that causes no change in production, consumption or investment. In the context of figure 1, the imposition of a neutral tax would not alter the position of the supply curve. Consequently, a neutral tax does not induce inefficient resource use.

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3. Of course, many people feel that government should guide resource use in order to attain ends not necessarily reflected in market prices. For example, Sen. Russell Long, former chairman of the Senate Finance Committee, was characterized in a recent Wall Street Journal interview as being opposed to “[r]elinquishing tax law to the raw forces of the free market . . .”:

> I do not regard this matter of collecting taxes as simply a matter of bringing in revenue to finance government,” he says, “just as the appropriations process seeks to do more than pay for national defense.”

> To shy away from using the tax code to promote the general welfare, he says, is to be as callous as those who “don’t want to be bothered doing anything that benefits anyone except their own greedy selves.” (Birnbaum, 1985)

This view is widespread in both houses of Congress and on both sides of the aisle. For example, Senate Finance Committee Chairman Robert Packwood concurs in using the tax code for “legitimate social purposes.” (McGinley, 1985). Frequently, such social purposes are identified with a particular industry as in Sen. Malcolm Wallop’s defense of tax preferences for the oil industry: “. . . These provisions are backed by sound tax policy and protect a higher public need, namely energy independence.” (Wallop, 1985) Conversely, Sen. Bill Bradley, a proponent of tax reform, argues,

> The best allocator of capital is the free market, not the Senate Finance Committee . . . as laudable as these credits and deductions may be, when you put them in the tax code, rates are higher than they would otherwise be. (McGinley, 1985)

Obviously, any tax that can be reduced by a change of activities is not neutral. For example, an income tax is not a neutral tax because it varies with income. Thus, for individuals, an income tax lowers the cost of leisure (which is not taxed) and induces people to substitute more leisure in place of income-generating (taxed) activities. The extent of this substitution is small, of course, when considering the impact of taxes on corporate income. A corporation’s shareholders are unlikely to place much value on the leisure time of corporate assets — or that of the corporation’s workers. Consequently, the tax-free status of leisure does not preclude neutral taxation of business income.

Although business income taxation could be set up in a nearly neutral fashion, in reality, it seldom is. Tax preferences exist explicitly to encourage specific activities that would not be undertaken otherwise. Capital-intensive industries benefit from certain investment tax credits and accelerated depreciation that are not as remunerative to less capital-intensive industries. Some capital expenditures are treated as a current expense (for example, intangible drilling costs), and depreciation deductions based on historical costs are subject to distortions from inflation. Some business income is not taxed at all (for example, additions to bank reserves for loan defaults and the income of limited liability partnerships), while other business income is taxed twice (corporate dividends). Finally, tax rates vary according to arbitrary realization procedures (capital gains vs. income). In each of these instances, taxes can be altered by changing the firm’s production activity — its input mix, legal structure, product mix or timing of sales. To the extent that such tax-induced changes exist, the tax system is not neutral; the result is a distortion of resource use and economic inefficiency.

**Illustrations of Nonneutral Taxes**

To illustrate the potential allocative effects of the current business tax structure, consider table 1, which contains effective tax rates for a sample of large corporations in various industries over the past four years. This table presents average (not marginal) and actual (not expected) tax rates. It nonetheless provides an indication of just how diverse tax rates have been across industries as well as how important tax preferences may have been in allocating resources among

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### Table 1

**Comparison of Tax Rates on Large Corporations in Various U.S. Industries, 1980–83**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerospace</td>
<td>16.4%</td>
<td>6.8%</td>
<td>(0.6)%</td>
<td>14.0%</td>
<td>9.7%</td>
</tr>
<tr>
<td>Beverages</td>
<td>28.0</td>
<td>28.8</td>
<td>20.5</td>
<td>18.7</td>
<td>23.2</td>
</tr>
<tr>
<td>Broadcasting</td>
<td>3</td>
<td>3</td>
<td>8.9</td>
<td>18.5</td>
<td></td>
</tr>
<tr>
<td>Chemicals</td>
<td>13.7</td>
<td>5.0</td>
<td>(17.7)</td>
<td>(1.0)</td>
<td>3.6</td>
</tr>
<tr>
<td>Computers and office equipment</td>
<td>24.9</td>
<td>25.3</td>
<td>26.4</td>
<td>26.3</td>
<td>25.8</td>
</tr>
<tr>
<td>Construction</td>
<td>3</td>
<td>3</td>
<td>15.9</td>
<td>0.7</td>
<td></td>
</tr>
<tr>
<td>Electronics and appliances</td>
<td>24.5</td>
<td>17.1</td>
<td>14.3</td>
<td>7.4</td>
<td>16.2</td>
</tr>
<tr>
<td>Financial institutions</td>
<td>5.8</td>
<td>2.7</td>
<td>(3.8)</td>
<td>6.4</td>
<td>3.8</td>
</tr>
<tr>
<td>Food processors</td>
<td>35.6</td>
<td>26.8</td>
<td>30.4</td>
<td>25.9</td>
<td>29.5</td>
</tr>
<tr>
<td>Glass and concrete</td>
<td>3</td>
<td>3</td>
<td>17.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instrument companies</td>
<td>37.1</td>
<td>26.6</td>
<td>21.9</td>
<td>32.8</td>
<td>29.5</td>
</tr>
<tr>
<td>Insurance</td>
<td>3</td>
<td>3</td>
<td>(6.3)</td>
<td>9.9</td>
<td></td>
</tr>
<tr>
<td>Investment companies</td>
<td>3</td>
<td>3</td>
<td>21.3</td>
<td>9.3</td>
<td></td>
</tr>
<tr>
<td>Metal manufacturing</td>
<td>15.3</td>
<td>10.2</td>
<td></td>
<td>30.2</td>
<td>15.1</td>
</tr>
<tr>
<td>Metal products</td>
<td>3</td>
<td>3</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Mining</td>
<td>3</td>
<td>3</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Motor vehicles</td>
<td>3</td>
<td>3</td>
<td></td>
<td>3.5</td>
<td></td>
</tr>
<tr>
<td>Paper and wood products</td>
<td>(1.4)</td>
<td>(14.2)</td>
<td>36.1</td>
<td>(0.5)</td>
<td>(2.9)</td>
</tr>
<tr>
<td>Petroleum*</td>
<td>31.1</td>
<td>21.7</td>
<td>18.2</td>
<td>21.3</td>
<td>23.5</td>
</tr>
<tr>
<td>Pharmaceuticals</td>
<td>39.2</td>
<td>35.9</td>
<td>32.7</td>
<td>27.2</td>
<td>32.9</td>
</tr>
<tr>
<td>Retailing</td>
<td>34.1</td>
<td>22.3</td>
<td>20.4</td>
<td>20.0</td>
<td>22.9</td>
</tr>
<tr>
<td>Rubber</td>
<td>3</td>
<td>3</td>
<td>39.0</td>
<td>19.6</td>
<td></td>
</tr>
<tr>
<td>Soaps and cosmetics</td>
<td>3</td>
<td>3</td>
<td>33.3</td>
<td>35.6</td>
<td></td>
</tr>
<tr>
<td>Telecommunications</td>
<td>3</td>
<td>3</td>
<td>1.6</td>
<td>4.8</td>
<td></td>
</tr>
<tr>
<td>Tobacco</td>
<td>31.4</td>
<td>31.3</td>
<td>36.3</td>
<td>33.8</td>
<td>33.3</td>
</tr>
<tr>
<td>Transportation:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Airlines</td>
<td>3.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Railroads</td>
<td>10.7</td>
<td>(7.5)</td>
<td>4.1</td>
<td>3.3</td>
<td>2.4</td>
</tr>
<tr>
<td>Trucking</td>
<td>37.5</td>
<td>46.1</td>
<td>36.9</td>
<td>34.5</td>
<td>38.2</td>
</tr>
<tr>
<td>Utilities*</td>
<td>10.9</td>
<td>10.3</td>
<td>15.6</td>
<td>7.1</td>
<td>10.7</td>
</tr>
<tr>
<td>Wholesalers</td>
<td>3</td>
<td>3</td>
<td>36.1</td>
<td>34.8</td>
<td></td>
</tr>
</tbody>
</table>


1 An industry is included in this table only if substantially the same companies are included in the sample each year.
2 Rate not computed on book loss.
3 The 1980 and 1981 rates are not available: the 1980-83 average is not computed.
4 Some companies included in the 1982 and 1983 group were classified with crude oil production in 1980 and 1981.
5 In 1980 and 1981, the utilities group included AT&T and GTE. The 1980 and 1981 utilities rate is restated to include only electric and gas utilities.

Industries. For example, in 1983, these rates ranged from an effective tax rate of -1.0 percent (that is, a subsidy) for the chemical industry to a 35.6 percent rate for the soaps and cosmetics industry. Furthermore, providers of services faced substantially diverse rates: from financial institutions (6.4 percent) to wholesalers (34.8 percent).

