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The Use of Severance Taxes In Tenth District States

By James Prescott and Tim R. Smith

Taxes on mineral production have been a source of revenues for most states in the Tenth Federal Reserve District for many years. Mineral tax revenues increased during the energy boom of the 1970s as increased fuel prices boosted the value of mineral production and some states changed their tax structures. In the early 1980s, however, world fuel prices have softened and the demand for nonfuel minerals has declined.

This article examines the extent to which recent changes in fuel and nonfuel mineral markets have affected mineral tax revenues of Tenth District states—Colorado, Kansas, Missouri, Nebraska, New Mexico, Oklahoma, and Wyoming. The first section reviews some of the key economic and political issues associated with taxes on mineral production. The second section outlines the mineral tax structures of Tenth District states, and the third and fourth sections explore recent trends in mineral production and tax revenues. The article concludes that there has been substantial erosion of the various bases for mineral taxation during the 1980s that has, in turn, exerted downward pressure on mineral tax revenues in district states.

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Economic issues in mineral taxation

Taxes levied on mineral production are commonly called severance taxes. They usually take the form of unit excise taxes or ad valorem taxes and are ordinarily levied on "severers," or producers of mined output. Revenues from unit excises depend only on the amount of ore mined since they are defined as a fixed money charge per unit of product. Ad valorem taxes are based on a percentage of the gross value of mined ore, so tax revenues vary with both the price of the ore and quantity produced. Though severance taxes have been in place for some time in district states, they became very popular during the 1970s as a source of revenue. High crude oil prices resulting from OPEC's price fixing and the subsequent rise in the prices of oil substitutes made fuels an attractive tax base for producing states. Some district states also produced large quantities of nonfuel minerals, such as copper and molybdenum, making these commodities lucrative sources of tax revenues as well. Thus, the district mineral tax structures developed under generally increasing demand for both fuel and nonfuel minerals during the 1970s.

In addition to being an attractive source of revenue, mineral taxes were considered desirable from the point of view of individual states because the incidence of many of the taxes could be shifted to buyers in other states. This ability to "export" the taxes further enhanced their revenue generating capabilities and political acceptability.

The extent to which severance taxes raise the price buyers pay depends, among other things, on the availability of substitutes for the taxed mineral.

There are two major factors that contribute to a state's ability to export severance taxes. One is low in-state purchases of the taxed mineral. If most processors are outside state boundaries, the tax can be shifted to these out-of-state buyers. The other contributing factor is the price sensitivity of buyers. The extent to which unit excises and ad valorem taxes raise the price buyers pay depends, among other things, on the availability of substitutes for the taxed mineral. If out-of-state buyers cannot obtain the mineral from producers in other states, or cannot substitute another mineral, the tax can be exported in the form of higher prices. For example, copper is an excellent electrical conductor with few close substitutes. On the other hand, it is one of many materials used in producing tubing. A copper-producing state is therefore expected to be more successful at exporting a tax on copper to wire producers than to pipe manufacturers.

Even in cases where the production of a particular mineral occurs in more than one state, tax rate setting coalitions of states are possible. If a few states can tax a large percentage of the mineral's production (and its substitutes) they can act together to tax producers, thereby avoiding substitution away from individual taxing states. As the number of states and geographic diversity increases, coalitions tend to be more unstable because of a variety of economic interests and separation of market areas.[1]

In addition to the incidence of severance taxes being shiftable, "market failure" arguments have also been used in support of severance taxes. Unlike most economic activities, the owner of a mine (a depletable resource) produces a fixed amount of output over the life of the mine. The higher the rate of extraction, the shorter the production life of the mine. Since ore prices and extraction costs vary over time, the mine owner tries to concentrate production in high profit periods, thereby increasing the present value of net revenues. In other words, the mine owner varies output to maximize the value of the mine. This extraction path over time may be optimal from the resource owner's viewpoint, but not for society as a whole, because private market rates of extraction may impose costs on society that exceed the direct expenses of producing ore.

[1] See Malcom Gillis, "A Tale of Two Minerals: Severance Taxes on Energy Resources in the United States," *Growth and Change*, Vol. 10, No. 1, January 1979, pp. 55-71. Gillis suggests that New Mexico and Wyoming might pursue a common taxing policy for uranium. However, depressed market conditions in recent years led New Mexico to reduce both severance tax rates and assessed valuation percentages for the period 1981-84, while Wyoming's tax rate remained at 5.5 percent during 1979-83 despite a decline in uranium revenues of 43 percent between 1981 and 1982.

Environmental side effects can cause private and social costs to differ. For example, environmental damages due to strip mining are added social costs due to a private economic activity and, if assessed to producing firms, would reduce the output of strip-mined coal. Severance taxes marked for restoring strip-mined land reimburse society for these costs, reduce the production of coal to levels considered more socially optimal, and extend the production of mining operations.

Another market-failure argument in favor of using severance taxes to reduce mining output is aimed at resource conservation. Conservation objectives are usually directed at two future uses of the taxed mineral resource. First, strategic military considerations may warrant low rates of present consumption of domestic mineral reserves and stockpiling for future use. This is primarily a national defense policy, however, and is not likely to be consistently pursued through the uncoordinated tax policies of various states. Second, concern over the availability of depletable resources for future generations is often a motivation for conservation legislation. Problems with this argument include determining the preferences of generations still unborn, estimating mineral reserves, and assessing the technological possibilities of finding future substitutes for the resource.

There are also more direct arguments against the use of severance taxes. One argument, although not unique to mineral taxes, applies to a tax on any competitively produced commodity. Such a tax usually reduces the production of ore, raises the price to buyers, and reduces the net price to producers (buyers' price minus the tax). The reduction in output represents a loss to society of valuable units of product, units that would be produced in the absence of the tax.

Policy conflicts among states and between states and the federal government often complicate the implementation of severance taxes. The OPEC-induced oil price increases of the 1970s stimulated demand for oil substitutes (coal, oil shale, and uranium) with price increases that usually exceeded rises in the cost of production. In the case of coal, it has been argued that the benefits generated during this period accrued primarily to railroads hauling the coal and to state governments that increased their severance tax rates.[2] The tax rate increases were sufficient to induce coal-consuming states to introduce protective legislation in the 97th Congress that would have limited total state and local coal severance taxes to 12.5 percent of the mineral's value.

Federal government objectives in fuel mineral use also conflicted with the severance tax policies of mineral-producing states during the 1970s. While the federal government encouraged the use of oil substitutes, tax rate increases by producing states tended to discourage consumption by raising the prices of these fuels.

Despite arguments against their use, severance taxes became an important revenue-generating tool in most district states during the 1970s. This increased dependency on mineral taxation has led, in turn, to variability in revenues because of cyclical movements in mineral prices and production.

Mineral tax structures of Tenth District states

Some states in the Tenth District began taxing mineral resources in the early 1900s.

[2] See John H. Mutti and William E. Morgan, "Changing Energy Prices and Economic Rents: The Case of Western Coal," *Land Economics*, Vol. 59, No. 2, May 1983, pp. 163-176. The authors cite Wyoming's severance tax rate increases from 1 percent to 10.5 percent over the period 1973-79, while production increased from 11 million to 71 million tons.

Oklahoma first imposed a tax on crude oil in 1916 and on natural gas in 1935. Nebraska's oil and gas severance tax was enacted in 1956. Both states' increased their severance taxes during the 1970s. In addition, Colorado began taxing mineral resources in 1978. There appears to be no consistent trend in very recent severance tax changes among district states. Some states have granted tax relief to troubled mineral industries while others have enacted new taxes. Most notably, Missouri and Kansas passed severance tax legislation in 1982 and 1983, respectively.

District states tax a variety of minerals, including crude oil, natural gas, coal, oil shale, molybdenum, uranium, potash, trona, copper, gold, and silver. Table 1 summarizes the current tax structure of each state. Most district mineral taxes are applied to the gross value of the minerals when they are removed from the ground, although some unit excises and indexed unit excises are used.

All district states, except Missouri, tax crude oil and natural gas. Of these states, New Mexico and Kansas have the highest tax rate (about 8 percent) while Nebraska's rate is

TABLE 1
Mineral tax structure in 1985*
Tenth Federal Reserve District states

Colorado:	Crude Oil and Natural Gas	Tax on gross value:	
		$0-$24,999	2% of gross income
		$25,000-$99.999	$500 + 3% of excess over $25,000
		$100,000-$299,999	$2.750 + 4% of excess over $100.000
		$300,000 and over	$10,750 + 5% of excess over $300,000
	Coal	$0.60 per ton for production in excess of 25,000 tons plus a surtax based on the Producer Price Index (PPI) (current rate $.816 per ton)	
	Oil Shale	1% of gross value in first year 2% of gross value in second year 3% of gross value in third year 4% of gross value in fourth and subsequent years (First 15,000 tons per day of oil shale or 10,000 barrels of shale oil exempt)	
	Molybdenum	$0.15 per ton	
	Metallic Minerals	2.25% on gross value exceeding $11,000,000	
Kansas:	Crude Oil and Natural Gas	8% of gross value	
	Coal	$1 per ton (mine is exempt if less than 350,000 tons produced in previous calendar year)	
Missouri:	Coal	$0.30 per ton for first 50,000 tons sold per year $0.20 per ton for next 50,000 tons sold per year	

*Individual statutes define "gross value" differently, depending on the tax. Most states allow royalties paid to federal or state governments and Indian tribes to be deducted. The information in this table was simplified by omitting most credits, exemptions, and deductions and by substituting "gross value" for individual state terminology. Names given to individual taxes are, however, those given by individual states.

TABLE 1 (continued)

Nebraska:	Crude Oil and Natural Gas	2% of gross value for stripper wells (under 10 barrels per day) 3% of gross value for non-stripper wells Conservation tax of 0.1% on gross value
New Mexico:	Crude Oil	All taxes on gross value: 3.75% Severance Tax 0.18% Conservation Tax 3.15% Emergency School Tax 1.25% Average Ad Valorem Production Tax (varies by taxing district)
	Natural Gas	Severance tax of $0.087 per thousand cubic feet (MCF) plus a surtax based on the Consumer Price Index (CPI) (current rate $0.152 per MCF) Taxes on gross value: 0.18% Conservation Tax 3.15% Emergency School Tax 1.25% Average Ad Valorem Production Tax (varies by taxing district) 0.45% Gas Processor Tax
	Coal	$0.57 (surface), $0.55 (underground) per ton + CPI surtax (current rates $0.994/ton (surface), $0.959/ton (underground)) Taxes on gross value: 0.75% Resource Tax 0.75% Processor Tax
	Uranium	3.75% Severance Tax on 50% of gross value
	Molybdenum	All taxes on gross value: 0.125% Resource Excise 0.125% Processor Tax 0.125% Severance Tax
	Copper	0.5% Severance Tax on 33% of gross value
	Potash	All taxes on gross value: 0.5% Resource Excise 0.125% Processor Tax 2.5% Severance Tax
	Gold	0.2% Severance Tax on 50% of gross value
	Silver	0.2% Severance Tax on 40% of gross value
	Other minerals (Includes pumice, gypsum sand, clay, lead, zinc, thorium, manganese, and other nonmetallic and metallic minerals)	All taxes on gross value: 0.75% Resource Excise 0.75% Processor Tax 0.125% Severance Tax

TABLE 1 (continued)

Oklahoma:	Crude Oil	All taxes on gross value: 7% Gross Production Tax 0.085% Petroleum Excise
	Natural Gas	Gross Production Tax of 7% on gross value Petroleum Excise Tax of 0.085% on gross value Gas Conservation Excise of $0.07 per MCF less 7% of gross value
	Uranium	5% tax on gross value
	Other Mineral Ores	0.75% tax on gross value
Wyoming:	Crude Oil and Natural Gas	4% of gross value for stripper wells 6% of gross value for non-stripper wells
	Coal	10.5% of gross value (surface) 7.25% of gross value (underground)
	Uranium	5.5% of gross value
	Trona	5.5% of gross value
	All other minerals	2% of gross value

Source: Annual Report, Colorado Department of Revenue, 1983
Annual Report, Nebraska Department of Revenue, 1982
Annual Report, State of New Mexico, Tax and Revenue Department, Santa Fe, New Mexico, FY 1982-83
1983 Wyoming Mineral Yearbook, Mineral Division of State Department of Economic Planning and Development
Updated by telephone conversations with individual state departments of revenue

lowest. Colorado's oil and gas tax is the most complex with a stepped rate beginning with 2 percent for up to $25,000 and three other brackets up to $300,000 and over.

