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Texas and OPEC

A Case of Economic Interpendence

Hossein Askari

James Creasey

The dramatic oil price increases of 1973-1974 have had a substantive adverse economic effect on much of the world, with the possible exception of Texas and a few other oil-producing areas in the United States. For Texas, oil price increases set by the Organization of Petroleum Exporting Countries (OPEC) have directly resulted in higher employment levels and higher tax revenues and have indirectly stimulated economic activity through exports and inflows of capital. For most of the world, the higher prices set by OPEC aggravated inflationary conditions in all oil-importing nations, deteriorated significantly their balance of payments positions, and reduced the level of disposable incomes at a time when worldwide recession was already in progress. It has been estimated by the International Monetary Fund (IMF) that increased energy prices were responsible for an inflationary impact of between 2.5 and 3.5 percent for most industrialized countries, an impact that was somewhat lower for the United States (1.5 percent) and a little higher for Japan (4.0 percent) and Italy (5.5 percent).[1] Furthermore, because of a lack of an immediate substitute, oil usage declined very little and thus the price increases reduced the level of disposable income available for non-oil purchases and contributed to the recent slowdown in economic growth.

These adverse effects are unquestioned, with the only debate being the relative impact on individual countries. It became apparent after the initial price increases that some countries would suffer more than others, depending on the proportion of imports of oil relative to domestic production. To make matters worse, the more dependent countries, with larger trade deficits brought about by higher oil prices, are forced to bridge the gap in their balance of payments with products whose production costs have increased (due to these prices) relative to those produced in countries whose oil dependency is less pronounced.

The issue, therefore, has been, "Who is hurt more or less relative to other nations?" Because of this focus, little attention has been paid to the possible beneficiaries of this alignment of petroleum exporters. It may seem unlikely that any industrialized nation or region outside of OPEC could actually flourish under the conditions described, but Texas has managed to do just that.

While the United States has on balance been adversely affected by the unilateral pricing policies of OPEC, these effects have been neither uniformly distributed among the states nor unidirectional. Some states, Texas in particular, have benefited both directly and indirectly from the higher price of oil.

Table 1

State Energy Tax Revenues and Total State Revenues
(Millions of dollars)

Fiscal year ending August 31	Production and regulation tax, crude oil	Production and regulation tax, natural gas	Special motor fuel tax	Motor fuel tax	Oil and gas well servicing tax	Total	Total state revenues*
1970	172	96	27	258	0	553	2219
1971	194	108	31	302	0	635	2454
1972	193	114	35	320	1	663	2858
1973	209	134	41	343	1	718	3150
1974	347	171	46	343	1	908	3716
1975	404	259	45	350	2	1060	4151
1976	431	364	51	376	2	1224	4816

*Excludes federal grants.
Source: Comptroller of Public Accounts, *Annual Financial Report of the State of Texas*, annual volumes.

A general indicator of the degree to which Texas has benefited can be found in the unemployment trends of the 1970-1976 period. Texas unemployment rose from 3.7 percent in 1970 (the base year) to a high of 5.6 percent in 1975, while the corresponding figures for the United States were 4.9 and 8.5 percent respectively. At the height of the recession Texas unemployment was 2.9 percent below the national average and only 2.6 percent above the lowest unemployment level, which occurred during the economic boom period in 1973.[2]

Admittedly, Texas was less affected than other states during the economic slowdown for reasons other than the stimulus provided by OPEC. However, OPEC and oil, the two being inextricably linked, are a major determinant of economic growth in Texas. They not only provide a direct infusion of dollars as an economic stimulus through higher oil prices but also affect the state's economy indirectly.

In Texas the most obvious direct effect of the higher world price for oil has been the reevaluation of its oil and gas reserves. Although federal price controls prevented the wellhead value of Texas oil from reaching the world market price, the wellhead price of Texas oil still increased from an average in 1970 of $3.28 per barrel to $8.02 per barrel in 1976.[3] World prices of oil during this same period ranged from $1.80 per barrel to the current price of $12.38 per barrel. Since the state tax on oil and gas production is an ad valorem tax, these higher prices have resulted in additional revenues to the state of Texas. The additional revenues resulting from the production tax levied on the wellhead value of oil and gas, although considerably below what uncontrolled domestic prices would have produced, have been substantial. Energy tax revenues rose from $553 million in 1970 to $1,224 million by 1976, amounting to 25.4 percent of the state's entire 1976 revenues (see table 1). Royalty payments from oil and gas production also increased from $672 million in 1970 to $1,867 million in 1976, or an increase of $1.2 billion (see table 2).[4]

In conjunction with the price increases has come an increased effort on the part of oil producers in the state to locate and retrieve greater quantities of oil and natural gas; in 1976, 13,884 wells were drilled in Texas whereas only 8,031 were drilled in 1973.[5] Because of this, energy industry employment in Texas has risen by 25.0 percent since 1970. A total of 45.4 thousand jobs have been thus created.[6] If the prices of oil and natural gas were allowed to move toward the world price set by OPEC either through adjustments at intervals to the price ceiling or through decontrol of prices, the Texas economy would be even further stimulated.