In large part, these variations are due to variations in the tax credits available to the corporations. This is made clear by an examination of table 2, which displays the data for 1981, the most recent year available.
### Table 2
The Impact of Tax Credits on Tax Rates, 1981 (dollar amounts in millions)

<table>
<thead>
<tr>
<th>Industry</th>
<th>Income Subject to Tax</th>
<th>Corporate Tax</th>
<th>Effective Percent¹</th>
<th>Net of Credit²</th>
<th>Total³</th>
<th>Total Credit as a Percent of Corporate Tax</th>
<th>Investment Credit as a Percent of Corporate Tax</th>
<th>Foreign Credit as a Percent of Corporate Tax</th>
<th>Possessions Credit as a Percent of Corporate Tax</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALL INDUSTRIES</td>
<td>$241,496.0</td>
<td>$102,258.0</td>
<td>42.3%</td>
<td>18.1%</td>
<td>$58,444.0</td>
<td>57.2%</td>
<td>18.5%</td>
<td>$21,829.0</td>
<td>21.3%</td>
</tr>
<tr>
<td>Agriculture, Forest, Fishing</td>
<td>1,278.0</td>
<td>557.0</td>
<td>32.2%</td>
<td>24.0%</td>
<td>142.0</td>
<td>25.5%</td>
<td>128.0</td>
<td>23.0%</td>
<td>3.0%</td>
</tr>
<tr>
<td>Mining</td>
<td>9,479.0</td>
<td>4,245.0</td>
<td>44.8%</td>
<td>17.8%</td>
<td>2,556.0</td>
<td>60.2%</td>
<td>582.0</td>
<td>13.7%</td>
<td>1,958.0</td>
</tr>
<tr>
<td>Construction</td>
<td>6,610.0</td>
<td>2,360.0</td>
<td>35.7%</td>
<td>28.3%</td>
<td>490.0</td>
<td>20.8%</td>
<td>334.0</td>
<td>14.2%</td>
<td>107.0%</td>
</tr>
<tr>
<td>ALL MANUFACTURING</td>
<td>133,416.0</td>
<td>59,555.0</td>
<td>44.6%</td>
<td>22.6%</td>
<td>29,439.0</td>
<td>49.4%</td>
<td>9,145.0</td>
<td>15.4%</td>
<td>17,737.0</td>
</tr>
<tr>
<td>Food</td>
<td>10,163.0</td>
<td>4,574.0</td>
<td>45.0%</td>
<td>27.6%</td>
<td>1,768.0</td>
<td>38.7%</td>
<td>850.0</td>
<td>18.6%</td>
<td>770.0</td>
</tr>
<tr>
<td>Tobacco</td>
<td>2,179.0</td>
<td>1,003.0</td>
<td>46.0%</td>
<td>35.7%</td>
<td>4,148.0</td>
<td>22.4%</td>
<td>1,003.0</td>
<td>19.0%</td>
<td>19.0%</td>
</tr>
<tr>
<td>Textile and Mill</td>
<td>1,470.0</td>
<td>653.0</td>
<td>44.4%</td>
<td>28.3%</td>
<td>430.0</td>
<td>20.8%</td>
<td>334.0</td>
<td>14.2%</td>
<td>107.0%</td>
</tr>
<tr>
<td>Fabricated Metals</td>
<td>4,686.0</td>
<td>2,869.0</td>
<td>42.8%</td>
<td>33.1%</td>
<td>430.0</td>
<td>20.8%</td>
<td>334.0</td>
<td>14.2%</td>
<td>107.0%</td>
</tr>
<tr>
<td>Machinery</td>
<td>15,219.0</td>
<td>6,987.0</td>
<td>45.3%</td>
<td>28.3%</td>
<td>3,268.0</td>
<td>47.4%</td>
<td>939.0</td>
<td>13.6%</td>
<td>2,229.0</td>
</tr>
<tr>
<td>Electrical, Electronic</td>
<td>9,561.0</td>
<td>4,282.0</td>
<td>43.0%</td>
<td>33.3%</td>
<td>452.0</td>
<td>21.3%</td>
<td>350.0</td>
<td>16.5%</td>
<td>97.0%</td>
</tr>
<tr>
<td>Motor Vehicles</td>
<td>4,292.0</td>
<td>1,869.0</td>
<td>45.0%</td>
<td>35.3%</td>
<td>1,003.0</td>
<td>53.7%</td>
<td>739.0</td>
<td>39.5%</td>
<td>218.0%</td>
</tr>
<tr>
<td>Transportation Equipment</td>
<td>2,005.0</td>
<td>880.0</td>
<td>43.9%</td>
<td>26.6%</td>
<td>347.0</td>
<td>39.4%</td>
<td>122.0</td>
<td>13.9%</td>
<td>205.0%</td>
</tr>
<tr>
<td>Telecommunications</td>
<td>8,113.0</td>
<td>3,789.0</td>
<td>46.7%</td>
<td>28.0%</td>
<td>2,421.0</td>
<td>63.9%</td>
<td>2,283.0</td>
<td>60.3%</td>
<td>67.0%</td>
</tr>
<tr>
<td>Utilities</td>
<td>23,843.0</td>
<td>10,727.0</td>
<td>45.0%</td>
<td>21.3%</td>
<td>5,660.0</td>
<td>52.8%</td>
<td>5,334.0</td>
<td>49.7%</td>
<td>228.0%</td>
</tr>
<tr>
<td>Transportation</td>
<td>5,413.0</td>
<td>2,257.0</td>
<td>41.7%</td>
<td>28.0%</td>
<td>739.0</td>
<td>32.7%</td>
<td>671.0</td>
<td>29.7%</td>
<td>53.0%</td>
</tr>
<tr>
<td>Telecommunications</td>
<td>8,113.0</td>
<td>3,789.0</td>
<td>46.7%</td>
<td>28.0%</td>
<td>2,421.0</td>
<td>63.9%</td>
<td>2,283.0</td>
<td>60.3%</td>
<td>67.0%</td>
</tr>
<tr>
<td>Utilities</td>
<td>10,317.0</td>
<td>4,681.0</td>
<td>45.4%</td>
<td>21.1%</td>
<td>2,502.0</td>
<td>53.5%</td>
<td>2,380.0</td>
<td>50.8%</td>
<td>108.0%</td>
</tr>
<tr>
<td>Wholesale and Retail</td>
<td>32,360.0</td>
<td>12,516.0</td>
<td>38.7%</td>
<td>31.8%</td>
<td>2,234.0</td>
<td>17.8%</td>
<td>1,593.0</td>
<td>12.7%</td>
<td>420.0%</td>
</tr>
<tr>
<td>Wholesale</td>
<td>16,966.0</td>
<td>6,700.0</td>
<td>39.5%</td>
<td>31.3%</td>
<td>1,038.0</td>
<td>15.5%</td>
<td>695.0</td>
<td>10.4%</td>
<td>264.0%</td>
</tr>
<tr>
<td>Finance, Insurance, Real Estate</td>
<td>21,903.0</td>
<td>8,159.0</td>
<td>37.3%</td>
<td>27.6%</td>
<td>2,121.0</td>
<td>26.0%</td>
<td>888.0</td>
<td>10.9%</td>
<td>1,190.0</td>
</tr>
<tr>
<td>Banking</td>
<td>7,664.0</td>
<td>2,803.0</td>
<td>36.6%</td>
<td>19.6%</td>
<td>1,301.0</td>
<td>46.4%</td>
<td>351.0</td>
<td>12.5%</td>
<td>936.0%</td>
</tr>
<tr>
<td>Services</td>
<td>12,034.0</td>
<td>4,100.0</td>
<td>34.1%</td>
<td>24.5%</td>
<td>1,156.0</td>
<td>28.2%</td>
<td>878.0</td>
<td>21.4%</td>
<td>183.0%</td>
</tr>
<tr>
<td>Hotels and other lodging</td>
<td>987.0</td>
<td>396.0</td>
<td>40.1%</td>
<td>32.2%</td>
<td>78.0</td>
<td>19.7%</td>
<td>61.0</td>
<td>15.4%</td>
<td>11.0%</td>
</tr>
</tbody>
</table>


¹Corporate tax divided by income subject to tax.
²Corporate tax less total credits divided by income subject to tax.
³Sum of investment tax credits, foreign tax credits, U.S. possessions tax credits, work incentive tax credits, jobs tax credit, nonconventional fuels tax credit and research activities tax credit.
In general, industries with proportionally high tax credits (table 2) correspond with the large corporations facing low tax rates (table 1) and vice versa. In particular, chemicals, banking and utilities each have high ratios of credits to tax and low tax rates for 1981. Conversely, food, instruments and wholesalers have low ratios of tax credits and high tax rates.

These tax credit ratios differ within industrial groups as well as across them. Within the utilities group, for example, compare tax credit ratios for transportation (32.7) and telecommunications (63.9) in table 2 with their corresponding tax rates in table 1, or compare the overall finance, insurance and real estate tax credit ratio (26.0) and that for banking (46.4) in table 2 with their corresponding tax rates in table 1.

Profit-seeking investors typically will ensure that their expected after-tax rates of return are the same across alternative investments, adjusting for risk differences. If tax rates differ across industries, however, the expected before-tax rates of return will vary with the tax rate. Consequently, some higher-earning investment opportunities, when compared on a before-tax basis, will be passed over in favor of investments that have lower before-tax, but higher expected after-tax, rates of return. A neutral tax system would result in the same relative ranking of investment opportunities before and after taxes. Tables 1 and 2 suggest that the present tax structure does not have this characteristic. A tax reform that produced more uniform tax rates across industries would generate more efficient allocation of resources because investments would be chosen more in line with their socially relevant, before-tax yields.

**A MORE NEUTRAL TAX SYSTEM: THE PRESIDENT'S PROPOSAL**

The President's proposed business tax reform consists of four primary adjustments. These adjustments would

1. Lower the corporate tax rate from 46 percent to 33 percent;
2. Shift the income tax burden proportionally — from personal taxes (down 6 percent) to corporate taxes (up 24 percent);
3. Reduce nonneutralities in the tax code by broadening the tax base and repealing tax subsidies; and
4. Reduce inflation distortions of resource allocation by indexing inventory costs and depreciation deductions to reflect price changes.

While the focus of our discussion is on the third general feature, the reduction of nonneutralities, the analysis cannot be undertaken without considering the other three.

The President's tax proposal was set up to be "revenue-neutral." Consequently, in order to lower the corporate tax rate yet shift the tax burden from the personal to the corporate tax, it was necessary to increase corporate tax revenues by broadening the tax base — that is, by removing subsidies, exemptions and credits. Their removal provides just about enough additional revenues to offset the impact of the rate reductions, corporate and individual. This revenue enhancement also extends to the reduction of inflation distortions. By indexing depreciation for inflation, much of the rationale for the accelerated depreciation system is removed. Thus, the protection of the depreciation deduction's real value compensates for the lower depreciation deductions.

The impact of these changes on total tax revenues can be seen at the bottom of table 3. Corporate tax and other federal tax revenues over the five years 1986–90 would rise by about $120 billion, while personal tax revenues would fall by $132 billion. The result is that overall tax revenues over the five years would be approximately unchanged — less than a one-half percent overall decrease — from what they would have been in the absence of tax reform.

Yet, there is more to the reform proposal. The Treasury's estimates of tax revenues over the 1986–90 period are based on an extrapolation of current macro-economic output and growth; this ignores the reallocative or microeconomic effects of the reforms. With the repeal of various tax subsidies reducing profitability in some business sectors, and the net reduction in marginal tax rates increasing profitability in other sectors, there would be a reallocation of resources. A major argument in favor of this tax reform is that it results in a more efficient allocation of productive resources. That is, the decrease in output in sectors losing tax subsidies will be exceeded by the increase in output in sectors benefiting from net declines in marginal tax rates.