Coal is taxed in Colorado, New Mexico, Wyoming, Kansas, and Missouri. The Kansas and Missouri taxes are unit excises and the Wyoming tax is a 10.5 percent ad valorem tax on strip-mined coal with a lower rate of 7.25 percent on underground coal. Colorado's unit coal tax includes an adjustment mechanism based on the Producers Price Index (PPI) and New Mexico adjusts its coal tax to the Consumer Price Index (CPI). As a result of price inflation in recent years, the escalators have increased the effective tax rate. The Colorado coal rate, for example, has increased from 60 cents a ton in 1978 to a current 81.6 cents. Thus, the escalator effectively converts a unit excise into an ad valorem type of tax, although the percentage rate may not be constant over time and the base is the general price level, not the price of the taxed mineral. If individual mineral prices are more stable than the CPI and PPI, states would find tax revenues rising faster under inflationary conditions than a flat ad valorem rate on the specific minerals. However, a more stable price level may be expected in the future compared with rapid price increases of the 1970s.

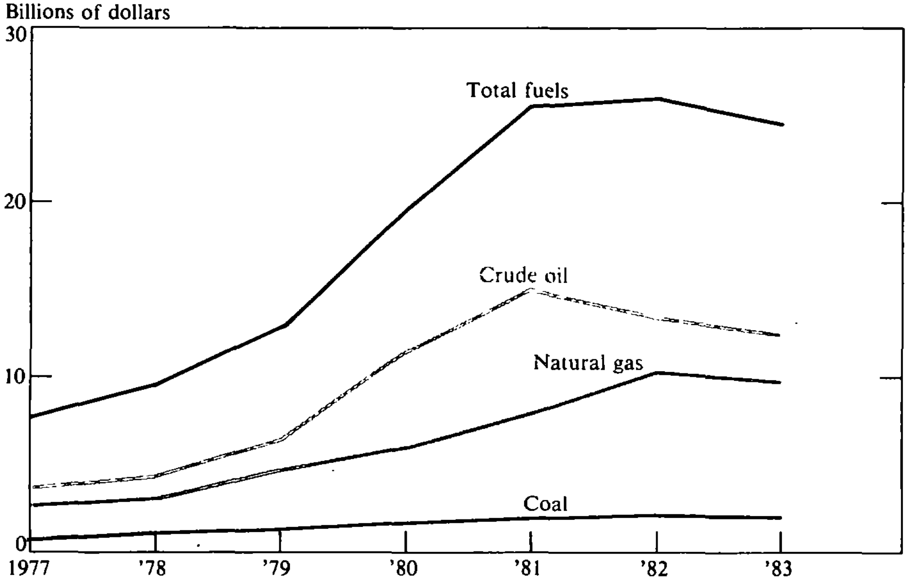
Uranium is taxed in New Mexico, Oklahoma, and Wyoming. All three states currently maintain flat ad valorem taxes on this mineral at rates ranging from 5.5 percent in Wyoming to an effective rate of less than 2 percent in New Mexico.

Colorado and New Mexico tax molybdenum. The Colorado tax is a unit excise at 15

CHART 1

Value of fuel mineral production

Tenth Federal Reserve District states combined



Note: Estimated crude oil production for 1977 represents a doubling of the value for the last half of the year. Coal value represents only mines producing 10,000 or more tons of coal per year. Total fuels value includes crude oil, natural gas, and coal.

Source: U.S. Department of Energy

cents a ton. New Mexico's three ad valorem levies on molybdenum have a combined effective rate on gross value of nearly 0.4 percent.

Other nonfuel minerals are taxed individually or under broadbased taxes that apply to "all other minerals." New Mexico taxes copper, potash, gold, and silver individually, Wyoming taxes trona, and Colorado has a separate tax for metallic minerals. Any remaining minerals are taxed under broad "all other minerals" categories in New Mexico, Oklahoma, and Wyoming.

Tenth District mineral production

There have been clearly identifiable trends in recent mineral production in the Tenth District. The increase in the value of mineral production that stimulated district states to impose severance taxes in the 1970s did not continue beyond 1980. In fact, the value of production fell substantially between 1980 and 1983 and it has not recovered.

Mineral production can be divided generally into fuels and nonfuels. Fuel minerals—crude petroleum, natural gas, and coal—are the more important source of severance tax revenues for district states. Chart 1 summarizes production values in the district between 1977 and 1983 for this group of fuels. The value of district fuel production increased at an average annual rate of nearly 35 percent between 1977 and 1981, and fell almost 2 percent between 1981 and 1983. Falling crude oil values accounted for most of the decline in value. The value of natural gas production began

TABLE 2
Value of production of fuel minerals
Tenth Federal Reserve District states

	Millions of dollars			Average annual growth rate	
	1977	1981	1983	1977-81	1981-83
Colorado	687	1,897	1,744	29.3	-3.4
Kansas	1,004	2,997	2,753	32.1	-4.1
Missouri	66	117	132	17.1	6.6
Nebraska	45	247	189	54.3	-12.4
New Mexico	1,838	5,267	4,748	30.5	-5.0
Oklahoma	2,862	9,623	9,815	36.0	1.5
Wyoming	1,601	6,127	5,876	40.6	-2.1
Tenth District	8,037	26,158	25,125	34.7	-1.9

Source: U.S. Department of Energy

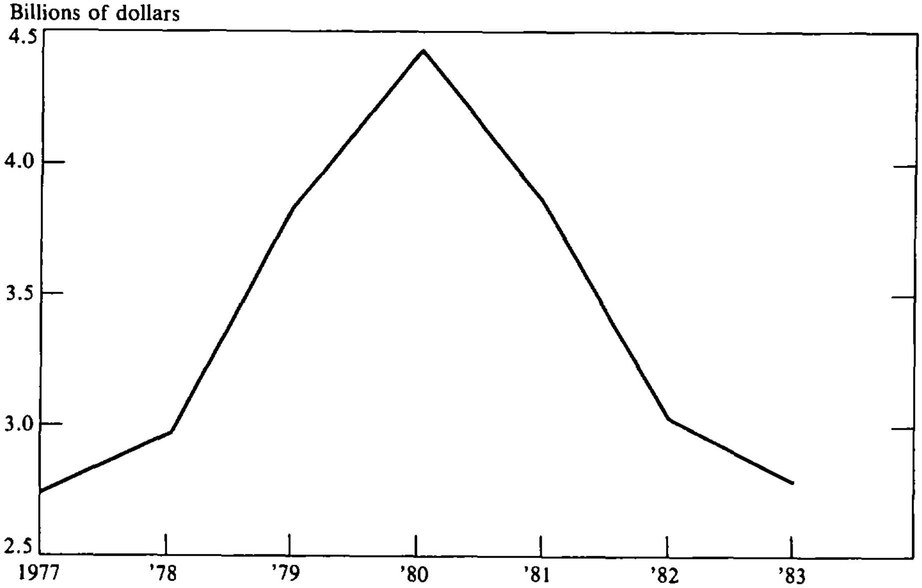
falling in 1983, and the value of coal production remained relatively flat between 1980 and 1983. This erosion of the bases for a large number of district severance taxes has continued since 1983 due to further downward pressure on world crude oil prices and a persistent natural gas surplus.

Individual district states exhibited a similar pattern in the growth of fuel production value. Table 2 lists the value of fuel production for each state and the average annual rates of growth over two periods, 1977-81 and 1981-83. The rate of growth slowed in all district states between 1981 and 1983. The value of fuel mineral production actually declined in five states in this latter period. The biggest change in production growth was in Nebraska, but this state, along with Missouri, has very low overall values of fuel production. Other states, especially in the western part of the district, produce far greater quantities of fuel minerals. Oklahoma, Wyoming, Kansas, and New Mexico are the district's major producers of crude oil, and Oklahoma and New Mexico also lead district states in natural gas production. Coal is produced mostly in Wyoming, New Mexico, and Colorado. The totals in Table 2 do not include uranium, often used as a fuel. This mineral is found primarily in New Mexico and Wyoming.

A wide variety of nonfuel minerals is also produced in Tenth District states. Production of such construction minerals as cement, crushed stone, sand, and gravel is widely distributed throughout the district. Important metals mined in the district are lead, molybdenum, and copper. Missouri ranks first in the nation in the production of lead, accounting for 92 percent of the national total. Colorado is the leading producer of molybdenum. New Mexico ranks third nationally in the production of copper and first in the production of potassium salts (''potash''). Wyoming is the nation's largest producer of sodium carbonate (''soda ash'' or ''trona'') and bentonite clay.

The value of nonfuel mineral production turned down before the value of fuel production, and the downturn has been more pronounced. Chart 2 shows values of nonfuel mineral production in the Tenth District from 1977 to 1983. The value of production increased in all states between 1977 and 1980, and declined substantially after 1980. The value of district nonfuel production grew at an

CHART 2
Value of nonfuel mineral production
Tenth Federal Reserve District states combined



Source: Bureau of Mines, U.S. Department of the Interior

average annual rate of 9.9 percent between 1977 and 1981, but declined at an average rate of 14.8 percent between 1981 and 1983. This decline, which reflects decreases in prices and production of such nonfuel minerals as molybdenum and copper, has continued due primarily to increased foreign production and a strong U.S. dollar that has made imported mineral products more attractive to domestic processors and manufacturers.

Individual states of the district also show declining rates of growth in the value of their nonfuel mineral production. Table 3 lists the value of nonfuel production for each state and the average annual rates of growth over two periods, 1977-81 and 1981-83. The rate of growth declined between 1981 and 1983 for all district states except Nebraska. Five states had negative rates of growth. The largest change was in Colorado, where the depressed molybdenum industry helped push the average annual rate of growth in nonfuel value from 19.4 percent over the 1977-81 period to -40.5 percent during the 1981-83 period.

While the increase in values of district fuel and nonfuel production in the 1970s prompted district states to raise severance tax rates in order to reap some of the benefits of their geology, decreases in values have placed substantial downward pressure on the bases for state severance tax collections.