The indirect effects of OPEC action on Texas have also been substantial. First, Texas has been a recipient of the increased spending on imports by the OPEC countries. Exports through the Houston Customs Region increased 206 percent between 1970 and 1976, against 166 percent for the United States overall. This difference in growth is attributable in large part to the role Texas plays as one of the major U.S. exporters to the OPEC nations. Export trade through the Houston Customs Region to these nations increased by nearly $2 billion over this period—an increase of nearly 440 percent (table 3).[7] A further indicator of the degree of interdependence of the Texas economy and OPEC is the fact that this trade currently accounts for 20 percent of all exports flowing through the Houston Customs Region, a figure that reflects a much larger share of trade with OPEC than the 10.9 percent national average (see table 4). Another interesting point that can be drawn from tables 3 and 4 is that by 1976 exports to OPEC through the Houston Customs Region constituted almost 20 percent of all the U.S. exports to that block of nations. It is evident then that not only is the economy of Texas influenced by OPEC through its effect upon domestic oil

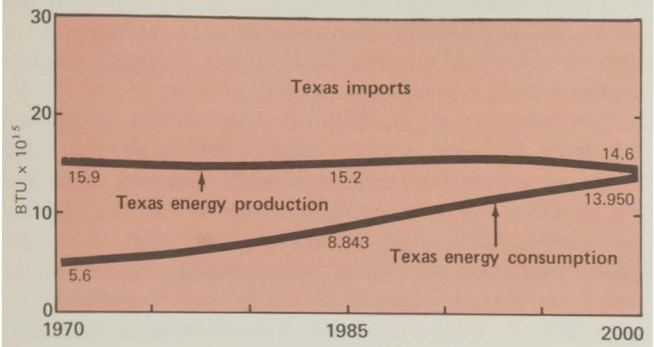
Table 2

Estimates of Royalty Payments for Texas Oil and Gas Production
(Millions of U.S. dollars)

Year	Total amount	Natural gas	Crude oil
1970	672	160	512
1971	712	180	532
1972	751	185	566
1973	873	229	644
1974	1443	347	1096
1975	1674	507	1167
1976	1867	674	1193

Source: Estimated from total wellhead value of annual natural gas and crude oil production in Texas. Estimates were based on 12.5 percent of wellhead value of oil and gas production.

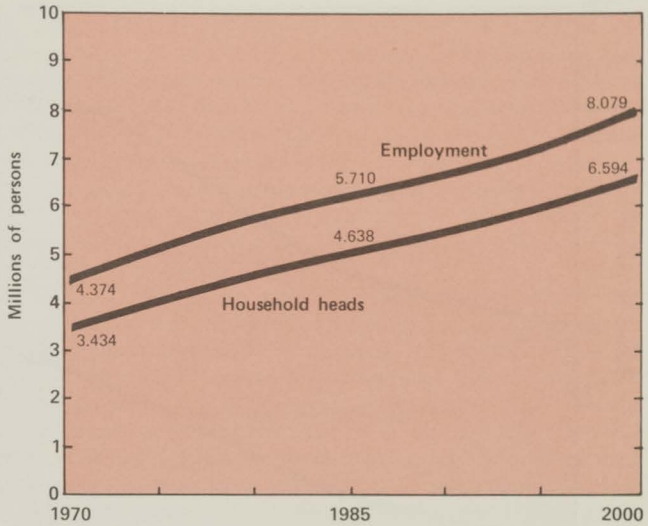
Figure 1



Note: Figures based on domestic prices of (a) oil $8.65/barrel, (b) gas $.66/MCF. Import prices based on oil $14.00/barrel.

Source: Milton L. Holloway, Herbert W. Grubb, and W. Larry Grossman, *An Economic Analysis of Declining Petroleum Supplies in Texas: Income, Employment, Tax, and Production Effects as Measured by Input-Output and Supply-Demand Simulation Models*, State of Texas, Governor's Energy Advisory Council Final Report (Austin, February 1975).