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5 This is clearly stated in the summary of The President's Tax Proposals to the Congress for Fairness, Growth and Simplicity (p. 7):

Taken together, the President's proposals are "revenue neutral" (plus-or-minus 1.5% of total revenues) — using conventional estimating procedures, without changing macro-economic assumptions. That is, under these assumptions, the proposals would, when fully effective, raise virtually the same amount of revenue as current law.
Table 3
Major Proposed Corporate Business Tax Reforms (dollar amounts in billions)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce corporate tax rates</td>
<td>Corporate tax rate reduced from 46 to 33 percent; revise graduated corporate rate structure; revise corporate minimum tax</td>
<td>6.01, 13.04</td>
<td>$-10.0</td>
<td>$-26.9</td>
<td>$-35.9</td>
<td>$-39.0</td>
<td>$-41.8</td>
</tr>
<tr>
<td>Neutrality toward location of income</td>
<td>Use per country limitation for foreign tax credit; allocation of deductions; replace possessions tax credit (Puerto Rico) with wage credit</td>
<td>15.00, 15.02, 12.05</td>
<td>1.3</td>
<td>3.4</td>
<td>4.1</td>
<td>4.6</td>
<td>5.1</td>
</tr>
<tr>
<td>Neutrality toward types of investment</td>
<td>Adjust depreciation schedules and index for inflation; repeal investment tax credit; allow inflation indexed FIFO inventory accounting recapture of rate differential on accelerated depreciation</td>
<td>7.01, 7.02, 7.04, 7.07</td>
<td>21.9</td>
<td>41.9</td>
<td>47.8</td>
<td>46.9</td>
<td>48.7</td>
</tr>
<tr>
<td>Neutrality toward form of business organization</td>
<td>Dividends paid 10 percent deductible from taxable income</td>
<td>6.02</td>
<td>0.0</td>
<td>-3.4</td>
<td>-6.2</td>
<td>-7.2</td>
<td>-8.0</td>
</tr>
<tr>
<td>Neutrality toward income measurement</td>
<td>Match expense and income from multiperiod construction; treat pledges of installment obligations as payments; repeal structure rehabilitation tax credits</td>
<td>8.01, 8.02, 12.01</td>
<td>3.3</td>
<td>6.9</td>
<td>10.3</td>
<td>13.6</td>
<td>15.0</td>
</tr>
<tr>
<td>Neutrality toward industries: repeal energy and natural resource subsidies</td>
<td>Repeal business energy credits; repeal percentage depletion</td>
<td>9.01, 9.02</td>
<td>0.2a</td>
<td>0.4a</td>
<td>0.5a</td>
<td>0.8a</td>
<td>1.1a</td>
</tr>
<tr>
<td>Neutrality toward industries: repeal financial institution subsidies</td>
<td>Repeal depository institutions' bad debt reserve deduction; disallow interest incurred to carry tax-exempts; repeal tax exemption of large credit unions; limit life insurance reserve deductions; repeal special percentage of taxable income deduction for life insurance companies; limit property and casualty insurance reserves</td>
<td>10.01, 10.02, 12.08, 12.09, 12.10</td>
<td>2.1</td>
<td>4.2</td>
<td>4.9</td>
<td>5.7</td>
<td>6.9</td>
</tr>
<tr>
<td>Total Changes</td>
<td>Change in corporate tax receipts6</td>
<td>$18.9</td>
<td>$26.1</td>
<td>$24.3</td>
<td>$23.9</td>
<td>$25.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Change in personal tax receipts4</td>
<td>-17.9</td>
<td>-26.0</td>
<td>-32.0</td>
<td>-29.0</td>
<td>-26.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Changes in other federal tax receipts4</td>
<td>0.2</td>
<td>0.3</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overall change in federal tax receipts</td>
<td>1.2</td>
<td>0.4</td>
<td>-7.3</td>
<td>-4.6</td>
<td>-1.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Percentage change from baseline revenues7</td>
<td>0.25%</td>
<td>0.08%</td>
<td>-1.29%</td>
<td>-0.74%</td>
<td>-0.18%</td>
<td></td>
</tr>
</tbody>
</table>

Source: PTP

1Not complete listing; reforms listed are those with cumulative revenue implications 1986-90 exceeding $1 billion.

2References are to subchapters in PTP.

3Static revenue estimates; for each reform group, the total change is reported including specific reforms not referenced in column 2.

4Includes change in excise taxes.

5Totals include some reforms not listed; source: PTP, Appendix B, p. 461.

6Estate, gift and excise taxes.

7As estimated by Treasury under current law.
An estimate of the overall gain (a part of which results from increased efficiency) due to the President's proposed reforms has been computed by the Treasury Department:

For reasons suggested above, it is reasonable to expect improved economic performance as a result of the President's tax proposals. The Treasury Department estimates that the effect of the proposals would be to cause real GNP to be at least 1.5 percent higher by 1995 than it would be under current law. Because of the inherent uncertainty in such forecasts, however, this additional growth has not been added to Administration forecasts and is not reflected in higher revenue estimates.6

The estimated 1.5 percent rise in the level of output results from resource reallocations that would be induced by the proposed tax reforms. In that sense, the proposed repeal of many so-called tax expenditures — that is, tax subsidies, exemptions, credits and the like — are sources of a rise in U.S. wealth. Repeal of these tax expenditures, which are subsidies of production in the beneficiary industries, releases resources to higher-valued uses. Thus, the value of production, in other words, income, and its capitalized value, wealth, will rise as a result of the reforms. To see more tangibly the source of such tax reform benefits, consider the following description of specific tax reforms outlined in table 3.

**Neutrality Toward Location of Income**

U.S. corporate income is subject to the U.S. income tax regardless of where such income is generated. Corporations, however, receive credits against their U.S. tax liabilities for taxes paid to foreign governments. (See table 2 for the impact of foreign tax credits across industries.) Under current tax law, corporations may receive larger credits from overseas production than from domestic production. This amounts to a subsidy of foreign production for U.S. corporations in high-tax foreign countries. The Treasury proposal would eliminate this subsidy by changing the foreign tax credit to a bilateral basis. U.S. corporations would be allowed to claim credit for taxes paid in each foreign country up to a limit of the equivalent U.S. tax. Since the U.S. tax rate under the Treasury proposal would be lower than most industrial nations, it is likely that some overseas production would be repatriated.7

In addition, the proposal would change some accounting rules that allow firms to reduce tax liabilities by transshipping goods or changing title to them in offshore facilities. Also, the so-called possessions tax credit, which applies predominantly to Puerto Rico, would be replaced with a wage credit. The result of this change would be to limit U.S. corporate tax credit to job-creating production in Puerto Rico. As shown in table 3, such reforms would result in an expected $18.5 billion increase in tax revenues during the 1986–90 period. Not shown in the table, but clearly important, would be any U.S. production increases induced by removal of the tax subsidy.

**Neutrality Toward Capital Investment**

Currently, tax deductions for the cost of depreciation of capital equipment and structures are based on their historical cost. This creates a bias favoring investment in less durable over more durable equipment and structures when the expected inflation rate is moderate or high. The 1981 and 1982 tax acts revised depreciation methods — the Accelerated Cost Recovery System.
Table 4

Effective Corporate Tax Rates on Income from Equity-Financed Investments for 46 Percent Taxpayer under ACRS

<table>
<thead>
<tr>
<th>Type of asset</th>
<th>Asset class (years)</th>
<th>Inflation rate (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Automobiles, light trucks</td>
<td>3</td>
<td>-75</td>
</tr>
<tr>
<td>Most other producers' durable equipment</td>
<td>5</td>
<td>-47</td>
</tr>
<tr>
<td>Railroad equipment</td>
<td>10</td>
<td>-6</td>
</tr>
<tr>
<td>Utilities' equipment and low-income housing</td>
<td>15</td>
<td>8</td>
</tr>
<tr>
<td>Structures</td>
<td>18</td>
<td>27</td>
</tr>
</tbody>
</table>

Source: PTP, p. 136.

1Assumptions: Real return after tax is 4 percent. The investment tax credit selected is the maximum allowable for new equipment (6 percent on three-year equipment and 10 percent on five-, 10- and 15-year equipment). Effective tax rates are the difference between the real before-tax rate of return and the real after-tax rate of return divided by the real before-tax rate of return.

The Importance of Investment Patterns

This bias against investment in structures does not impinge evenly on the earnings of all industries. Some industries invest a larger proportion of their capital in equipment than others. As table 5 shows, across all industries, equipment accounts for more than four-fifths of investment, but the proportion varies widely: the tobacco products and pharmaceuticals industries are on the low side, while the motor vehicle and paper industries are quite high.

The importance of such investment patterns is their impact on tax rates, both from the bias in the depreciation system (table 4) and the investment tax credit (ITC). ITC applies only to equipment; no credit is given for structures. Thus, industries with high proportional investment in equipment (table 5) tend to have high ratios of ITC to tax liabilities (table 2) and, consequently, lower tax rates (table 1) than firms with lower equipment-to-investment ratios. For example, the paper products industry, which put 88.2 percent of its investment into equipment, received an ITC covering 18.7 percent of its tax liability and had a net negative tax rate (—14.2 percent) in 1981. In contrast, the tobacco products industry put 68.8 percent of its investment into equipment, resulting in an ITC covering 15.1 percent of its tax liability and a 31.3 percent effective tax rate.