State severance tax revenues

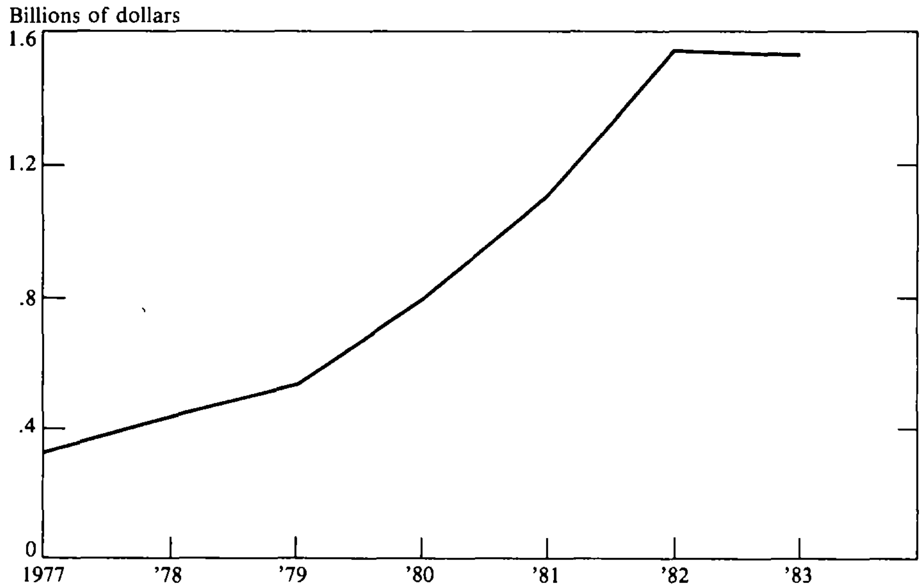
Severance taxes have become increasingly important as a source of revenue in district states since the mid-1970s. Chart 3 shows the substantial growth in severance tax revenues over the 1977-83 period. Despite a substantial decline in the value of mineral production,

TABLE 3
Value of production of nonfuel minerals
Tenth Federal Reserve District states

	Millions of dollars			Average annual growth rate	
	1977	1981	1983	1977-81	1981-83
Colorado	538	967	338	19.4	-40.5
Kansas	208	249	267	4.9	3.5
Missouri	826	875	726	3.2	-8.6
Nebraska	78	80	87	1.4	4.9
New Mexico	497	696	517	10.1	-9.1
Oklahoma	163	235	226	9.6	-1.8
Wyoming	442	768	630	15.2	-9.4
Tenth District	2,752	3,870	2,791	9.9	-14.8

Source: Bureau of Mines, U.S. Department of the Interior

CHART 3
Severance tax revenues
Tenth Federal Reserve District states combined



Source: Bureau of the Census, U.S. Department of Commerce

severance tax revenues continued to increase for the district as a whole through 1982. Though the base for severance taxation began falling around 1980, the growth of tax revenues did not slow until 1983. The rate of growth in district severance tax revenues began slowing in 1980, however, and declined substantially in 1982 and 1983. Table 4 shows

TABLE 4
Severance tax revenues
Tenth Federal Reserve District states

	Millions of dollars			Average annual growth rate	
	1977	1982	1983	1977-82	1982-83
Colorado	2.3	49.2	35.9	213.2	-27.0
Kansas	.816	1.0	2.3	5.2	130.9
Missouri	0	.030	.025	6.6	-16.7
Nebraska	1.1	6.0	5.2	42.4	-13.2
New Mexico	102.8	377.8	351.3	30.7	-7.0
Oklahoma	191.4	742.7	777.7	31.8	4.7
Wyoming	47.0	389.4	388.9	61.2	-0.1
Tenth District	345.4	1,566.1	1,561.4	35.5	-0.3

Note: Severance taxes are "taxes imposed distinctively on removal of natural products—e.g., oil, gas, other minerals, timber, fish, etc., from land or water and measured by value of quantity of products removed or sold" as reported by the state to the Bureau of the Census.

Source: Bureau of the Census, U.S. Department of Commerce

that while severance tax revenues grew in the district at an average annual rate of over 35 percent between 1977 and 1982, they fell slightly between 1982 and 1983.

The reason for the delayed decline in revenues is twofold. First, most district states rely heavily on fuel taxes (Table 1). A comparison of Charts 1 and 2 shows that the value of fuel production continued to rise through 1982 even though the value of nonfuel production was well into its downward slide. Second, some state severance taxes are indexed to the CPI or the PPI, both of which were increasing during the early 1980s while the values of the taxed minerals were falling. Therefore, the effective rate of taxation increased on these indexed taxes, forestalling the decline in revenues.

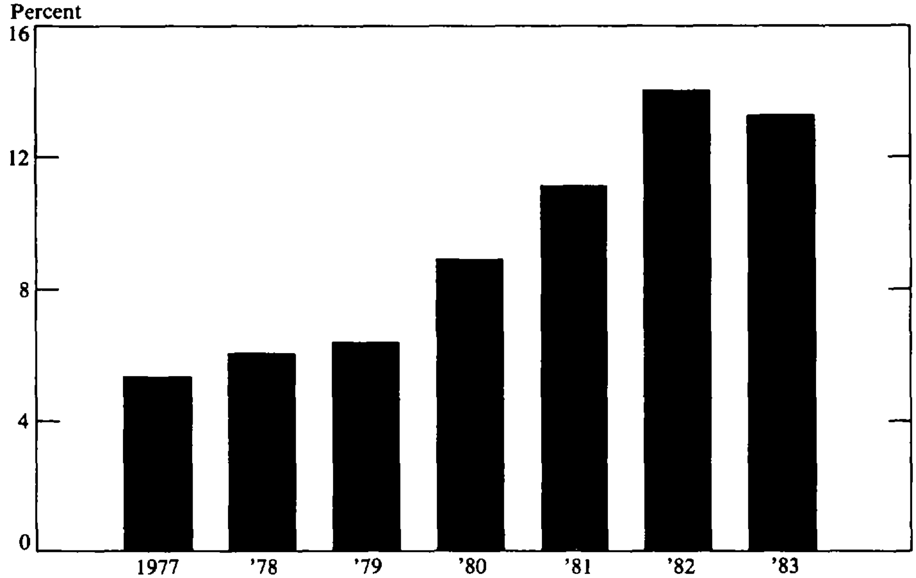
The rate of growth in district severance tax revenues began slowing in 1980 and declined substantially in 1982 and 1983.

The increased importance of severance taxes in the district is further emphasized by Chart 4. This chart shows that severance tax revenue as a share of total tax revenue in the district more than doubled between 1977 and 1983.

All district states have shared in the growth in severance tax revenues. Table 4 shows the behavior of severance tax revenues for each district state over two periods, 1977-82 and 1982-83. Severance tax collections increased in all the states between 1977 and 1982. Colorado had the largest average annual growth—213 percent. Between 1982 and 1983, severance tax revenues fell in all the states except Oklahoma and Kansas, and the rate of growth slowed substantially in Oklahoma. The high rate of growth in Kansas during 1982-83 reflects the imposition of new fuel taxes. Note, though, the very low total of collections in Kansas during those years.

The increased dependence of each state on severance tax revenues is shown in Table 5. Between 1977 and 1983, severance taxes rose as a proportion of total taxes in all the district

CHART 4
Severance tax revenues as a share of total tax revenues
Tenth Federal Reserve District states combined



Source: Bureau of the Census, U.S. Department of Commerce

states except Kansas. Wyoming, New Mexico, and Oklahoma had the largest proportions of their total revenues coming from severance taxes at the end of the period. Growth in the importance of severance taxes as a share of total taxes was strongest in Wyoming and Colorado. As a share of total taxes, severance taxes remained flat in Kansas.

States also receive revenue from related sources, such as lease royalties, and they have

TABLE 5
Severance tax revenues as a share of total tax revenues
Tenth Federal Reserve District states

	Percent		
	1977	1981	1983
Colorado	0.2	2.5	2.0
Kansas	0.1	0.1	0.1
Missouri	0	0	*
Nebraska	0.2	0.5	0.5
New Mexico	17.2	27.4	30.1
Oklahoma	16.8	26.9	29.7
Wyoming	20.1	29.5	52.8
Tenth District	5.5	11.3	13.6

*Less than 0.001 percent
See note from Table 4

Source: Bureau of the Census, U.S. Department of Commerce

TABLE 6

Dependence on the natural resource sector

Tenth Federal Reserve District states

	Natural Resource Revenues as a Percent of Total Taxes* (1983)	Net Transfers as a Percent Total Taxes** (1983)
Colorado	4.73	1.15
Kansas	0.240	-3.67
Missouri	1.01	-2.98
Nebraska	3.25	-1.91
New Mexico	48.40	45.40
Oklahoma	30.97	28.23
Wyoming	62.32	57.30

*(Mineral taxes + royalties + rents) ÷ total taxes

**[(Mineral taxes + royalties + rents + minor license fees) - (operating and capital expenditures for natural resource programs)] ÷ total taxes

Source: State Government Finances in 1983, Government Finances, GF83, No. 3, U.S. Department of Commerce, Bureau of Census

expenditure programs that make payments to the natural resources sector. In the first column of Table 6, royalty and rent receipts are added to severance tax revenues and divided by total state taxes to arrive at a broader measure of each state's reliance on the natural resource sector. This measure includes royalties received from the federal government for mineral production on federal land, a particularly significant source of revenue for states in the western part of the district. For example, New Mexico received $146.8 million in 1982, half of all mineral leasing rents, royalties, and bonuses the federal government received from its holdings in the state.

Not all district states are net recipients of revenues from the natural resource sector. A measure of net receipts from the natural resource sector is shown in the last column of Table 6. Operating and capital expenditures for natural resource programs in each state are subtracted from the total of severance taxes, rents, royalties, and minor license fees for hunting and fishing, and divided by total tax revenues. The negative measures for Kansas, Missouri, and Nebraska suggest that these states are not net recipients of tax revenues from this more broadly based natural resource sector. The positive measures for Colorado, New Mexico, Oklahoma, and Wyoming illustrate the dependence of western states on the resource sector.

Conclusion

Tenth District states, especially New Mexico, Oklahoma, and Wyoming, have come to depend increasingly on severance taxes. Their dependence increased substantially in the 1970s, when the prices of fuels and other minerals rose sharply. Shares of severance taxes in total taxes increased in all but one district state.

Since 1980, however, severance tax revenues have declined in district states. The value of mineral production in the district has fallen due to downward pressure on prices and outputs. Although the decline in value of fuel production lagged the decline in the value of nonfuel production, both began to depress state tax revenues by 1983. Estimates of 1984 production indicate a slight upturn in mineral production in the Tenth District, but as recovery to prerecession levels is unlikely in the near future, mineral tax revenues are not expected to turn around soon, given current state mineral tax structures.

The Demand for M1 by Households: An Evaluation of Its Stability

By V. Vance Roley

The reliability of the narrowly defined money supply, M1, as a monetary policy guide has been questioned following the events of 1982 and 1983. During that period, M1 grew very rapidly and the turnover or velocity of M1 underwent an unprecedented decline.

Some observers argue that the 1982-83 drop in velocity was caused by an unpredictable shift in the M1 velocity function during the 1982-83 period.[1] According to this argument, the relationship between M1 velocity and the factors that determine M1 velocity deviated from historical norms during the 1982-83 period. If this argument is valid, the 1982-83 decline in M1 velocity would not have been predicted by reference to historical experience. Other observers hold that movements in some of the determinants of M1 velocity caused the 1982-83 velocity decline.[2] According to this explanation, the M1 velocity function was stable during the 1982-83 period and the drop in velocity would have been predicted based on historical experience.