Figure 2



Source: Milton L. Holloway, Herbert W. Grubb, and W. Larry Grossman, *An Economic Analysis of Declining Petroleum Supplies in Texas: Income, Employment, Tax, and Production Effects as Measured by Input-Output and Supply-Demand Simulation Models*, State of Texas, Governor's Energy Advisory Council Final Report (Austin, February 1975).

prices and thus upon state revenues, but the economy is also stimulated through increased export demand.

The second indirect effect of OPEC oil price increases has been the expansion of demand for oil-related equipment as a result of increases in drilling activity. Again, the economic base of Texas has benefited from this surge in demand. This impact is only partially captured in the rapid increase of Texas exports because domestic demand for such products has also increased.

Third, given the increasing economic prominence of the "Sun Belt" and the special relationship between Texas and OPEC countries, the inflow of capital to Texas, both domestic and international–particularly from OPEC–has been or will be increased.[8]

The total effect of all these economic stimuli on the Texas economy is only partially accounted for by the above facts. A multiplier effect also occurs. That is, a portion of each dollar increase in any one person's disposable income becomes an addition to another's income when a portion of the dollar is spent.

An example of this multiplier effect in the Texas economy is clearly shown in the projections of the Governor's Energy Advisory Council.[9] Demand multipliers were estimated for several industrial categories. The total projected effects on the demand for these products (as shown in figures 1, 2, and 3) are far more pronounced than would be obtained from the direct effects alone, that is, if these multipliers and interdependencies were not taken into account.

It is clear that oil production has provided a stimulus to the Texas economy. However, care must be taken that

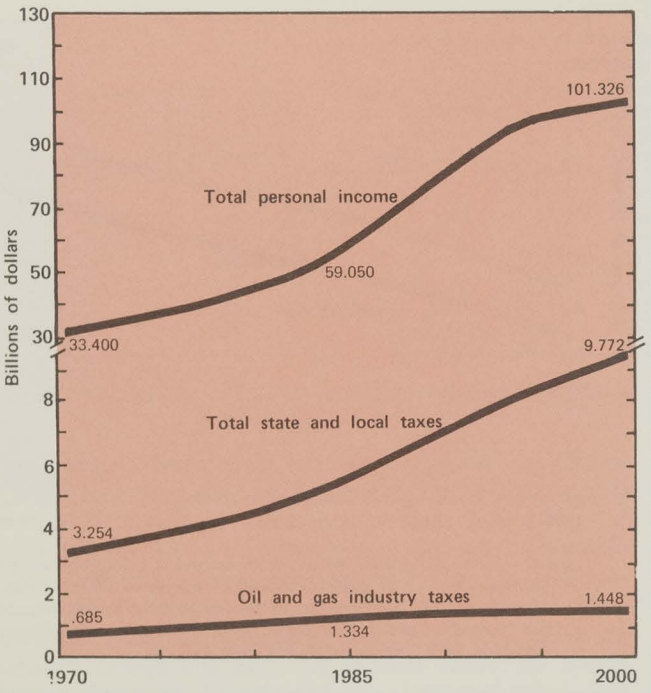
Table 3

Estimates of Texas Exports* to OPEC
(Millions of dollars)

Country	1970	1971	1972	1973	1974	1975	1976
Iraq	3.0	4.1	3.4	9.3	48.7	47.4	51.2
Iran	44.8	61.6	81.8	128.1	296.4	495.6	371.8
Kuwait	8.5	10.6	16.2	19.7	35.7	55.9	63.2
Saudi Arabia	19.4	21.0	46.0	73.3	142.7	229.6	371.5
Qatar	–	–	2.0	3.2	5.8	7.6	10.6
U.A.E.	–	–	10.1	20.1	39.3	56.9	56.9
Indonesia	35.5	39.6	45.6	58.9	65.2	77.6	85.9
Venezuela	248.1	257.6	307.2	399.5	645.5	856.2	992.4
Ecuador	41.5	43.9	44.5	66.9	119.0	158.0	157.1
Algeria	10.9	14.0	17.4	34.8	83.8	127.4	89.9
Libya	19.0	13.4	15.1	22.4	37.0	46.8	51.1
Nigeria	22.7	28.8	20.4	34.8	76.1	108.1	142.1
Gabon	1.2	1.0	2.3	4.1	8.8	11.9	8.5
Texas export total	454.6	495.6	612.0	875.1	1604.0	2279.0	2452.2

*Houston Customs Region.
Source: U.S. Department of Commerce, Bureau of the Census, *Highlights of U.S. Export and Import Trade*, December issues, 1970-1976.