To reduce these biases and their nonneutral tax effects, the President’s tax proposal would revamp the depreciation accounting deduction and repeal ITC. ACRS would be replaced with the Capital Cost Recovery System (CCRS). CCRS differs from ACRS in three important respects:

First, CCRS would allow cost recovery of the real or inflation-adjusted cost of depreciable assets, rather than only the original, nominal cost. Second, CCRS would assign property among new recovery classes based upon economic depreciation rates. Third, CCRS would prescribe depreciation schedules and recovery periods which produce systematic investment incentives that are neutral across recovery classes. (PTP, p. 138)

Along with this revamping of depreciation accounting, ITC would be repealed. The result is to drastically reduce the biases against durable equipment and structures. As can be seen by comparing tables 4 and
Table 5
Investment Expenditures and the Proportion Invested in Equipment by Selected Industries (dollar amounts in millions)

<table>
<thead>
<tr>
<th>Industry</th>
<th>Total Expenditures</th>
<th>Percent in Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerospace</td>
<td>$ 672.5</td>
<td>82.5%</td>
</tr>
<tr>
<td>Beverages</td>
<td>993.9</td>
<td>80.2</td>
</tr>
<tr>
<td>Chemicals</td>
<td>5,812.7</td>
<td>85.8</td>
</tr>
<tr>
<td>Computer and Office Equipment</td>
<td>826.1</td>
<td>79.9</td>
</tr>
<tr>
<td>Electronics</td>
<td>2,866.5</td>
<td>81.9</td>
</tr>
<tr>
<td>Food processors</td>
<td>4,214.9</td>
<td>78.5</td>
</tr>
<tr>
<td>Glass and concrete</td>
<td>1,050.4</td>
<td>83.1</td>
</tr>
<tr>
<td>Instruments</td>
<td>938.9</td>
<td>74.9</td>
</tr>
<tr>
<td>Metal manufacturing</td>
<td>4,496.8</td>
<td>85.4</td>
</tr>
<tr>
<td>Fabricated metal products</td>
<td>2,606.1</td>
<td>81.5</td>
</tr>
<tr>
<td>Motor vehicles and equipment</td>
<td>3,636.1</td>
<td>87.5</td>
</tr>
<tr>
<td>Paper and wood products</td>
<td>3,887.0</td>
<td>88.2</td>
</tr>
<tr>
<td>Petroleum and coal products</td>
<td>2,261.3</td>
<td>72.7</td>
</tr>
<tr>
<td>Pharmaceuticals</td>
<td>578.5</td>
<td>73.2</td>
</tr>
<tr>
<td>Rubber</td>
<td>1,645.3</td>
<td>81.4</td>
</tr>
<tr>
<td>Soap and other detergents</td>
<td>334.0</td>
<td>80.3</td>
</tr>
<tr>
<td>Tobacco products</td>
<td>181.5</td>
<td>68.7</td>
</tr>
<tr>
<td>All industries</td>
<td>47,459</td>
<td>82.1</td>
</tr>
</tbody>
</table>


6, the effective tax rates on equipment are changed from subsidies for short-lived equipment to a level tax rate across all durabilities, and the bias against structures is reduced to a few percentage points from its current huge spread. Note also that the indexing for inflation removes that tax distortion as an influence on asset choice. Correspondingly, there would be a narrowing of the tax rate differentials across industries.

It is important to emphasize that these reforms are not intended to be neutral in the sense of removing incentives to invest. The new depreciation scheme (CCRS) retains write-off periods for capital recovery that are shorter than the anticipated economic lives of the assets. Rather, the neutrality sought is between investments of varying durations:

The proposed CCRS depreciation system, in conjunction with repeal of the investment tax credit and other capital and business taxation proposals, makes possible a substantial lowering of statutory tax rates for individuals and corporations. This reduction in statutory tax rates is accomplished without sacrificing investment incentives necessary to stimulate continued economic growth for the economy as a whole. The CCRS depreciation rates and recovery periods produce effective tax rates which would stimulate new investment in depreciable assets. The indexing of depreciation allowances for inflation and the classification of assets on the basis of economic depreciation would ensure that the CCRS system provides neutral investment incentives. (FTP, p. 148)

Another form of investment whose yields are distorted by the current tax code is inventories. The costs of maintaining inventories are a relatively more important part of business in the service sector, particularly wholesale and retail trade, than in manufacturing. Inflation reduces the real deductible expense incurred in inventory replacement. This tends to lower the profitability of production in retail and wholesale trade relative to manufacturing both directly and indirectly (by inducing a smaller inventory level than otherwise would be held). The President’s proposal
would alleviate this bias by indexing for inflation the inventory replacement expense tax deduction.

As shown in table 3, the result of such changes in the tax code for investment would be an increase in corporate tax revenues during 1986–90 of about $207 billion.

**Neutrality Toward Form of Business Organization**

Income generated by corporations is subject to double taxation. It is subject to the corporate tax; then, dividends paid out from this after-tax income to the corporation’s shareholders are subject to the personal income tax. In contrast, income from sole proprietorships or partnerships is not taxed at the firm, only as the owner’s personal income.

To reduce this distortion, the President’s proposal would allow corporations to deduct from taxable income 10 percent of their dividend payout. As shown in table 3, this would result in a decline in tax revenues during 1986–90 of about $24.8 billion.

**Neutrality Toward Income Measurement**

Analogous to the nonneutralities in the existing depreciation deduction system are distortions in determining taxable income from the production of assets covering more than one tax year. Examples are the construction of large buildings or ships and the design and production of aircraft. This raises the issue of how to treat the costs of production incurred before the sale. Economic theory suggests these costs should be capitalized and deducted when the project is completed or sold; however, current tax law allows many such costs to be deducted currently, while receipts are not taxed until received, perhaps years later. Revising the tax code to require matching of expenses and income from multiperiod production would raise corporate tax receipts by $39.7 billion over 1986–90.

The President’s proposed tax reform would repeal structural rehabilitation tax credits, yielding an increase in corporate taxes of about $1.5 billion in 1986–90. Also, the interest tax exemption for private-purpose state and municipal bonds — the so-called industrial development bonds — would be repealed. While this repeal would not increase corporate tax revenues, it would significantly reduce the number of tax-exempt bond issues and increase individual tax revenues — by an estimated $15.9 billion over 1986–90.

**Neutrality Toward Industries**

**Repeal of Energy and Mining Subsidies** — An important tax subsidy to the oil- and gas-producing industry as well as other mining industries is percentage depletion. No longer available to large integrated

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**Table 6**

**Effective Tax Rates on Equity-Financed Investments in Equipment and Structures**

<table>
<thead>
<tr>
<th>Asset Type (example)</th>
<th>Paid⁴</th>
<th>Held⁵</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>four-year depreciation (autos)</td>
<td>16%⁴</td>
<td>18%⁵</td>
</tr>
<tr>
<td>five-year depreciation (trucks, computers, office equipment)</td>
<td>16</td>
<td>18</td>
</tr>
<tr>
<td>six-year depreciation (construction, machinery, aircraft, instruments)</td>
<td>17</td>
<td>18</td>
</tr>
<tr>
<td>seven-year depreciation (furniture, industrial machinery, communications and railroad equipment)</td>
<td>17</td>
<td>18</td>
</tr>
<tr>
<td>10-year depreciation (ships, turbines, plant and equipment for electric utilities)</td>
<td>17</td>
<td>18</td>
</tr>
<tr>
<td>Structure:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28-year depreciation (industrial and commercial buildings, rental housing)</td>
<td>23</td>
<td>25</td>
</tr>
</tbody>
</table>

Source: *PTP*, p. 147.

1 Assumes 33 percent statutory tax rate and 4 percent required return after tax and inflation. The effective tax rate at the entity level may be lower than reported here on leveraged investments, depending on the degree of debt-finance and the relation between the interest rate on debt and the rate of return on the investment. Effective tax rates on different property within a recovery class may vary somewhat depending on experienced economic depreciation rates.

2 Assumes application of a 10 percent dividend-paid deduction to a corporation which distributes 100 percent of its earnings derived from depreciable assets.

3 Assumes no distribution of corporate earnings derived from depreciable assets.

4 The differences between the 16 percent effective tax rate for classes 1 and 2 and the 17 percent effective tax rate for equipment with six-year through 10-year depreciation write-off periods are due to rounding and are not significant.

5 Tax procedures that avoid double taxation of dividends are common among the principal industrial countries. For example, France has a 50 percent dividend tax credit, Germany effectively excludes 100 percent of dividends paid from double taxation and Japan excludes 38 percent. See U.S. Treasury (1984), vol. 1, p. 260.

6 Individual tax revenues, including those from limited partnerships, which are very common in real estate investment, would rise over 1986–90 by about $5 billion as a result of this repeal. (The President’s Tax Proposals to the Congress for Fairness, Growth and Simplicity, p. 459)
petroleum producers, it primarily benefits small independent producers. Percentage depletion allows these small producers to deduct from taxable income a fixed percentage of the value of production to compensate for the reduction in the total amount remaining. In practice, it results in a total deduction over the life of the well or mine that exceeds the capitalized value of the deposit. The proposed reform would phase out this subsidy of oil and mineral production over the 1986–90 period, except for oil wells with small amounts of production.

Also to be repealed are the business energy tax credits. Originally, these credits were introduced to increase non-petroleum energy production, lower energy use and enhance petroleum production from technically difficult or deep deposits.

In total, the repeal of these energy and mineral industry deposits would yield an increase in corporate tax revenues over 1986–90 of about $3 billion.

**Repeal of Financial Institution Subsidies** — As shown in table 1, the tax rate levied on the U.S. financial and insurance industries has been substantially lower than in other industries. Largely, this has been due to tax subsidies that the reform proposal would eliminate. Primarily, the form of these subsidies has been to permit deductions from taxable income contributions to reserves for various losses. Under the proposed reforms, only the actual losses would be deductible.

Overall, the Treasury’s proposed reforms of financial and insurance institution tax deductions would raise corporate tax revenues during 1986–90 by $23.8 billion. In particular, the principal reforms are the following (estimated tax revenue gains during 1986–90 in parentheses):

- the repeal of the deduction for depository institutions’ contribution to bad debt reserves ($5.1 billion);
- the disallowance of the deduction of interest paid by financial institutions to finance purchase of tax-exempt securities ($2.2 billion); and
- a limit on property and casualty insurance company tax-deductible additions to reserves equal to the capitalized value of expected claims ($5.6 billion).

**Impact of Reform: Investment Yields Less Affected by Taxes**

The most important measures of the overall impact of tax reform, in terms of making the tax code more neutral, are the tax rates displayed in table 6. Comparing these rates with those under current law in table 4, one can see two major differences: no impact on investment due to inflation and nearly level tax rates on investments of diverse durations.

While tax rates are considerably less variable across types of investments under the new tax plan, as levies against corporate income, they are somewhat higher on average. The net result may be a lower aggregate investment rate. A decline in investment, however, would not necessarily imply a lower level of output. The more uniform tax rates on investments ensure that investment will be induced by market demands — the valuations of consumers — rather than tax subsidies. A resulting decline in investment would mean that some projects undertaken under the old tax code were inefficient. The release of resources from such inefficient investment would imply an improvement in welfare.