The predictability of M1 velocity is important for monetary policymaking. Predictable

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[1] See, for example, *Economic Report of the President*, 1983, pp. 21-22, and Alan S. Blinder, "Comment," *Brookings Papers on Economic Activity*, 1984:1, pp. 266-270.

[2] Many explanations of the 1982-83 velocity decline rely on the fall in short-term interest rates beginning in mid-1982 and/or the effects of financial deregulation since 1981. See, for example, John P. Judd and Rose McElhattan, "The Behavior of Money and the Economy in 1982-83," *Economic Review*, Federal Reserve Bank of San Francisco, Summer 1983, pp. 46-51; Flint Brayton, Terry Farr, and Richard Porter, "Alternative Money Demand Specifications and Recent Growth in M1," mimeo, Board of Governors of the Federal Reserve System, May 1983; Phillip Cagan, "Monetary Policy and Subduing Inflation," *Essays in Contemporary Economic Problems: Disinflation*, American Enterprise Institute, 1984, pp. 21-53; Michael J. Hamburger, "Recent Velocity Behavior, the Demand for Money and Monetary Policy," Conference on Monetary Targeting and Velocity, Federal Reserve Bank of San Francisco, 1983; and R. W. Hafer, "The Money-GNP Link: Assessing Alternative Transactions Measures," *Review*, Federal Reserve Bank of St. Louis, March 1984, pp. 19-27.

velocity movements can be allowed for when the Federal Reserve establishes M1 growth targets and responds to ongoing movements in M1. To the extent that M1 velocity is not predictable, however, M1 is an unreliable monetary policy guide.

This article presents evidence supporting the view that the behavior of M1 velocity was predictable during the 1982-83 period relative to the last half of the 1970s, but not predictable relative to earlier years. In other words, during the 1982-83 period, M1 velocity conformed to the historical experience of the 1974-81 period, but deviated from norms established during the 1959-73 period. The evidence is based on an empirical examination of the M1 velocity behavior of the nation's household sector during the 1959-83 period. The first section of the article defines velocity, discusses why its predictability is important, and shows that movements in total M1 velocity are dominated by movements in household M1 velocity. The second section discusses a model of household M1 demand that was used in the empirical investigation, while the third section presents the empirical results.

Household M1 velocity

For narrowly defined money, M1, velocity measures the rate of M1 turnover for a given amount of nominal spending in the economy. M1 velocity, M1V, can be expressed as

$$(1) \quad M1V = GNP/M1,$$

where GNP corresponds to nominal gross national product.

The predictability of M1 velocity is important to the Federal Reserve in setting its M1 growth objectives. From the above expression for velocity, the growth of M1 can be related to the economy as follows:

$$(2) \quad \dot{M}1 + M\dot{1}V = G\dot{N}P.$$

That is, the growth rate of M1 plus the growth rate of velocity equals the growth rate of nominal GNP. In turn, the growth rate of nominal GNP is the sum of the growth rate of real GNP and the rate of inflation. Thus, if velocity growth is predictable, the growth rate of M1 consistent with desirable outcomes for inflation and economic growth can be determined. If velocity growth behaves erratically, however, the growth rate of M1 consistent with desired values of inflation and economic growth cannot be determined.

The behavior of aggregate M1 velocity reflects the behavior of the velocity of the two major sectors of M1 holders: businesses and households. During past episodes of velocity instability, shifts have frequently been attributed to the behavior of the business sector. In terms of the proportion of M1 balances held, however, the household sector has gained in importance in recent years, rising to 63 percent in 1983. The proportion of household M1 balances in total M1 is illustrated in Chart 1.[3] This proportion has risen fairly steadily since the early 1960s. As a result, any shifts in household M1 velocity would have been increasingly reflected in the behavior of aggregate M1 velocity.

A comparison of the historical behavior of total and household M1 velocity growth is presented in Chart 2. The unprecedented decline

[3] The source of these data is Board of Governors of the Federal Reserve System, *Flow of Funds Accounts*. Household M1 velocity in Chart 2 also is calculated using end-of-quarter data from the flow of funds accounts. Total M1 velocity is calculated using the traditional quarterly averaged data. Total M1 velocity measures computed with flow of funds data and traditional data exhibit a correlation coefficient of 0.9991, and their growth rates have a correlation coefficient of 0.9326. In the empirical work reported in subsequent sections, flow of funds data are used. Flow of funds data also are used, for example, in Stephen M. Goldfeld, "The Case of the Missing Money," *Brookings Papers on Economic Activity*, 1976:3, pp. 683-730.

CHART 1
Proportion of household M1 balances in total M1

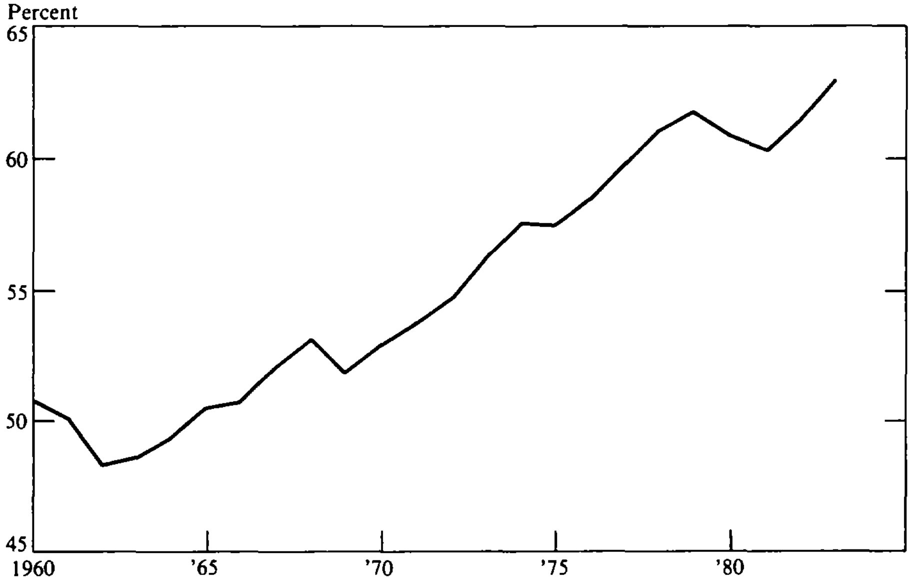
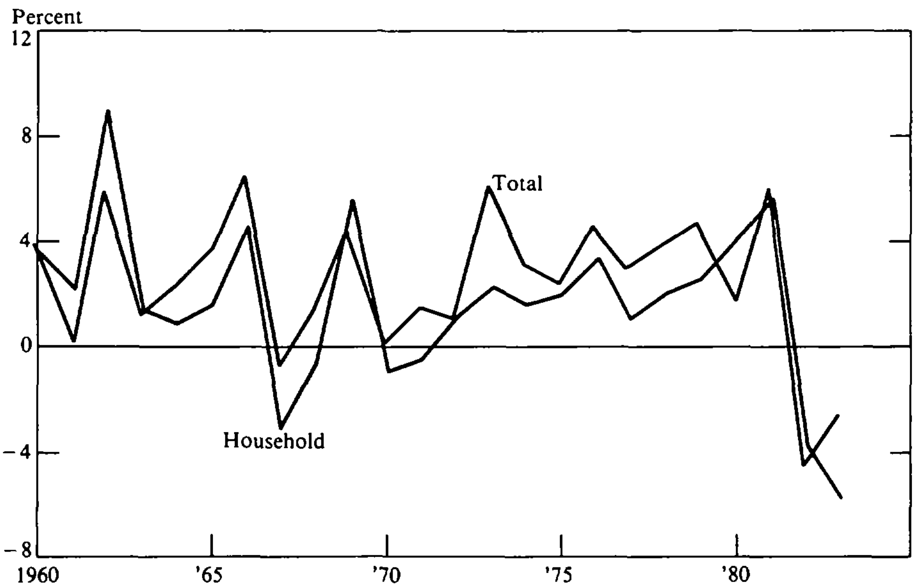


CHART 2
Household and total M1 velocity growth



in aggregate M1 velocity in 1982 and 1983 can be readily seen. The decline in 1982 is mirrored by household M1 velocity, and the performance in 1983 is again quite similar. Thus, factors affecting household M1 velocity appear to be largely responsible for the behavior of total M1 velocity growth during these years.

In previous years, the performances of household and total M1 velocity also are similar despite the attention given to the business sector in explanations of past swings in M1 velocity growth. Before 1973, the relationship appears to have been particularly close. The fluctuations of household M1 velocity growth occurring from 1960 to 1973 corresponded to those of total M1 velocity growth. From 1973 through 1979, however, total M1 velocity growth was uniformly higher than the same measure for households. In this case, the difference was due to the growth in the fraction of M1 held by households, or, equivalently, the sharp rise in velocity growth of other sectors' M1 balances. During these years, improved cash management practices by businesses causing an upward shift in velocity growth are often cited as a primary factor.[4] Changes in M1 velocity growth are nevertheless reflected quite well by the household sector's M1 velocity. As a result, to the extent that the velocity of household M1 balances was predictable over this period, as well as 1982 and 1983, a major portion of the movements in total M1 velocity can potentially be explained by movements in household M1 velocity.

[4] See, for example, Jared Enzler, Lewis Johnson, and John Paulus, "Some Problems of Money Demand," *Brookings Papers on Economic Activity*, 1976:1, pp. 261-280; Stephen M. Goldfeld, "The Case of the Missing Money," *Brookings Papers on Economic Activity*, 1976:3, pp. 683-730; and Thomas D. Simpson and Richard D. Porter, "Some Issues Involving the Definition and Interpretation of the Monetary Aggregates," *Federal Reserve Bank of Boston Conference Series*, October 1980, pp. 161-234.

A model of household M1 demand

The velocity of M1 is closely related to the demand for M1. For example, an increase in the volume of M1 balances demanded per dollar of GNP causes M1 to grow more rapidly than GNP. Since M1 velocity is equal to the ratio of GNP to M1, rapid growth in M1 relative to GNP is associated with a decline in velocity. Thus, there tends to be an inverse relationship between velocity and the demand for M1: an increase in the demand for M1 is associated with a decline in the growth of velocity, while a decrease in the demand for M1 is associated with an increase in the growth of velocity.

Given the close association between M1 velocity and the demand for M1, the predictability of M1 velocity during the 1982-83 period can be investigated by examining the predictability of the demand for M1 during this period. To do the latter, a model of household M1 demand is required.

The model of household M1 demand used in this article is based mainly on the transactions demand for M1. According to this basic model, households hold M1 to purchase goods and services in the future. Moreover, the higher the opportunity cost of holding M1, as represented by the rates of return on alternative assets, the lower the amount of M1 holdings. By minimizing M1 balances, households will have more wealth and hence greater consumption in the future. Thus, the determinants of M1 demand suggested by this model are interest rates and a measure of transactions such as income or consumption expenditures.

In addition to the variables suggested by the basic transactions model, two other potential determinants of household M1 demand are considered in this article. In particular, based on portfolio motives, a wealth variable is included. It is assumed that the greater the amount of wealth, for example, the larger the holdings of M1 as well as other assets by households. Moreover, an increase in wealth may lead to a rise in future consumption expenditures, which in turn may increase the current demand for M1.[5]

The other variable considered as a possible determinant of household M1 demand is price inflation. The role of price inflation already is implicit in many conventional transactions models. In particular, nominal interest rates are typically included in these models, and increases in expected inflation are assumed to cause nominal interest rates to rise. In addition to this channel, however, inflation may have direct effects on the demand for M1. If the primary alternative asset available to households is savings deposits, for example, the nominal interest rate implied by Regulation Q ceilings have frequently been set below inflation. In this case, standard models imply that households ignore the negative real returns realized on these deposits. As a consequence, it is implicitly assumed that they settle for fewer goods and services in the future by holding either demand or savings deposits. Alternatively, if consumers reduced M1 holdings by purchasing goods, they would not have realized negative real rates of return. Thus, if the real rate of return on M1 substitutes is negative at times, inflation may affect M1 demand directly.

Another possible determinant that has received attention recently is the rate of return on NOW accounts. Since the introduction of nationwide NOW accounts in 1981, households have been able to earn 5 1/4 percent on transactions balances. Despite the plausibility of including this variable as a determinant, the results reported in the next section are virtually unchanged when it is considered.[6]

Finally, the demand for M1 is frequently assumed to adjust only gradually to current interest rates, income, and wealth. The motivation for this partial adjustment is based on transactions costs. In converting alternative assets into M1, such costs as brokerage fees and the opportunity cost of the time taken to make the conversion are incurred. To represent partial adjustment, lagged M1 balances are included as a possible short-run determinant of M1 demand.

Empirical results

This section presents the results of an empirical investigation that used particular versions of a household M1 demand model. The model was employed to determine whether there was an unpredictable shift in the household demand for M1 during the 1982-83 period; that is, whether the relationship between the household demand for M1 and the determinants of that demand deviated during the 1982-83 period from historical norms. The demand for M1 relationship was first estimated for historical periods and then these estimated relationships were used to evaluate the behavior of M1 demand in the 1982-83 period.

In estimating the historical demand for M1 relationship, two historical periods were separately considered. They were the period from the third quarter of 1959 to the fourth quarter of 1973 and the period from the first quarter of 1974 through the fourth quarter of 1981. Two periods were considered because researchers have found that the demand for

[5] The effect of increases in wealth—defined similarly to the measure used here—on future consumption expenditures is examined in Robert Hall, "Stochastic Implications of the Life Cycle-Permanent Income Hypothesis," *Journal of Political Economy*, December 1978, pp. 971-987.

[6] Estimation and simulation results of specifications including the rate of return on NOW accounts are presented in V. Vance Roley, "Money Demand Predictability," *Journal of Money, Credit, and Banking*, Part II, forthcoming.

M1 relationship shifted in 1974 so that the relationship during the 1974-81 period differed from that during the 1959-73 period.

In estimating the demand for M1 relationship for these two historical periods, the particular model used states that the quantity of M1 demanded depends on a transactions variable—either real GNP or consumption—rates of return on alternative assets, inflation, and wealth. Two versions of the model were estimated for each period. In one version, the levels of the variables representing the determinants of M1 demand were entered into the regression. In this version, M1 in the previous period was entered as an independent variable under the assumption that, during any short time span, households make only partial adjustments in their M1 holdings in response to changes in the determinants of M1 demand.[7] The other version was the first-difference version. In this version, changes in the variables are entered in the regressions, rather than levels.[8]

The results of estimating the models differ depending on time period, the version of the model, and whether real GNP or consumption was used as a transactions variable. For the 1959-73 period, the results using the levels of the variables and real GNP as the transactions variable indicate that the savings deposit rate and real income are statistically significant determinants of household M1 demand. The coefficient on lagged M1 balances also is statistically significant, but other potential determinants are not.[9] For the first-difference model using real GNP as a transactions variable, the 1959-73 estimation results show no statistically significant determinants of household M1 demand. Moreover, the estimated partial adjustment coefficient has an incorrect sign. It is, nevertheless, insignificantly different from zero.

For the 1974-81 period, the levels/real GNP model shows that the speed of adjustment is estimated to decline, and the coefficient on inflation is statistically significant.[10] The results for the first-difference/real GNP model over the 1974-81 period show that inflation is estimated to be significantly correlated with household M1 demand.[11] (See Table 1 for complete estimation results of the models for the two periods using real GNP as a transactions variable.)

[7] This model conforms to the real adjustment model, as real M1 holdings are hypothesized to adjust to desired real M1 balances. The nominal adjustment model's specification only differs from that of the real adjustment model in that an additional term equaling the change in the logarithm of the price level is included. Since this same inflation variable is included in the estimated equations, the empirical results allow for the possibility of nominal adjustment. For discussions of these models, see Stephen M. Goldfeld, "The Case of the Missing Money," *Brookings Papers on Economic Activity*, 1976:3, pp. 683-730.

[8] The data used to estimate M1 demand models motivate this first-difference specification. In particular, most economic time series have trends, and the presence of trends can cause spurious correlation to appear in estimated relationships. First differencing the data helps to eliminate these trends. Moreover, if a model is appropriately specified, it should yield similar estimated coefficients when specified as levels on first differences. See, for example, Charles I. Plosser and G. William Schwert, "Money, Income, and Sunspots: Measuring Economic Relationships and the Effects of Differencing," *Journal of Monetary Economics*, November 1978, pp. 637-660.

[9] The inflation coefficient can again be interpreted as arising from the nominal adjustment model. While the nominal adjustment model cannot be rejected under this interpretation, neither can the real adjustment model because of the lack of statistical significance of this coefficient. Because the variables are entered as natural logarithms, the estimated coefficients can be interpreted as elasticities. For real GNP, for example, the estimated coefficient implies that a 1 percent increase in real GNP causes a 0.41 percent increase in the short-run demand for real M1 balances.

[10] Interpreting these results in terms of the nominal adjustment model, the hypothesis of nominal adjustment cannot be rejected at low significance levels, while the real adjustment model can be rejected.

[11] In all of the models, the hypothesis of coefficient stability across periods cannot be rejected at low significance levels in Chow tests. However, these tests are weak because of the number of statistically insignificant coefficient estimates.

TABLE 1

Estimation results with GNP as the transactions variable

Sample Period	Dependent Variable	Coefficient Estimates† c	rsd	rtb	y	e	m_{-1}	Δp	Summary Statistics‡ $\bar{R}^2$	SE	DW
1959:Q3-1973:Q4	m	-2.548*	-0.1221*	-0.0197	0.4149*	-0.0070	0.5510*	-0.0541	0.97	.0162	1.86
		(0.7350)	(0.0498)	(0.120)	(0.1220)	(0.209)	(0.1283)	(0.8479)			
1959:Q3-1973:Q4	Δm	0.0032	-0.0597	0.0200	0.2678	0.0104	-0.1128	-0.1570	-0.06	.0182	1.90
		(0.0039)	(0.0872)	(0.0189)	(0.3013)	(0.0325)	(0.1527)	(0.7094)			
1974:Q1-1981:Q4	m	-0.8637*	-0.3455	-0.0048	0.2211*	0.0226	0.7460*	-1.7102*	0.82	.0160	2.68
		(0.4299)	(0.2395)	(0.0154)	(0.0864)	(0.0327)	(0.1167)	(0.7241)			
1974:Q1-1981:Q4	Δm	-0.0047	0.0380	0.0004	0.5768*	0.0126	-0.1515	-1.6227*	0.20	.0177	1.84
		(0.0036)	(0.4367)	(0.0209)	(0.2926)	(0.0353)	(0.1786)	(0.6873)			

*Significant at the 5 percent level.
**Significant at the 10 percent level.
†When Δm is the dependent variable, all right-hand-side variables also are differenced. Numbers in parentheses are standard errors of estimated coefficients.
‡ $\bar{R}^2$ is multiple correlation coefficient corrected for degrees of freedom, SE is the standard error of estimate, and DW is the Durbin-Watson statistics.

m = natural logarithm of household M1 balances divided by the GNP deflator (Board of Governors of the Federal Reserve System, *Flow of Funds Accounts*)
rsd = natural logarithm of the savings deposit rate (MPS model databank)
rtb = natural logarithm of the end-of-quarter 3-month Treasury bill yield
y = natural logarithm of real GNP
e = natural logarithm of the end-of-quarter total value of equities (Board of Governors of the Federal Reserve System, *Flow of Funds Accounts*)
p = natural logarithm of the GNP deflator
Δ = difference operator

TABLE 2

Estimation results with consumption expenditures as the transactions variable

Sample Period	Dependent Variable	Coefficient Estimates† c	rsd	rtb	ce	e	m_{-1}	Δp	Summary Statistics‡ $\bar{R}^2$	SE	DW
1959:Q3-1973:Q4	m	-2.420*	-0.1069*	-0.0159	0.4145*	0.0128	0.5181*	0.6597	0.98	.0161	1.86
		(0.6499)	(0.0441)	(0.0122)	(0.1142)	(0.0218)	(0.1312)	(1.091)			
1959:Q3-1973:Q4	Δm	0.0012	-0.0481	0.0168	0.5228	0.0104	-0.1130	0.4833	-0.04	.0184	1.93
		(0.0044)	(0.0865)	(0.0190)	(0.3682)	(0.0337)	(0.1471)	(0.9059)			
1974:Q1-1981:Q4	m	-1.0223*	-0.4686**	-0.0201	0.2857*	-0.0009	0.6860*	0.0300	0.79	.0166	2.68
		(0.4745)	(0.2800)	(0.0187)	(0.1083)	(0.0313)	(0.1508)	(1.0785)			
1974:Q1-1981:Q4	Δm	-0.0046	-0.0776	0.0069	0.5296	0.0584	-0.3165	0.8231	-0.02	.0195	1.84
		(0.0045)	(0.4813)	(0.0228)	(0.4030)	(0.0387)	(0.2070)	(1.1058)			

Note: Variables and symbols are as defined in Table 1, except for the following:

m = natural logarithm of household M1 balances divided by the consumption expenditures deflator
ce = natural logarithm of real consumption expenditures
p = natural logarithm of the consumption expenditures deflator

TABLE 3

Percentage simulation errors using pre-1974 coefficient estimates*

Period	Levels (m)		First Differences (Δm)	
	GNP	Consumption	GNP	Consumption
1974:Q1	1.43%	1.07%	0.03%	-1.06%
Q2	-1.25	-1.65	-3.02	-3.29
Q3	-1.48	-2.17	-1.75	-2.11
Q4	0.61	0.10	0.40	1.23
1975:Q1	-1.61	-2.72	-1.98	-1.83
Q2	1.33	0.05	2.30	1.86
Q3	-2.20	-3.24	-2.30	-2.43
Q4	-3.76	-4.52	-1.98	-1.94
1976:Q1	-1.74	-2.44	1.92	1.39
Q2	-1.20	-2.06	1.83	1.55
Q3	-4.01	-5.18	-1.61	-2.20
Q4	-2.64	-3.86	0.74	0.30
1977:Q1	-1.27	-2.33	2.26	1.85
Q2	-3.49	-4.13	-0.64	-0.29
Q3	-2.31	-2.84	1.08	0.97
Q4	-3.22	-4.25	-0.15	-0.64
1978:Q1	-0.88	-1.85	2.36	2.14
Q2	-2.70	-3.34	-0.80	-0.79
Q3	-4.31	-4.98	-1.46	-1.46
Q4	-3.06	-3.65	0.43	0.41
1979:Q1	-4.06	-4.75	-0.46	-0.71
Q2	-2.38	-3.11	1.46	1.32
Q3	-2.16	-3.24	0.73	0.05
Q4	-3.15	-4.95	-0.71	-1.68

*Numbers correspond to percentage errors of real M1 balances obtained in post-sample static simulations.