**SUMMARY AND CONCLUSION**

The taxation of business income in the United States has evolved into a complex system of distortions, subsidies and preferences, that has induced corporations to employ valuable resources inefficiently. Output could be increased and people made better off if these tax-generated distortions were eliminated. If it becomes legislation, the President’s proposed business tax reform would be a major step in reducing the role that taxation plays in allocating our nation’s resources. Those who concentrate on the macroeconomic impacts of the proposal are overlooking some substantial efficiency gains from the proposed changes.

**REFERENCES**


Factors Behind the Rise and Fall of Farmland Prices:
A Preliminary Assessment

Michael T. Belongia

The current debt problems facing many farmers can be attributed, in large measure, to the factors that produced the spectacular rise in farmland prices during the 1970s and their precipitous decline since 1981. After increasing at a 5.6 percent average annual rate between 1951 and 1971, the growth in the price of U.S. farmland accelerated dramatically: farmland prices rose at a 14.0 percent average annual rate from 1972 to 1981. Because land prices were rising faster than the rate of inflation at that time, the collateral base against which farmers could borrow increased significantly. Moreover, the availability of subsidized credit for farmland purchases and certain tax advantages enhanced farmland ownership as an investment. Finally, repeated warnings about impending world food shortages suggested that returns to farmland in production would rise, further increasing the demand for it.¹

Recently, however, the price of farmland has been falling. Since its 1981 peak, the price of farmland in the United States has declined at a 5.1 percent average annual rate, bringing farmland prices near their 1979 values. Of course, as land prices have fallen, the value of farm equity has declined, and the ability of farmers to secure additional credit has been diminished.

Many studies of the general movement in farmland prices have been conducted in the past.² Most of these studies, however, predate the recent-period decline in land prices. The purpose of this article is to examine the theoretical determinants of farmland values and to determine whether they can account for the rise and decline of farmland prices in recent years.

THE UPS AND DOWNS OF FARMLAND PRICES

The data plotted in chart 1 show the behavior of farmland prices in the postwar period.³ The first point to note is that the price of farmland generally has increased at a rate higher than the rate of inflation, as measured by the GNP deflator. Moreover, the variab-

¹For example, as late as 1981, just two years prior to when the PIK program was implemented to reduce large and growing surplus grain stocks, the title of USDA's Yearbook of Agriculture was Will There Be Enough Food?

²Explanations for rising land prices include the accumulated savings from farm income and accumulated real estate debt, variations in farm income, increases in the general price level and increases in the provisions of commodity price support programs. See Shalit and Schmitz (1982), Herdt and Cochrane (1966) and Castle and Hoch (1982). Other studies of farmland prices include Tweeten and Martin (1966), Phipps (1984) and Reinsel and Reinsel (1979). A recent paper that provides a descriptive overview of the initial year of the recent land price decline is by Scott (1983). Doll, Widdows and Velde (1983) have surveyed the theoretical and empirical literature on land prices.

³The index is based on an average of farmland prices, per acre, in the 48 contiguous states. Until 1975, the prices were those existing on March 1. From 1976–81, February 1 prices were used. April 1 is the basis for 1982–84 prices. See Economic Report of the President (1985), p. 341.
ity in farmland price growth appears to be considerably greater than the variability of increases in the general price level. Although the growth of land prices and the rate of inflation obviously are correlated, the chart suggests that land prices may be affected by additional factors. Chart 1, however, merely summarizes what has occurred to land prices and does not tell us what has produced this result. For inferences concerning what these causal factors might be, we turn to a simple model of land prices.

THEORETICAL DETERMINANTS OF THE PRICE OF FARMLAND

Although the supply of land for use in farming has some price elasticity and will change in response to factors that affect its returns in other uses, it is convenient for our purposes to examine primarily those factors that change the demand for farmland. Stigler (1966) notes the common fallacy, which argues that the supply of land is perfectly inelastic. While this is not even strictly true for the total supply of land, the important consideration is how easily land can be shifted from other uses to agricultural production. In this sense, the supply of land certainly is not perfectly inelastic.

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The standard deviations of the growth rate of land prices and the rate of inflation are, respectively, 6.5 and 2.6. Average values for the annual growth rate of land prices and the rate of inflation over the 1948–85 (through 1984 for inflation) sample are 6.0 and 4.1 percent, respectively.

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Farmland must arise from changes in the demand for farmland. The section that follows explains the factors that, theoretically, should influence the demand for farmland.

**Farmland as a Capital Asset**

The price of land always will be determined by two factors: the net return to land employed in its "best" alternative use and the interest rate or rates that are used to discount these net returns to the present. For purposes of illustration, consider an acre of land best suited to corn production that will yield 100 bushels at a price of $3 per bushel; total receipts, then, are $300. If variable costs in producing corn each year — the costs of fertilizer, seed, the use of equipment and labor — were $200, the residual return to the land would be $100 each year. In the absence of expected inflation, increased productivity and special knowledge about future economic shocks, $100 would be the net return expected in all future years as well.

This net expected annual return to the owner of an acre of farmland used to produce corn will be evaluated against the stream of returns accruing to other investments. That is, the farmer will ask himself what amount, if invested elsewhere at the current interest rate, would yield an annual return of $100. A rational farmer-investor, ceteris paribus, will not pay more for the acre of farmland than the amount of this alternative investment.

This acre of land will sell for its capitalized value, that is, the present discounted value of all future earnings from the land. This relationship can be expressed as:

\[
\text{land price} = \frac{\text{net returns}}{\text{interest rate}}.
\]

If the interest rate is currently 5 percent, the value of the land would be $2,000 ($100 \div 0.05); this is the maximum price that an investor would pay for the land. If the land price were higher, for example, $2,500, it would be irrational and unprofitable to purchase the land; investing the $2,500 in bonds or stocks yielding 5 percent would earn more ($125) than the $100 return to land employed in farming.

It is clear from equation 1 that, for a given interest rate, the price of farmland will change whenever there are changes in the expected real net returns to farming. Expected net returns will change if the expected receipts from selling corn or the expected variable cost of producing corn are altered.

In assessing changes in real returns, we are interested in changes in receipts or costs apart from those changes in nominal values associated with the general trend in inflation. Expected real receipts would rise, for example, if yields per acre were increased and the demand for corn were relatively elastic in the relevant range, or if government price supports were raised. The expected real cost of producing corn is affected by changes in the relative prices of fuel, fertilizer, crop insurance, water and a variety of other factors employed as inputs in the production process. In either case, for a given rate of interest, changes in expected real receipts or costs will produce changes in the expected net returns to investment in farmland relative to the returns available on other investments. When this occurs, land prices will change to bring the rate of return for farmland back into line with other alternative rates.

Changes in government farm programs have affected land prices by raising the expected net income associated with farming. Direct income transfers based on target prices have increased the expected income from crop production by allowing farmers to sell eligible crops at the market price and then receive a direct payment equal to the quantity of a crop sold multiplied by the difference between the market price and target price. Loan rates, which establish a price floor for crops, also increase expected income by eliminating the risk associated with market prices falling below the support level. Because these program benefits increase the expected income from farming, they are capitalized into land values.

**LAND PRICE DETERMINATION: SOME STATISTICAL EVIDENCE**

The Model and Data

The relative impacts on land prices from the economic relationships discussed above can be assessed in a simple statistical model. Based on the previous discussion, the annual percentage change in the price of farmland can be estimated as:

\[
%ΔLP_t = α + β_1E(ΔP_t) + β_2E(ΔNR_t) + β_3%Δr + ε_t,
\]

This result has been demonstrated by Harris (1977), Boehlje and Griffin (1979), Gardner (1981), Pasour (1980) and Belongia (1983).

Percentage changes (%Δ) are calculated as first differences of logarithms, multiplied by 100.
Table 1
Assessing the Contribution of Alternative Factors to the Growth of Land Prices

\[
%\Delta LP = 2.981 + 1.398 \times E(\%AP_t) + 0.196 \times E(\%ANR_t) + 0.001 \times \%Ar
\]

(2.18) (4.54) (2.65) (0.15)

\[R^2 = 0.49 \quad SER = 3.48 \quad DW = 1.80\]

NOTE: t-statistics in parentheses.

Equation 2 states that the rate of change in farmland prices (%\(\Delta LP\)) will be determined by the expected future rate of inflation \(E(\%AP_t)\), expected growth in real net returns from farming \(E(\%ANR_t)\), which includes cash receipts and government payments minus variable costs, and the percentage change in the real rate of return on an alternative investment \(\%Ar\).

Note that, in contrast to many previous empirical studies, this equation is based on \textit{ex ante} expectations rather than actual \textit{ex post} data. Although using estimated proxies for unobserved expectations variables introduces the problem of measurement error, \textit{ex post} data values have little to do with the \textit{ex ante} decision to buy or sell farmland.

Expectations for future inflation and real returns are assumed to be three-year moving averages of past actual values. Exact variable definitions and data sources appear in the appendix to this article. Based on the earlier discussion of how land prices are determined, expected inflation and the expected growth in real net returns to farm production should be positively related to land values. The expected sign on the percentage change in the real opportunity cost of capital, \(\%Ar\), is negative.\textsuperscript{a}

The Results

The results of estimating equation 2 using annual data from 1955 through the 1981 peak in land prices are shown in table 1. The model explains 49 percent of the variation in the growth of land prices.

The results show, as expected, that increases in the growth of expected real net returns and an increase in expected future inflation tend to increase the rate at which farmland prices increase. The sizes of these estimated coefficients and actual changes in expected inflation and returns offer more insight. While a 1 percentage-point increase in expected inflation has an effect on the rate of land price appreciation about seven times larger than a similar increase in expected receipts, expected receipts exhibit considerably larger changes over time than expected inflation. For example, expected inflation ranged between 1.4 and 8.1 percent over the 27-year sample, whereas expected growth in real net returns was as high as 24 percent in 1974 and as low as –25 percent in 1977. Considered together, these coefficients and the raw data suggest that expected inflation is a determinant of the long-run trend growth of nominal land prices and expected net returns, which are subject to considerable year-to-year variability, are a significant factor in producing short-run variations in the growth of land prices.

It also is interesting to note that the coefficient on expected inflation is not significantly different from one, implying that expected inflation was completely reflected in land prices. From an economic viewpoint, this result indicates that farmland was a perfect hedge against inflation over the estimation period. Finally, the growth in land prices is not significantly related to the regression's other variable, the real rate of interest.