With one major exception, the results using consumption expenditures as the transactions variable are virtually the same as those using real GNP. The exception is evident in the 1974-81 period, where the effect of inflation is not estimated to be statistically different from zero. (See Table 2 for complete results.)

The next step was to use the estimated demand for M1 relationships to evaluate the behavior of M1 in the 1982-83 period; that is, to determine whether the demand for M1 relationship deviated from historical norms in 1982 and 1983. This was done by using the estimated relationships to simulate, or "predict," historically consistent behavior of M1 for the 1982-83 period and then determine whether the actual behavior of M1 deviated from the predicted behavior.[12] Again, the two periods were treated separately because the relationships might not have been the same during the two periods due to a possible shift in the demand for M1 in 1974. To obtain some preliminary insight into this possibility, the behavior of the demand for M1 during the 1974-81 period was evaluated. To do this, the 1959-73 relationship was simulated over the 1974-81 period to determine whether the behavior of the demand for M1 during the

[12] In all empirical equations used in the simulations, coefficients with theoretically incorrect signs are deleted and the equations are reestimated.

TABLE 3 (continued)

Period	Levels (m) GNP	Levels (m) Consumption	First Differences (Δm) GNP	First Differences (Δm) Consumption
1980:Q1	-3.65	-5.57	-1.38	-1.66
Q2	-5.59	-7.11	-2.11	-1.51
Q3	-2.24	-4.52	1.39	0.69
Q4	-8.81	-11.34	-6.16	-6.10
1981:Q1	-5.11	-6.86	0.96	1.27
Q2	-7.38	-9.39	-0.91	-1.18
Q3	-8.63	-10.44	-1.99	-1.80
Q4	-5.19	-6.72	2.51	3.03
1982:Q1	-4.85	-7.52	1.57	0.72
Q2	-6.90	-9.62	-1.37	-1.27
Q3	-6.39	-9.21	0.84	-0.04
Q4	-3.68	-7.05	2.83	2.25
1983:Q1	-0.45	-3.47	4.34	4.93
Q2	-0.63	-3.88	2.94	2.04
Q3	-4.98	-7.85	-2.00	-1.95
Q4	-5.34	-8.25	-1.09	-1.26
%ME(1974-81) =	-3.00%	-4.13%	-0.28%	-0.46%
RMSE(1974-81) =	$5.46b	$7.12b	$2.72b	$2.74b
%ME(1982-83) =	-4.15%	-7.11%	-1.01%	0.68%
RMSE(1982-83) =	$6.95b	$11.055b	$3.64b	$3.50b
%CE(1983:Q4) =	-9.28%	-14.95%	8.06%	5.42%

%ME = mean percentage simulation error
RMSE = root-mean-square error, in $1972b
%CE = cumulative percentage error

1974-81 period deviated from its behavior in the 1959-73 period.

These simulation results for the 1974-81 period are reported in Table 3. The reported values correspond to percentage errors in predicting real household M1 balances.[13] From the levels/real GNP model, for example, the results indicate that actual household real M1 balances in the first quarter of 1974 were 1.43 percent higher than those predicted by the model. The table shows that, starting in the third quarter of 1975, forecast errors for the levels model using either real GNP or real consumption expenditures were uniformly negative. As a consequence, for the 1974-81 period as a whole, the mean percentage forecast errors are -3.00 and -4.13 percent, respectively. Thus, the results using the levels model indicate that household M1 demand shifted downward over this period.

Forecasts from first-difference models are reported in the last two columns of Table 3. In contrast to the results of the levels models, the

[13] The forecasts were computed using static simulations. With this approach, the forecast in each period depends only on the values of the M1 demand determinants in the period. That is, historical values of the determinants, including lagged real M1 balances, are used to forecast current real M1 balances. This approach allows the magnitude of shifts in the empirical M1 demand relationship to be identified. For a discussion of the relative merits of the static and dynamic simulation methodologies, see Scott E. Hein, "Dynamic Forecasting and the Demand for Money," *Review*, Federal Reserve Bank of St. Louis, June/July 1980, pp. 13-23.

first-difference specifications do not exhibit large systematic errors. For the 1974-81 period as a whole, the mean percentage forecast errors using real GNP and real consumption expenditures were only -0.28 and -0.46 percent, respectively. Moreover, the root-mean-square errors—another measure of forecasting accuracy—were less than half those of the other models. These first-difference models, however, would not be expected to exhibit systematic negative simulation errors in response to permanent downward shifts in the level of M1 demand. Instead, permanent shifts would be indicated by the presence of a single large prediction error followed by a series of errors approximately summing to zero. In the first-difference model using real GNP as the transactions variable, for example, the 14 errors following the 3.02 percent decline in the second quarter of 1974 sum to 0.12. Thus, the downward shift in this quarter was not offset during these subsequent quarters. If household M1 demand equations in the pre-1974 period differ from those in the post-1974 period only by the presence of a permanent level shift, however, the pre-1974 models might explain the 1982-83 period.

Simulations over 1982-83 involving all four models estimated over the pre-1974 period are examined next. These results are reported in Table 3. The results for the models specified in levels form suggest that the earlier downward shift in household M1 demand persisted, as reflected by the negative percentage errors. The forecast errors using the first-difference models again are smaller than those of the other models.

To examine further whether the relationships estimated over the 1959-73 period were consistent with recent experience, cumulative percentage errors, %CE, over the 1982-83 period were calculated. The starting date in the corresponding simulations was the first quarter of 1982. The cumulative errors reported in Table 3 for the fourth quarter of 1983 are quite sizable. For the levels specifications, the smallest error is -9.28 percent. The cumulative errors for the first-differences specifications are 8.06 and 5.42 percent. As a whole, the magnitude of even the smallest of these cumulative errors casts doubt on the applicability of the pre-1974 models for the 1982-83 period.

Simulation results for models estimated over the 1974-81 period are presented in Table 4. In contrast to the results of the previous table, the simulations of all the models register about the same predictive ability. Specifications employing real consumption expenditures, however, have slightly higher mean percentage errors.

The cumulative percentage errors reported for the four models in Table 4 also are smaller than those of their counterparts in Table 3. For the levels specifications, cumulative errors in the fourth quarter of 1983 in simulations starting in the first quarter of 1982 are 2.35 and 3.26 percent for models using real GNP and real consumption expenditures, respectively. These errors are about one-fourth the absolute values of those reported for similar specifications in Table 3. The cumulative percentage errors in the fourth quarter 1983 for the first-differences specifications also are noticeably smaller. These results therefore suggest that models estimated over the 1974-81 period better reflect current household M1 demand than those estimated over the 1959-73 period.[14] That is, the behavior of household M1 demand

[14] Several factors account for this result. In the levels specifications, one factor is of course the smaller absolute value of the constant term in post-1974 models. This difference, however, does not account for all of the improvement. Other factors include the increased role of inflation in the levels specification with real GNP, the larger estimated coefficient on lagged M1 in both levels specifications, and the lower estimated coefficients on either real GNP or real consumption expenditures. In the first-differences specification, factors include the larger effect of wealth in both models and the increased effect of inflation in the model using real GNP.

TABLE 4
Percentage simulation errors using post-1974 coefficient estimates*

Period	Levels (m) GNP	Levels (m) Consumption	First Differences (Δm) GNP	First Differences (Δm) Consumption
1982:Q1	-0.17%	0.42%	0.13%	1.17%
Q2	-0.86	-0.51	-0.85	-1.04
Q3	-0.78	-0.35	0.00	-0.48
Q4	1.55	1.65	2.86	1.66
1983:Q1	4.50	4.47	4.77	4.64
Q2	3.34	3.68	1.24	1.63
Q3	-1.07	-0.49	-2.43	-1.92
Q4	-0.85	-0.41	-1.28	-1.12
%ME(1982-83) =	0.58%	0.93%	0.55%	0.57%
RMSE(1982-83) =	$3.42b	$3.45b	$3.44b	$3.21b
%CE(1982:Q4) =	2.35%	3.26%	4.44%	4.54%

*See the notes in Table 3.

and M1 velocity was predictable over 1982-83 given the recorded values of real GNP, inflation, and real consumption expenditures. This result is particularly true for the behavior of M1 demand in 1982.

Conclusions

The reliability of the narrowly defined money supply, M1, as a monetary policy guide has been questioned following the events of 1982 and 1983. During that period, M1 grew rapidly and the turnover or velocity of M1 underwent an unprecedented decline. Some observers argue that this drop in velocity was caused by an unpredictable shift in the M1 velocity function during the 1982-83 period.

This article presents evidence supporting the view that, during the 1982-83 period, the behavior of M1 velocity was predictable relative to the last half of the 1970s, but not predictable relative to earlier years. In other words, during the 1982-83 period, M1 velocity conformed to the historical experience of the 1974-81 period, but deviated from norms established during the 1959-73 period. The evidence is based on an empirical examination of the M1 velocity behavior of the nation's household sector during the 1959-83 period.

While the results suggest that the behavior of M1 velocity in 1982 and 1983 conformed with M1 velocity behavior since 1974, the use of M1 as a policy guide merits caution. One reason is that the results indicate that the behavior of M1 relative to the economy changed in the mid-1970s, and further changes could occur in the future. Another is that the empirical results for the period after the mid-1970s may not exhibit the necessary precision or robustness to adhere strictly to M1 as a monetary policy guide. The results, nevertheless, suggest that M1 is a useful monetary policy guide if used with caution.

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Supervision of Bank Foreign Lending

By John E. Young

Foreign lending by U.S. commercial banks increased greatly in size and geographical scope from the mid-1970s to the early 1980s as U.S. banks recycled dollars from oil-exporting to oil-importing nations. While extensive U.S. bank lending helped oil-importing countries maintain economic growth, global recession and high international interest rates made it difficult for them to service their foreign debt in the early 1980s. The culmination of these difficulties led, in turn, to the international debt crisis in late 1982.

The 1982 debt crisis raised numerous questions about whether foreign lending by U.S. banks was effectively supervised. Subsequently, U.S. bank supervisory agencies developed a more comprehensive system for supervising bank foreign lending. The system was mandated in late 1983 by the International Lending Supervision Act (ILSA).

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This article describes the principal features of the current system for supervising bank foreign lending, with the focus primarily on the ILSA. The first section provides a brief background on bank foreign lending supervision before the ILSA. The second section discusses principal provisions and objectives of the ILSA. The final section describes other regulatory actions affecting bank foreign lending supervision.

Background on bank foreign lending supervision

Three federal agencies—the Federal Deposit Insurance Corporation (FDIC), the Comptroller of the Currency, and the Federal Reserve System—supervise banking activities in the United States, including bank lending. The supervision and regulation of banks help ensure monetary stability, promote an efficient and competitive financial system, and protect consumers and depositors. In the strictest sense, banking regulation refers to the framework of laws and rules under which banks operate, and supervision refers to the monitoring of financial conditions at banks and to the enforcement of banking regulations and policies.[1] Disclosure refers to information banks are required to make available to the public. Disclosure is intended to promote market discipline. Market discipline refers to the limitations placed on a bank's lending behavior by investors. Investors may impose market discipline by withholding or withdrawing their deposits, demanding a higher yield on their uninsured deposits, or paying a lower price for bank debt and bank stock.

Though bank lending has been supervised for some time, only recently has foreign lending been supervised separately from domestic lending. Separate supervision of bank foreign lending began after the 1973-74 oil embargo. With the embargo and the associated sharp increase in oil prices, lesser developed countries (LDC's) that imported oil began to borrow heavily from banks in industrial countries to finance their rising oil-import bills.[2] Following this rapid buildup of LDC debt, congressional hearings were held in 1977 to discuss bank foreign lending and its supervision. Changes were subsequently made in the supervision of bank foreign lending. Bank supervisors developed a country exposure lending survey and initiated a uniform system for the examination of country risk.

Developed jointly by the three federal bank supervisors, the country exposure lending survey was implemented in 1977. This survey allows collection of information on U.S. bank foreign lending. The aggregated information is made available to the public. The survey is also used by bank supervisors in the uniform system for the examination of country risk.

The uniform system for the examination of country risk was developed by the bank supervisors and introduced in 1979. The system is administered by the InterAgency Country Exposure Review Committee (ICERC), which consists of members from the FDIC, the Comptroller, and the Federal Reserve System.

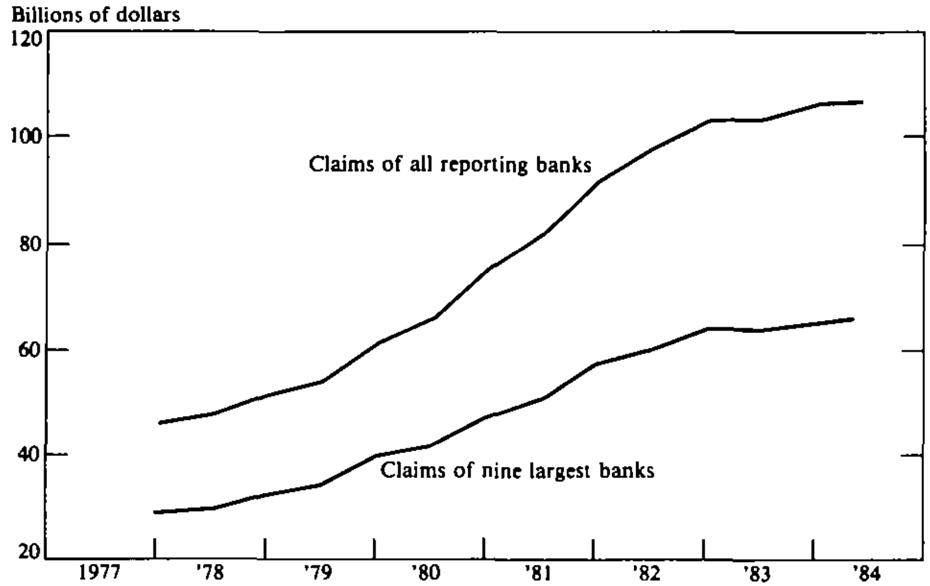
The uniform system was designed to improve the supervision of bank foreign lending. The primary objectives of the system are to encourage diversification of foreign lending and to develop uniform practices for examining country risk. Country (transfer) risk refers to the economic, legal, political, and social conditions within a country that may prevent its domestic borrowers from repaying foreign creditors. These conditions include social or political unrest, government repudiation of external debt, nationalization, exchange controls, and an inability to obtain foreign exchange. Country risk is what distinguishes foreign lending from domestic lending and gives rise to the need for separate examination procedures for foreign loans.

The uniform system and the country exposure lending survey were partially ineffective prior to the ILSA. The survey provided no mechanism for market discipline, since it provided investors with no bank-specific foreign lending data. The uniform system was advisory only, with no mechanism for ensuring that examiners' comments and recommendations were acted on. Although the system brought uniformity to the examination of country risk, it was generally unsuccessful in bringing about greater diversification in foreign lending. In mid-1982, for example, about three years after the uniform system was adopted, loans from the nine largest U.S.

[1] For more discussion of the objectives of bank supervision, see Kenneth Spong, *Banking Regulation, Its Purpose, Implementation, and Effects*, Federal Reserve Bank of Kansas City, January 1983, pp 5-10

[2] For a discussion of the origins of the international debt problem, see William R. Cline, *International Debt and the Stability of the World Economy*, Institute for International Economics, September 1983, pp. 21-31.

CHART 1
U.S. bank claims on non-oil exporting LDC's*



*Includes Mexico
Source: Country Exposure Lending Survey, Federal Financial Institutions Examination Council

banks to Argentina, Brazil, and Mexico amounted to 137 percent of their capital, compared with 114 percent in early 1979.[3] Exposure of all reporting U.S. banks to the three countries increased from 12 percent of their total foreign loans in June 1979 to 15 percent in June 1982.

The International Lending Supervision Act

Following the sharp increase in oil prices in 1979-80, non-oil exporting LDC's increased their borrowings from U.S. banks. Chart 1 traces the increase. Chart 2 shows that, as a percentage of bank capital, claims on non-oil exporting LDC's were substantial, especially for the nine largest U.S. banks.

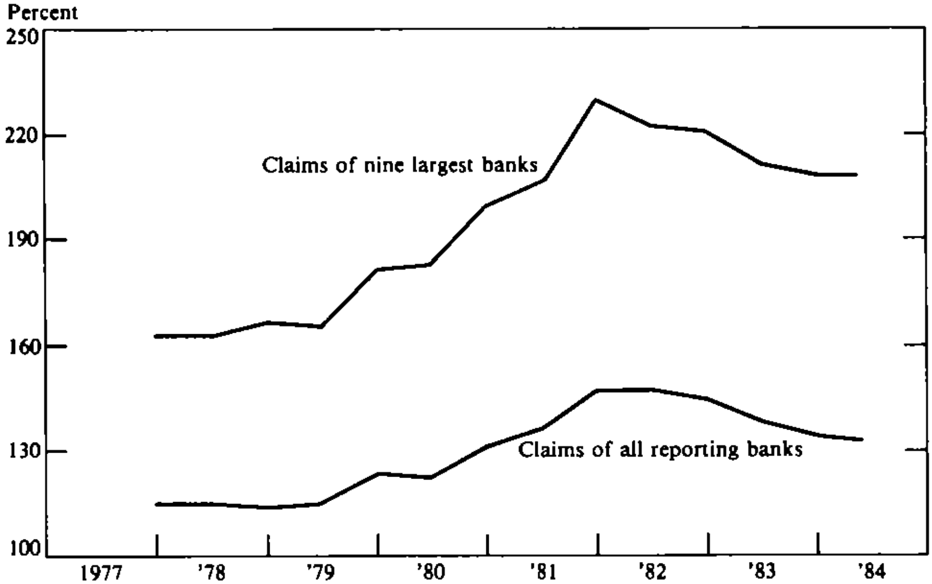
This heavy borrowing along with the sharp rise in international interest rates placed a heavy debt servicing burden on non-oil exporting LDC's. The burden was made worse by the recession in industrial countries in 1981-82 because it lowered their demand for LDC exports. By August 1982, the debt servicing burden on Mexico was too great and the Mexican government announced it could not meet payments due on its debt to banks. Soon after, when Argentina and Brazil were unable to meet payments due on their debts, the international debt situation moved from the problem stage to the crisis stage.

Following these developments, Congress in late 1983 passed the ILSA in conjunction with legislation allowing for increased U.S. partici-

[3] Richard Dale, Brookings Institute Hearings, Committee on Banking, Finance and Urban Affairs, House of Representatives, "International Financial Markets and Related Matters," February 2, 8, and 9, 1983, p 388.

CHART 2

U.S. bank claims on non-oil exporting LDC's as a percentage of capital*



*Includes Mexico

Source: Country Exposure Lending Survey, Federal Financial Institutions Examination Council

pation in the International Monetary Fund. The general objectives of the ILSA are to encourage the diversification of risk and the maintenance of financial strength adequate to deal with unexpected contingencies.[4] The law directs bank supervisors and banks to take steps to strengthen existing programs on bank foreign lending supervision.[5] Several provisions of the law are discussed below.

[4] Paul Volcker, *Federal Reserve Bulletin*, Board of Governors of the Federal Reserve System, April 1983, p. 277.

[5] The Federal Reserve has jurisdiction over state chartered banks that are members of the Federal Reserve System, bank holding companies, and Edge and Agreement Corporations engaged in banking. The Comptroller has jurisdiction over banks with national charters, and the FDIC has jurisdiction over state chartered banks that are not members of the Federal Reserve System.

The country exposure lending survey

This provision of the ILSA, implemented in February 1984, calls for continuation of the country exposure lending survey, but with some changes. The survey is now conducted quarterly and covers banks with a foreign office and more than $30 million in outstanding foreign loans. The survey collects information similar to the information collected before the ILSA. This includes bank claims on individual countries, the type of borrowers, and the maturity distribution of those claims. The survey data are published quarterly by the Federal Financial Institutions Examination Council (FFIEC). Table 1 gives an example of information in the survey.

Pursuant to the ILSA, the country exposure lending survey contains a special public dis-

TABLE 1

Amounts owed to U.S. banks by selected foreign borrowers, September 1984
(in millions of dollars)

Country	Total Claims	Claims on: Banks	Claims on: Public Borrowers	Claims on: Private Nonbank Borrowers	Maturity Distribution of Claims: 1 Year And Under	Maturity Distribution of Claims: Over 1 to 5 Years	Maturity Distribution of Claims: Over 5 Years
Argentina	8,229.2	1,884.4	4,075.0	2,269.8	5,739.8	2,159.3	330.1
Brazil	23,621.0	8,529.3	11,096.3	3,995.3	8,579.1	8,596.5	6,445.3
Mexico	26,570.8	4,438.1	13,376.3	8,756.2	8,355.4	12,225.1	5,990.2

Source: Country Exposure Lending Survey, Federal Financial Institutions Examination Council

closure supplement in which banks list claims on a country when the claims exceed 1 percent of the bank's assets or 20 percent of its capital. The type of borrower is also identified and maturity distribution is given. A bank is required to list countries where claims are between 0.75 percent and 1.0 percent of the bank's assets or 15 percent to 20 percent of capital, along with the aggregate claims on these countries.

The survey supplement is available to the public on request. This supplement provides investors with bank-specific data on foreign lending that had not been generally available. By segmenting the geographical distribution of bank foreign lending exposure, the supplement allows investors to make judgments about bank exposure to country risk as economic and political conditions in debtor countries change. It also allows investors to pressure bank management through market discipline when bank exposure to country risk becomes excessive.

Strengthened examination procedures for country risk

Another provision strengthens the uniform system for the examination of country risk. The system, still administered by the ICERC, was modified to improve the identification of troubled foreign loans and increase bank management's awareness of exposure to country risk.

Under the strengthened system that went into effect in December 1983, examiners continue to draw on information from the country exposure lending survey and to list and comment on banks' foreign exposures in bank examination reports. The purpose is to increase bank management's awareness of country risk and, possibly, effect a change in lending policy. Examiners also continue to evaluate banks' internal systems for managing exposure to country risk. As was the practice prior to the ILSA, the ICERC classifies loans adversely affected by country risk, which in turn affects the bank's overall asset quality rating.

Three categories are currently used to classify loans that have been adversely affected by country risk. These categories are "loss," "value-impaired," and "substandard." Foreign loans classified as loss are considered uncollectible. A foreign loan is classified as value-impaired when the quality of the loan has been impaired by a protracted inability of the borrower to make payments on the loan and there is no definite prospect for the orderly restoration of debt service in the near future. A foreign loan is classified as substandard when the borrower has not been complying with its debt service obligations as evidenced by arrearages or forced restructurings. In addition, the category of "other transfer risk problems" is used to highlight loans that are judged to be adversely affected by country risk problems, but not affected seriously enough to be classified as substandard. Loans in this category are considered by examiners as a judgmental factor in their general assessment of a bank's asset quality and the adequacy of its reserves and capital.