Examining the in-sample fit of the model can be used as a guide to the model's likely usefulness in determining its ability to predict the future behavior of land prices. For example, if the model's errors are randomly distributed through time and are neither one-sided nor of larger absolute value in recent periods, one might infer that it represents a reasonably accurate description of the process through which changes in land prices are determined. Conversely, if recent errors are significantly larger or one-sided, this information may imply that the model is misspecified. As chart 2 indicates, the in-sample errors of equation 2 over the 1955–81 period appear to be randomly distributed, despite the volatile behavior of land prices. Two of the residuals are more than twice the size of the regression's standard error (6.96).

Out-of-Sample Simulation Errors

The results in table 1 explain the behavior of land prices through their 1981 peak. In view of the variety of

\textsuperscript{a}Changes in expected inflation are linked, in theory, to transitory changes in the real rate of interest. This possibility introduces the potential for a collinearity problem in the estimating equation if \(E(\%AP)\) and \(\%Ar\) are correlated. Their simple correlation coefficient (0.06), however, is not significantly different from zero.
explanations that have been offered for the sharp drop in land prices, it is interesting to investigate whether the model will reveal any one variable as a dominant factor in the recent land price decline.

This experiment is conducted by using the estimated coefficients in table 1 and actual values for the variables in equation 2 to project values for the percentage change in farmland prices for 1982–85. These projections and the out-of-sample errors are reported in table 2.

The table clearly shows that the variables in equation 2 do a poor job of explaining the sharp decline in farmland prices since 1981. While the model projects slower growth for land prices, it does not explain the actual reductions in the levels of land prices that have occurred in each of the last four years.

A number of possible explanations for this poor simulation performance can be offered. Equation 2 could be misspecified in a variety of ways, including the omission of variables important to the land price decline. A more likely explanation is that the variables included are subject to considerable measurement error. Since they are intended to reflect expectations, they are not observable directly and may not follow the assumed moving average process. Moreover, expectations may be asymmetric: that is, expectations may be based on a long history of past data while inflation and government payments are rising, but take on a short history when these variables are declining. This effect may be particularly true since 1981, when proposals to cut government’s support of agriculture significantly began to emerge. The evidence presented in the bottom half of table 2 lends some support to this conjecture by indicating that only expected returns from farming have moved in a direction and changed by a magnitude consistent with the land price decline, while expected inflation has ad-
justed slowly to lower actual inflation. Thus, while the drop in expected real returns is consistent with the land price decline, it is largely offset by movements in the other variables that are smaller or in the wrong direction.

**SUMMARY**

The price of farmland generally has followed the rollercoaster of expectations about future inflation and income from farming. The influences of these expectations were assessed in conjunction with other factors that affect the demand for farmland as an input to farm production. A simple model of land prices was constructed based on variables that were expected to influence the net returns to land used in farming and the returns and costs of holding land as an investment relative to the returns on other investments. The results of estimating a statistical model derived from these arguments showed that expected inflation and expected growth in real net returns to farm production were significant factors in determining the rate of increase in land values during the 1970s. Even with the recent sharp reductions in expected returns, however, the model does not explain the rapid decline in farmland values since 1981. A likely reason for this failure, when contrasted with the model's in-sample performance, is error in the measurement of expectations concerning the future paths of inflation, returns and the real interest rate.

**REFERENCES**


**APPENDIX**

**Data Sources and Variable Descriptions**

Land prices were measured by an index of farmland values for the 48 states reported in the *Economic Report of the President* (1985), p. 341. Inflationary expectations were represented by a three-year moving
average of past actual inflation as measured by growth in the GNP deflator. Expected real net returns from farming were assumed to be a three-year moving average of past growth in actual returns; this assumption was based on the notion that, since random shocks to production are the largest source of price change but cannot be predicted in advance, expected returns follow a random walk around some trend. Net returns were defined to be receipts from farm marketings plus government payments minus variable costs and were obtained from the *Economic Report of the President*, p. 338. Real returns are net returns deflated by the GNP deflator. The ex ante real rate of interest was measured as the nominal interest rate on one-year Treasury securities in the fourth quarter of year \( t-1 \) minus the one-year-ahead expectation of inflation as measured by the December, year \( t-1 \), Livingston survey; see Holland (1984) for further details. The data used to estimate equation 2 are annual series from 1955–81.
Weekly Money Announcements: New Information and Its Effects

Richard G. Sheehan

The consensus among economists is that monetary policy has its primary effects over relatively long time intervals — that is, quarters or years rather than days or weeks. Financial market participants, however, devote considerable attention to the weekly money stock announcement, despite substantial “noise” in the series. Moreover, some economists recently have “discovered” that an announcement of an unexpectedly large money stock increase causes interest rates and U.S. exchange rates to rise and stock prices to fall.

At first glance, the weekly impacts on financial markets may seem to contradict the consensus that money has its primary effects over longer horizons. In this paper, we show why money stock announcements may have an impact on financial market variables on a daily or weekly basis even though the principal effects of monetary policy are felt over substantially longer periods. The explanation for this apparent contradiction is the adjustment of financial markets to new information. The focus is on financial markets since their adjustments to new information tend to be more rapid than the adjustments of other markets. The paper examines three hypotheses that relate money stock surprises to financial market prices, the relationships between these hypotheses and the existing empirical evidence that attempts to discriminate between these two.

Announcements about the weekly money stock typically are made on Thursday afternoons at 4:30 p.m. EST; at this time the Federal Reserve Board releases figures on the stock of money (M1) for the statement week ending 10 days earlier. If changes in the money stock itself have an immediate impact on financial markets, that impact will begin to be felt almost two weeks before the announcement when the money stock itself changed.

The evidence discussed below suggests that the money stock announcements themselves appear to

MONEY ANNOUNCEMENTS AND MONEY EXPECTATIONS

Before examining the effects of money announcements, one must begin with an obvious observation: the money stock announcement itself does not create money. It does, however, create new information about the money stock. At the time of the announcement, the level of the money stock to be announced has already been determined. Thus, any response resulting from the announcement is due to new information rather than new money. In the following analysis, it will be important to distinguish between these two.

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The evidence discussed below suggests that the money stock announcements themselves appear to

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1 That is, much of the week-to-week movements in the money stock are unrelated to any economic phenomenon. See Pierce (1981).

2 For a sample of these results, see Cornell (1983b), Hardouvelis (1984), and Urich and Wachtel (1984).

3 The standard assumption is that financial market prices adjust rapidly to changes in their determinants, within a span of hours or at most days, while prices in other markets tend, for a variety of reasons, to adjust more slowly. See Fama (1982).

4 Information also is released on the monetary base for the week ending one day earlier, the components of the money stock and the monetary base, and the aggregate portfolio of weekly reporting banks.

5 The hypothesized short-run impact on interest rates of changes in the money stock is termed the “liquidity effect.” For example, the Federal Reserve may buy government securities and in so doing provide currency and reserves. To convince economic agents to part with the securities in exchange for money, the Federal Reserve’s purchase of securities will bid the price of securities up, thus bidding the yield down. This liquidity effect occurs as soon as the stock of money is increased. See Brown and Santoni (1983) for evidence about the existence, magnitude and duration of the liquidity effect.
influence interest rates independent of any effect that the actual money growth may have had. To explain why the money announcements — which carry only new information — may influence interest rates, one must distinguish between expected and unexpected money announcements.

**Theoretical Effects of Expected and Unexpected Money Announcements**

The money stock figures, when announced, are not reported in a vacuum. Financial market participants have substantial information on current and previous interest rates and previous money announcements, allowing them to form expectations about the likely amount of the money stock to be announced. Current asset prices are based in part on expected future economic conditions, including future money stocks. Observers generally believe that if financial markets are efficient, only the unexpected component of the money stock announcement should influence financial variables. The expected component conveys information already digested by the markets and incorporated in the prices and yields of financial assets. Consequently, only surprises matter, not because they provide new money, but because they provide new information that may be useful in predicting policymakers' actions and the behavior of both real and nominal variables. The money stock announcement, to the extent that it is expected, commonly is assumed to have no impact on economic activity.6

**THE IMPACTS OF UNANTICIPATED MONEY ANNOUNCEMENTS**

There are a number of hypotheses about why money surprises influence financial market variables. The following sections compare three hypotheses and their underlying assumptions. All three hypotheses are based on the assumption that financial markets efficiently use all available information. Thus, current interest rates, exchange rates and stock prices reflect the implications of the expected future money stocks.

The analysis of the alternative hypotheses is based on the Fisher equation, which divides the current nominal interest rate into the expected real return over the holding period of the asset and the relevant anticipated rate of inflation. The money announce-

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6See Cornell (1983b) for an explicit statement of this assumption. It should be noted, however, that more general models can be developed in which expected and unexpected announcements are both important. For example, see Belongia and Sheehan (1985b). These more general models have not been widely applied.
To focus on the expected liquidity effect, assume that the money stock for the week announced previously was $M_a$. Just before the money announcement, interest rates, exchange rates and stock prices reflect the assumption that $M_b$ is the money stock to be announced. Further assume that the announcement of the money stock during week $t$ is then made and reveals that the money stock was, in fact, $M_i$ rather than $M_b$.

The expected liquidity effect assumes that financial markets believe the Fed will adhere to its previous policy and will take action to return the money stock to its expected path. This temporary tightening may begin even before the money announcement, since the Fed develops estimates of the money stock before its announcement. During this period, higher nominal interest rates will be expected. If the long-run growth rate in the money stock is assumed to remain unchanged, the rate of expected inflation should also remain unchanged. Thus, short-term real interest rates should rise as short-term nominal rates rise.

Long-term rates will rise to the extent that they are an average of the current short-term rate and expected future rates.

The strength of the expected liquidity effect may vary over time. A deviation of announced from expected $M_1$ will typically have a larger effect on interest rates when market participants think the Fed is placing greater emphasis on controlling $M_1$. Thus, the expected liquidity effect should have been stronger from October 1979 to September 1982 when the Federal Reserve targeted on nonborrowed reserves as an intermediate target.

It is not widely recognized that the expected liquidity effect also makes an assumption about the permanence of the shock underlying the unexpected change in money, assuming the Fed is not the cause of the shock. If the cause is temporary — for example, a winter snowstorm delaying check clearance — no Fed intervention is required. When the disturbance is removed, the stock of money will return to its expected growth path even without Federal Reserve intervention. A movement from $M_i$ to $M_t$ during week $t$ will still be expected to yield money stock $M_t$ in week $t+k$ even without Fed intervention. Thus, a positive shock perceived as temporary will not result in expected monetary tightening or higher interest rates. In contrast, if the shock is perceived to be permanent, then discretionary policy action will be required to return to the expected path as discussed above.

If the change is temporary but the adjustment back to the expected path is slow, policy action may be expected. For example, if delays in processing tax refunds were an important but temporary factor in lowering money growth, the Fed might act to offset factors that would otherwise result in a temporary

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1For example, see Roley and Walsh (1984) and Gavin and Karakouzis (1984). The most important institutional change was the switch in the Federal Reserve’s operating procedures for conducting monetary policy. Before October 6, 1979, the Federal Reserve primarily focused on interest rates in the short run, although there were explicit monetary aggregate targets since 1975; see Wallich and Keir (1979). From October 1979 through September 1982, to improve monetary control, the Federal Reserve adopted a policy of targeting on nonborrowed reserves in the short run. Since then, the Federal Reserve has pursued a more flexible policy, paying somewhat more attention to interest rate fluctuations than it had in the previous period, although not reverting to the pre-October 1979 regime. See Wallich (1984) and Gilbert (1985).

Institutional changes since 1977 also include changes in the money stock announcement date (switched from Thursday to Friday and back to Thursday), a change from lagged to contemporaneous reserve requirements (in February 1984), and the changes associated with financial deregulation. Any of these, in theory, could alter the informational content of the money stock announcement.
decline in the money stock. Thus, the expected liquid­
ity effect is also predicated on the assumption that the
cause of an unexpected money change is permanent
(or of long enough duration to prompt an expectation
of Federal Reserve intervention).

**Inflation Premium Effect**

The inflation premium hypothesis, like the ex­
pected liquidity hypothesis, focuses on market per­
ceptions of Federal Reserve behavior in response to
money surprises. In sharp contrast to the expected
liquidity effect, this hypothesis assumes that the Fed­
eral Reserve will not react to offset unexpected money
fluctuations.

Again assume the Federal Reserve has a target range
for money growth given by the cone in figure 2, and the
dashed line represents expected money growth. The
last announced value of the money stock was \( M^*_a \) and
\( M_b \) is the level expected to be announced in the cur­
rent week. Also assume the actual announced value is
\( M_d \), yielding a positive money surprise of \( M_d - M_b \).

The inflation premium effect assumes that the sur­
prise will not be offset but that the money surprise will
induce (or is the result of) changes in the Federal
Reserve strategy toward less restrictive monetary pol­
icy. Thus, the money stock is not expected to return to
its former target path but is expected to move along a
new path as indicated by \( m^* \) in figure 2. The slope of
this new path generally will be greater than that of the
previous expected path, which indicates higher ex­
pected money growth and thus higher expected in­
flation. The inflation premium effect predicts that the
increase in expected inflation will lead to higher nomi­
nal interest rates for as long as this inflationary policy
is expected to last.

A crucial assumption underlying the inflation pre­
mium effect is that an increase in the money stock,
at least in part, signals an easier monetary policy
stance. An unexpected increase in the money stock
announcement leads financial market participants to
revise upward their perceptions of expected future
money growth and expected inflation. What does this
assumption imply about financial market partici­
pants' view of Federal Reserve policy? To the extent
that the Fed has stated monetary aggregate targets,
market participants must believe that those aggre­
gates may not be the sole target of policy.

The inflation premium effect, like the expected li­
quidity effect, also assumes that unexpected shocks
are perceived as permanent or only slowly self­
correcting. If the shock were perceived as temporary,
Fed intervention would be unnecessary, and money
growth would return to its original expected path
without Fed intervention.

**Money Demand Effect**

A third hypothesis suggested as an explanation of
positive money surprises leading to interest rate in­
creases focuses on money demand effects. Suppose

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13 If the slope along \( m^* \) is less than that along \( m^e \), the two paths will
ultimately converge, as they are assumed to do in the analysis of the
expected liquidity effect. Alternately, the growth path could have
exactly the same slope, \( m^* = m^e \), before and after an unexpected
increase in the money stock. In this case, money growth before and
after the one-week shock would be expected to be the same. The
long-run money growth rate would increase only by the amount that
the one-week increase had an impact on the average. Since money
growth influences inflation only with a substantial lag and since a
one-shot level change in the money stock is generally small in
relation to, say, the year-to-year change in the money supply, a
simple step up in the level of the money stock would usually have
little effect on the actual or the expected inflation rate.

14 Again, this discussion assumes financial markets believe the Fed is
using a single target within the cone.

15 This statement also abstracts from considerations such as interest
rate smoothing. For example, a temporary shock may lead to Fed
intervention to smooth the adjustment to equilibrium. In addition, if
the shock were temporary but led to a permanent shift in Fed policy,
it could also have the effect shown in figure 2.

16 This effect has also been titled the real economic activity effect. See
Cornell (1983b).
money demand depends in part on expected future output, a situation considered by Fama (1982). Since expectations about future output are unobservable, financial market participants cannot determine aggregate money demand. The money announcement then conveys information not only about money demand but also about expected future output. An increase in money demand due to an increase in expected future output is expected to persist and cause interest rates to be bid up. This effect is illustrated in figure 3, which focuses directly on market perceptions of money supply and demand. While an increase in money demand may lead market participants to also expect an increase in money supply, it is assumed in this section that only the money demand curve has shifted. The case of money demand and supply both changing is discussed below.

Before the money stock announcement, the expected future money supply and demand curves are given by $S$ and $D$, respectively. After an unexpectedly large money announcement, the future money demand curve is perceived to have shifted (permanently) from $D$ to $D'$. Interest rates in the future are expected to rise to equilibrate the money market, and the expectations of higher future rates lead current rates to rise in anticipation. Note that it is the new information about the location of the present and expected future demand curves that influences interest rates. Any actual shift in the demand curve, subject to the limitations noted above, would already have had its impact felt before the announcement.\footnote{17}

**Distinguishing Between the Alternative Effects**

The three effects described above all predict that an unexpected money stock increase will lead to higher nominal short-term interest rates. In an effort to differentiate the impacts of the expected liquidity effect, the inflation premium effect and money demand effect, some studies have examined the implications of the alternative effects on stock prices and exchange rates.\footnote{18}

Based on the expected liquidity effect, some have argued that, because the money surprise leads to higher expected interest rates, it depresses the present discounted value of future dividends, thus lowering stock prices. In addition, the expected liquidity effect predicts that, after taking into account exchange rate risk, higher expected real returns in the United States relative to, say, Germany should induce a capital inflow that will be accompanied by a rising value of the dollar vis-a-vis other currencies.

The inflation premium effect predicts that an unexpected money stock increase will lower exchange rates, as U.S. inflation increases relative to inflation in other countries. The inflation premium effect makes no prediction about the effect of an unexpected money stock increase on stock prices.\footnote{19}

\footnote{A shift in money demand that is not due to a shift in expected future output is not necessarily associated with any change in stock prices.}

\footnote{One particular money demand effect that is sometimes considered separately is the reserve settlement effect. This effect existed only under lagged reserve requirements when the timing of the money announcement was such that it revealed information about current reserve demand. Consider a money stock announcement, say, on August 26, 1982. Data on the money stock was released then for the week ending August 18, 1982. But deposits for the week ending August 26, 1982, determined required reserves for the week ending September 2, 1982. When the money stock numbers were released, they may have contained incremental information on the demand for reserves.}

\footnote{An individual bank may know its own reserve requirements prior to the money announcement, but it has only limited information on aggregate reserves and thus on the federal funds rate expected to prevail for the remainder of the reserve settlement period. An unexpected money increase generally implies that deposits, as well as the demand for required and total reserves, are all greater than expected. The reserve settlement effect demonstrates how institutional characteristics can influence the relationship, say, between money announcements and interest rates.}

\footnote{For example, see Cornell (1983b).}

\footnote{See Cornell (1983b) for a more detailed explanation.
In contrast, the money demand effect implies that an unexpectedly large money announcement will increase stock prices due to the underlying increase in expected future output. The international value of the U.S. dollar may increase due to the direct impact of an increased money demand as well as the indirect effect of greater money demand leading to higher real interest rates and resulting capital inflows.3

COMPARING THE HYPOTHESES:
SUBSTITUTES OR COMPLEMENTS?

Previous studies have advanced the three hypotheses presented above as competing theories to explain why unanticipated money announcements alter financial market variables.21 In fact, the three effects do not necessarily compete and may be either substitutes or complements. Consider a simple example in which they are complements. As in figures 1 and 2, the expected money stock prior to the announcement at time t was $M_0$, while the announced value was $M_d$. The expected liquidity effect again predicts a slowing of money growth from time t to t+k. Assume that this tightening is expected to be only partially successful. In terms of figure 2, the money growth rate will be between $m^*$ and $m^*_e$. In this scenario, nominal interest rates will be expected to rise due to both the expected restrictive policy and higher expected inflation. Simply stated, monetary policy is expected to be tighter after the unexpected increase, but not tight enough to restore the former growth rate.

Figures 1 to 3 each focus on one monetary disturbance. There is, however, substantial noise in the weekly M1 series. Thus, temporary shifts cannot readily be distinguished from permanent shifts. Furthermore, in light of this uncertainty which all financial market participants face, the Federal Reserve may be expected to hedge its response to fluctuations.22 Thus, it is plausible that market participants may expect monetary policy to be tighter after an unexpected increase, but not tight enough to restore the former growth rate.

Both the expected liquidity and the inflation premium effects are based on the assumption of a permanent money market shock that may prompt Federal Reserve response. While such a shock need not originate in money demand, clearly it could. If it does, then the expected liquidity and inflation premium effects cannot be distinguished from the money demand effect.

Further complicating the analysis of the money demand effect is that it presumes a shift in money demand, but market participants are unlikely to believe money demand can shift without some Fed response based on its presumed targets. Thus, the money demand effect may imply, say, an expected liquidity effect in response. For example, assume money demand increases and the Federal Reserve is believed to be focusing exclusively on a monetary aggregate target. The increase in money demand, ceteris paribus, will lead to increases in both the money stock and interest rates as figure 3 demonstrates. Furthermore, the announcement of a money stock increase could lead financial market participants to expect the Fed to reduce the money supply in order to maintain its monetary aggregate target. This tightening, however, is the expected liquidity effect.