As a follow-up to examinations, bank examiners still discuss country risk problems and foreign loan concentrations with members of the boards of directors of banks involved in heavy foreign lending. Such discussions are intended to heighten the awareness of country risk and encourage prudent foreign lending.

Reserves

Pursuant to the reserves provision of the ILSA, a special reserve called an Allocated Transfer Risk Reserve (ATRR) is established for foreign loans classified as value-impaired.

Bank supervisors jointly decide at least once a year what foreign loans are subject to risks that warrant establishing an ATRR. They also determine the size of the ATRR, and whether a previously established ATRR should be increased or decreased due to a change in the quality of the loan. Although the amount of the ATRR may be adjusted at the supervisors' discretion, it is normally 10 percent of the loan principal in the first year it is classified as value-impaired and 15 percent in subsequent years. Instead of establishing an ATRR, banks can write down (reduce the book value of) the loan by an amount equal to the ATRR.

The objective of establishing ATRR's is to strengthen banks by requiring them to carry reserves sufficient to offset possible foreign loan losses. Since ATRR's are not counted as capital for supervisory purposes, a bank is in a better position to absorb a foreign loan loss without reducing its stated capital.

Foreign loan fees

The fees provision of the ILSA deals with how banks can treat the fees they receive for originating and restructuring foreign loans. Under the provision, fees banks receive in excess of the administrative costs of originating or restructuring a foreign loan must be deferred and amortized over the effective life of the loan. Until the implementation of the provision in April and June 1984, banks often took these fees into income immediately.

One reason for requiring banks to defer a part of their restructuring fees is to avoid excessive debt servicing burdens on debtor countries. With a typical restructuring fee of 1 percent of the loan principal, borrowers expected to pay the entire fee immediately could incur a sizable increase in their debt servicing burden. The banks involved in the 1982 restructuring of Mexico's debt, for example, received roughly $200 million in fee income.[6]

A second reason for the fees provision is to remove an artificial incentive to foreign lending. By taking the whole loan fee into income immediately, banks could boost their current earnings. As a result, there was an incentive to originate or restructure foreign loans. The purpose of the fees provision is not to discourage foreign lending but to discourage foreign lending undertaken for the purpose of boosting banks' current income.[7]

[6] Hearings, Committee on Banking, Finance and Urban Affairs, House of Representatives, "International Financial Markets and Related Matters," February 2, 8, and 9, 1983, pp. 163-164.

[7] William Isaac, Federal Deposit Insurance Corporation Hearings, Committee on Banking, Finance and Urban Affairs, House

International coordination of supervision

This provision, which became effective with passage of the ILSA, directed the bank supervisors to review the laws, regulations, and examination and supervisory procedures covering foreign lending in major industrial countries.[8] The bank supervisors were then to consult with their counterparts in these countries to promote international coordination of bank foreign lending supervision.

There are two reasons for this provision. First, if U.S. banks are more regulated in their foreign lending than banks in other industrial countries, they may be at a competitive disadvantage. Second, lack of similar supervision of foreign lending by other countries could undermine the effectiveness of the ILSA in promoting the safety and soundness of the U.S. banking system. If bank foreign lending in other countries is not properly supervised and excessive foreign lending follows, it could lead to additional international debt problems. This could jeopardize the foreign loans of U.S. banks and, consequently, the safety and soundness of the U.S. banking system.

Capital requirements

The capital requirements provision of the ILSA gives the bank supervisors authority to establish and enforce minimum capital requirements for banks. This provision represents a subtle but important change. Until the ILSA, the regulation of bank capital lacked uniformity and stringency. Regulators issued capital guidelines but it was not clear that they had enforcement power.[9]

The ILSA directs bank supervisors to make sure that a bank's capital position is adequate to accommodate the risks of large country exposure and foreign loan restructuring. Banks with large concentrations of loans in particular countries are expected to maintain higher capital ratios than well-diversified banks.

Additional elements of foreign lending supervision

In addition to steps taken under the ILSA, other regulatory actions by bank supervisors and the Securities and Exchange Commission (SEC) are related to bank foreign lending. These actions are aimed at stricter accounting treatment of nonaccrual foreign loans and increased disclosure of foreign lending.

SEC disclosure requirements

The SEC helps protect investors by requiring the disclosure of material information. Disclosure allows investors to make more informed investment decisions. More than 760 bank holding companies (BHC's)—with subsidiaries including the 100 largest banks—are subject to SEC disclosure provisions.[10]

of Representatives, "International Financial Markets and Related Matters," April 20-21, 1983, p. 219.

[8] The major industrial countries are Belgium, Luxembourg, Canada, France, Germany, Italy, Japan, Sweden, United Kingdom, and the Netherlands.

[9] Under those capital guidelines, existing since December 1981, the FDIC, Comptroller of the Currency, and the Federal Reserve System set minimum capital requirements for banks under their respective jurisdictions. However, these capital guidelines varied to some extent across bank size and supervisory agency. Although supervisory agencies could issue cease and desist orders when banks failed to comply with capital guidelines, they rarely did and there was uncertainty about supervisors' authority to enforce their guidelines. For collaboration of this point, see Karlyn Mitchell, "Capital Adequacy at Commercial Banks," *Economic Review*, Federal Reserve Bank of Kansas City, September/October 1984, pp. 19-20.

[10] See John S.R. Shad, Securities and Exchange Commission. Hearings, Committee on Banking, Finance and Urban Affairs, House of Representatives, "International Bank Lending," April 20-21, 1983, p. 350.

In 1976, the SEC imposed requirements on certain BHC's that they disclose information on their foreign lending activities.[11] The information must include a breakdown of aggregate foreign loans outstanding into the following categories: government and official institutions, commercial and industrial entities, banks and other financial institutions, and others. The amount of foreign assets, as well as foreign revenue and income, is also disclosed for each significant geographical area in which the BHC does business, such as Europe or Latin America. Yields on average foreign assets and the allowance for foreign loan losses are also disclosed.[12]

With the Latin American debt crisis of 1982, it became apparent that loans to countries with liquidity problems might involve unusual risks and uncertainties for banks. Consequently, the SEC established additional disclosure requirements in 1982, 1983, and 1984. Under these recent disclosure requirements, BHC's must disclose exposures to foreign countries that amount to more than 1 percent of their assets. BHC's with foreign country exposures that equal 0.75 percent to 1.0 percent of their assets must disclose the names of the countries and the aggregate exposure to the countries.[13] BHC's with loans outstanding to borrowers in a foreign country that exceed 1 percent of their assets must disclose information on loan restructuring.[14] BHC's must also disclose the amounts in their ATRR.[15]

Nonaccrual loan rule

In June 1984, amid growing concern over Argentine debt, the Comptroller of the Currency and the Board of Governors of the Federal Reserve System sent a joint statement to banks clarifying their policy regarding loans classified as nonaccrual. Generally, a nonaccrual loan is one on which the borrower has fallen behind on principal or interest payments. Before this clarification, some banks classified loans as nonaccrual only if the interest or principal payments were more than 90 days overdue on the day the bank was filing its income statement. Consequently, some banks would record uncollected interest as income, even on loans that had been on nonaccrual status and were clearly not performing according to the terms of the contract. As a result, there was an overstatement of earnings on these banks' income statements.

The policy was clarified to make sure that banks correctly followed established procedures for classifying loans as nonaccrual. Under the clarification of policy, a loan is to be placed on nonaccrual status the day that interest or principal payments become 90 days past due. When this happens, any interest

[11] A BHC is required to disclose information on its foreign lending activity if over each of the past two years: 1) the pre-tax income associated with foreign banking operations exceeded 10 percent of total pre-tax income, or 2) the assets associated with foreign banking operations exceeded 10 percent of total assets.

[12] *SEC Docket*, Vol. 10, September 16, 1976, pp. 316-321. See also John S.R. Shad, Securities and Exchange Commission. Hearings, Committee on Banking, Finance and Urban Affairs, House of Representatives, "International Bank Lending," April 20-21, 1983, p. 344.

[13] *Washington Financial Reports*, "SEC Revises Disclosure Requirements on BHCs' Foreign, Nonperforming Loans," Vol. 41, August 15, 1983, pp. 286-287 Preliminary research suggests that these SEC foreign loan disclosure requirements do promote market discipline. See Steven C Kyle and Jeffrey D. Sachs, "Developing Country Debt and the Market Value of Large Commercial Banks," *NBER working paper 1470*, September 1984, p. 7 See also Jeremy A. Gluck, "The Impact of LDC Loan Exposure on U.S. Commercial Bank Stock Prices and Borrowing Rates," mimeo, Federal Reserve Bank of New York, October 1984.

[14] *SEC Docket*, Vol. 27, February 4, 1983, pp. 63-64.

[15] *Washington Financial Reports*, "SEC Staff Says Risk Reserve for Banks May Not Satisfy Federal Securities Laws," Vol 42, February 13, 1984, p. 301.

accrued but not actually collected must be subtracted from income and any additional interest will be counted as income only when interest payments are actually received. A loan remains classified as nonaccrual until all interest and principal payments are brought up to date.[16]

This policy had an immediate and substantial effect on bank earnings. The policy became effective in the third quarter of 1984, however, many banks chose to apply it in the second quarter. For example, the largest U.S. lender to Argentina classified $638 million of its Argentine loans as nonaccrual during the second quarter of 1984. As a result, the lender had a net loss of $21.4 million that quarter. Another large bank placed many of its Argentine loans on nonaccrual status during that quarter and suffered a $3.1 million loss.[17] By the fourth quarter of 1984, the big banks had placed 40 to 60 percent of their Argentine loans on nonaccrual status.[18]

Conclusion

Supervision of bank foreign lending has evolved substantially over the past decade. Early efforts to supervise foreign lending—such as the original country exposure lending survey and the uniform system for the examination of country risk—did not prevent excessive foreign lending because they did not provide mechanisms for forcing banks to behave more prudently.

Recent supervisory measures are designed to use both regulatory power and market pressure through disclosure to promote prudence. By empowering bank supervisors to require special reserves and minimum capital, the ILSA encourages banks to scrutinize their foreign lending programs and, thereby, strengthens the banking system against foreign loan losses. The ILSA promotes market discipline by requiring banks to disclose detailed data on foreign lending through the country exposure lending survey. The SEC disclosure requirements also promote market discipline by providing investors with material information. More prudent accounting practices, which also may promote market discipline, are promoted by recent changes in the treatment of foreign loan fees and nonaccrual foreign loans.

Steps taken pursuant to the ILSA and other recent regulatory steps come at a time when bank foreign lending has already curtailed due to the international debt crisis of 1982. It is unclear, therefore, what effect these steps have had on bank foreign lending. It is clear, however, that the current system of supervising bank foreign lending has evolved in a manner designed to help ensure the safety and soundness of the U.S. banking system.

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[16] *Washington Financial Reports*, "Banks May Take Hit on Foreign Loans After Interest Accrual Loans Clarified," Vol. 46, June 25, 1984, pp. 1065-1066.

[17] Suzanna Andrews, "Accounting for LDC Debt," *Institutional Investor*, August 1984, p. 193.

[18] Dan Hertzberg and S. Karene Witcher, "Republic New York, RepublicBank Put Argentine Loans on Non-Accrual Status," *Wall Street Journal*, January 17, 1985, p. 2.