Alternatively, if financial market participants believe the Federal Reserve is trying to peg nominal interest rates, the expected Fed response to a money demand increase would be very different. An increase in money demand would prompt the Fed to increase the money supply to prevent interest rates from increasing. In this scenario, the unexpected money announcements should have no effect on interest rates. Between the extremes of focusing exclusively on interest rates and focusing exclusively on a monetary aggregate, both the expected liquidity and inflation premium effects may be present.

EVALUATING THE EMPIRICAL RESULTS

The findings of previous empirical analyses of the impact of anticipated and unanticipated money announcements are summarized in table 1. The results presented indicate considerable disagreement among previous studies.

**Short-Term Interest Rates — Unexpected Changes**

Most studies conclude that short-term interest rates are significantly and positively influenced by unanticipated money announcements. While this is true in both the pre- and post-October 1979 periods, the ef-
Table 1
Summary of Empirical Results

<table>
<thead>
<tr>
<th>Pre-October 1979</th>
<th>Post-October 1979</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NOMINAL INTEREST RATES</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Short-Run</strong></td>
<td></td>
</tr>
<tr>
<td>Unexpected Money Changes</td>
<td>Expected Money Changes</td>
</tr>
<tr>
<td>0 Cornell (1983b)</td>
<td>0 Roley and Troll (1983)</td>
</tr>
<tr>
<td>Roley and Walsh (1984)</td>
<td>0 Cornell (1983b)</td>
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<td></td>
<td>Roley (1983)</td>
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<tr>
<td></td>
<td>Roley and Walsh (1984)</td>
</tr>
<tr>
<td><strong>Long-Run</strong></td>
<td></td>
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<tr>
<td>Unexpected Money Changes</td>
<td>Expected Money Changes</td>
</tr>
<tr>
<td>0 Cornell (1983a)</td>
<td>0 Cornell (1983a)</td>
</tr>
<tr>
<td>Cornell (1983b)</td>
<td>Cornell (1983b)</td>
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<td>0 Cornell (1983b)</td>
<td>0 Cornell (1983b)</td>
</tr>
<tr>
<td>0 Cornell (1983b)</td>
<td>0 Cornell (1983b)</td>
</tr>
<tr>
<td><strong>STOCK PRICES</strong></td>
<td></td>
</tr>
<tr>
<td>Unexpected Money Changes</td>
<td>Expected Money Changes</td>
</tr>
<tr>
<td>0 Cornell (1983b)</td>
<td>0 Cornell (1983b)</td>
</tr>
<tr>
<td><strong>EXCHANGE RATES</strong></td>
<td></td>
</tr>
<tr>
<td>Unexpected Money Changes</td>
<td>Expected Money Changes</td>
</tr>
<tr>
<td>0 Cornell (1983b)</td>
<td>0 Cornell (1983b)</td>
</tr>
<tr>
<td>0 Cornell (1983b)</td>
<td>0 Cornell (1983b)</td>
</tr>
</tbody>
</table>

+ indicates a significant positive effect was found.
- indicates a significant negative effect was found.
0 indicates an insignificant effect.

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Federal Reserve Bank of St. Louis
fects are substantially larger in the latter period.\textsuperscript{23} For example, Judd (1984) finds that a 1 percent positive money surprise would increase the three-month Treasury bill rate by only 6 basis points before October 1979, but by 36 basis points after September 1979.\textsuperscript{4} That this is true is consistent with financial markets believing that after September 1979 the Fed placed substantially more weight on short-term money stock movements in their efforts to achieve monetary aggregate targets. Apparently, the market believed the Fed’s statements that its procedures were being changed. The very small estimated coefficients before October 1979 indicate that financial markets believed the Fed was less interested in short-term movements in the money stock before then.

That an unexpectedly large money announcement increases short-term nominal interest rates cannot be used as evidence to distinguish between the expected liquidity, inflation premium and money demand effects, however. All three predict a positive relationship between the two.\textsuperscript{29} Thus, previous research also has focused on financial market variables for which the responses to money surprises might differ. These variables include long-term interest rates, stock prices and exchange rates.

### Long-Term Interest Rates

Studies that have considered the impact of money announcements on long-term interest rates have been unanimous in concluding that neither announcement surprises nor anticipations influenced long-term rates prior to October 1979. This is again consistent with financial markets believing that the Federal Reserve was pegging interest rates before October 1979. After September 1979, with limited analysis there is some evidence that expected announcements have no impact on long-term rates. Expected increases in the money stock may lead to higher inflation and higher long-term interest rates, but do not necessarily lead to higher inflation and interest rates immediately after the money announcement.

The results concerning announcement surprises are mixed. Studies that have used long-term forward rates such as Shiller, et. al. (1983), Hardouvelis (1984) and Judd (1984) generally have found no significant response.\textsuperscript{29} These findings are not consistent with the inflation premium effect. A money surprise is apparently expected to be quickly offset by the Fed and thus has no effect on long-run inflation expectations. Alternately, financial market participants could simply believe that weekly money announcements, from a long-run perspective, convey little or no information useful in forecasting long-term interest rates.

Studies such as Cornell (1983a) that have used changes in actual long-term rates, which include the effects of short-term rates, have found significant effects. Whether these effects are the result of market participants’ short-run expectations about current or prospective short-term interest rates or whether they truly convey information about inflation expectations has not been determined.

### Stock Prices

Relatively few studies have considered the implications of money announcements on stock prices. Stock prices apparently decreased in response to positive money surprises in the post-September 1979 period. In the pre-October 1979 period, there is no consensus

\textsuperscript{23}There is also substantially greater interest rate volatility in the latter period. In addition, studies that have attempted to assess the impact of money surprises have been faced with the task of sorting out the influences of other factors such as a change in the day of the money announcement, a discount rate surcharge, credit controls, etc. See also the institutional changes mentioned in footnote 12. Most studies have simply chosen a period (or periods) for analysis and assumed that non-money-announcement effects were unchanging over that period. Whether this approach is valid is debatable. It should be noted, however, that most estimated equations can explain only 30 percent or less of the fluctuation in interest rates around the time of the money announcement.

\textsuperscript{29}In general, no attempt is made here to present the magnitude of estimated coefficients since the studies differ with respect to time periods, definitions of the dependent variable (e.g., federal funds rate vs. three-month Treasury bill as the short-term interest rate) and equation specification. In addition, all the studies except Judd (1984), Loeys (1984) and Gavin and Karamouzis (1984) make no systematic study of differential effects occurring after October 1982 when the Federal Reserve deemphasized the M1 monetary aggregate.

\textsuperscript{29}Cornell (1983b) states:

The dramatic shift in the market response to money supply announcements after October 6 is difficult to reconcile with the expected inflation hypothesis. If the money supply announcements are providing information about future money growth, there is no obvious reason why the Fed’s stated intention to control monetary aggregates should induce a positive correlation between announced innovations in money and changes in interest rates. In fact, it is more reasonable to conclude that the correlation would decline because week-to-week variation in the aggregates would no longer provide information about long-run policy.

Cornell’s argument is that the expected liquidity effect predicts a greater response to money surprises pre- vs. post-October 1979, while the inflation premium effect predicts no change in response. This lack of change with the inflation premium hypothesis, however, is based on the assumption that the change in operating procedures did not alter market participants’ view of the money supply process. The inflation premium effect could also be associated with a greater response to a money surprise after October 1979 if, for example, an unexpected increase in the money stock after that date is viewed as having a greater probability of signaling monetary ease than under the previous operating procedures.

\textsuperscript{29}Gavin and Karamouzis (1984) find the four-year forward rate three years ahead is significantly influenced by money surprises, while the 23-year forward rate seven years ahead is not.
on whether money surprises influenced stock prices (table 1). Expected changes had no effect on stock prices in either period.

These results are inconsistent with the money demand effect. If the money announcement reveals an increase in money demand due to an increase in expected output, stock prices should increase.27

**Exchange Rates**

The exchange rate results presented in table 1 indicate that neither anticipated announcements nor surprises significantly influenced exchange rates before October 1979. After September 1979, money surprises have resulted in significant appreciation of the dollar relative to some currencies, in particular the German mark and the Swiss franc. Other exchange rates, such as those relative to the British pound and the Canadian dollar, have not appreciated significantly. To date, there apparently have been no joint tests of the significance of money surprises on all exchange rates.

The evidence that exchange rates generally did not depreciate is also inconsistent with the inflation premium effect. The inflation premium effect predicts that an unexpectedly large money announcement, associated with higher expected inflation, should lead instead to lower exchange rates.28

**Short-Term Interest Rates — Expected Changes**

Most studies also indicate that expected money announcements had no impact on short-term interest rates before October 1979. After then, table 1 indicates a consensus that expected money announcements had significant negative effects on short-term interest rates. This result is inconsistent with any of the competing theories and the efficient markets hypothesis.29 Thus, either the efficient markets hypothesis is incorrect, the theories as they are currently formulated or tested are insufficiently detailed, or other factors are changing that are correlated with expected money.

It is difficult to argue that the efficient markets hypothesis is incorrect. If it were, it would imply that profitable trading opportunities exist based only on knowledge of expected money.30 Given that the money announcement is widely forecasted and both the forecasted and announced values are widely disseminated, it seems unreasonable to expect profitable trading opportunities to remain for long. It seems more plausible to attribute the significance of expected money either to correlation between expected money and omitted variables or to limitations in the underlying theory.31

**CONCLUSIONS**

While a number of theories have been advanced to explain why money stock announcements, particularly the component that is unexpected, influence financial market variables, this paper shows that these theories are not generally competing. For example, the expected liquidity effect and inflation premium effects may be complementary depending on financial market participants’ perceptions of Federal Reserve goals. Some empirical results are inconsistent with either the inflation premium effect or the money demand effect alone. The expected liquidity effect, by itself, can explain the responses of interest rates, exchange rates and stock prices to unexpected money announcements. There is no reason, however, to believe that this effect, or either of the two others, operates in isolation.

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**REFERENCES**


To be precise, the efficient markets hypothesis would allow trading rules to exist with a positive gross return that was less than the transaction costs of making the trades.

30To be precise, the efficient markets hypothesis would allow trading rules to exist with a positive gross return that was less than the transaction costs of making the trades.

31See Roley (1983) and Hein (1985) for examples of the former. A full discussion of the potential impacts of expected money is beyond the scope of this paper. For more details, see Belongia and Sheehan (1985b).