Figure 3



Source: Milton L. Holloway, Herbert W. Grubb, and W. Larry Grossman, *An Economic Analysis of Declining Petroleum Supplies in Texas: Income, Employment, Tax, and Production Effects as Measured by Input-Output and Supply-Demand Simulation Models*, State of Texas, Governor's Energy Advisory Council Final Report (Austin, February 1975).

current oil production provide a future economic base for the day when oil reserves are depleted.

In this sense Texas finds itself in a situation very similar to the one that stirred the OPEC nations to action. Its unreplenishable natural resources are being rapidly depleted at prices set unrealistically below the world price level. The current price level of domestic oil, although below world market price, is, however, considerably higher than levels previous to the 1973-1974 OPEC price hikes. These higher prices have allowed Texas to capture, in part, a more reasonable economic return on its natural resources, but the fact remains that once these revenues are lost through low prices, the lost revenues can never be compensated—that is, the oil sold at the lower yield cannot be regenerated or replenished. It is gone forever.

The importance of obtaining a fair return for natural resources is most acutely evident when the need for economic diversification is considered. Reserves of oil and gas in Texas are both unreplenishable and finite. The day will come when these energy revenues will no longer provide the basis for the economic activity that currently exists. An infrastructure founded on non-oil related industries must be built now, while the resources are available. Incentives should be initiated to attract to this area industry that will provide future jobs and economic growth for the state when the energy revenues diminish to insignificance.

In its need to evolve a more diversified infrastructure, Texas again finds itself in a position similar to that of the OPEC nations, with the difference being only one of degree. While the initiative should be taken to attract an oil-independent industrial base, it is not so imperative in Texas because of the considerable industrialization relative to OPEC and the fact that market forces are currently operating in Texas' favor. Industrial growth and population growth in Texas are far outstripping projections, in part because of the relatively light tax burden—a direct result of the increased revenues from oil and gas production. But tax incentives alone are not sufficient to build the infrastructure necessary to replace the massive oil and gas industry in the Texas economy.

Also it must be realized that if the wellhead tax on oil and gas production is allowed to remain fixed at its current level, revenues become determined by the price ceiling set by the federal government and the volume of production, which is dependent upon that price. Therefore, revenues are lost both because of lower prices per unit of production and because of the lower production levels set by that low price. This prevents Texas from raising enough revenues from its natural resources to both keep pace with its normal

Table 4

U.S. Exports to OPEC
(Millions of dollars)

Country	1970	1971	1972	1973	1974	1975	1976
Iraq	22	32	23	56	285	310	382
Iran	326	482	559	772	1734	3242	2776
Kuwait	62	83	111	119	209	366	472
Saudi Arabia	141	164	314	442	835	1502	2774
Qatar	–	–	14	19	34	50	79
U.A.E.	–	–	69	121	230	372	425
Indonesia	266	263	308	442	531	810	1036
Venezuela	759	787	924	1033	1768	2243	2728
Ecuador	127	134	134	173	326	414	416
Algeria	62	82	98	161	315	632	487
Libya	108	78	85	104	139	232	277
Nigeria	129	168	115	161	286	536	770
Gabon	7	6	13	19	33	59	46
Total	2009	2279	2767	3622	6725	10768	12568

Source: U.S. Department of Commerce, Bureau of the Census, *Highlights of U.S. Export and Import Trade*, December issues, 1970-1976.

state expenditures and initiate a system of incentives to attract the economic base necessary for its future.

The most viable alternative in this dilemma, since the pressure Texas can put on domestic oil prices is restricted by the influence of the other states, is to increase revenues by raising the 4.6 percent wellhead tax rate. This would provide Texas with more control over the economic revenues generated from these diminishing resources and would provide the necessary revenues for building the future infrastructure for the Texas economy. Texas has reaped considerable benefits from the pricing strategy set by OPEC, but it is now time for this passive role to end. Effective revenue-producing measures must be taken to ensure adequate return on the unreplenishable natural resources before they are exhausted.

Notes

1. International Monetary Fund (IMF), *Annual Report of the International Monetary Fund*, 1975, p. 9.
2. U.S. Department of Labor, Bureau of Labor Statistics, *Handbook of Labor Statistics*. Texas data from Texas Employment Commission in cooperation with the U.S. Bureau of Labor Statistics, *Labor Force Estimates*, Texas (annual issue).
3. U.S. Department of Interior, Bureau of Mines, *Minerals Yearbook* (annual volumes).
4. This impact, if anything, is an underestimate since, in the absence of the oil price increase, oil and gas production would have declined substantially, leading to a possible decline in such revenues.
5. Texas Railroad Commission, *Annual Report of the Oil and Gas Division* (annual volumes); and American Petroleum Institute, *Petroleum Facts and Figures*, 1971.
6. Texas Employment Commission in cooperation with U.S. Bureau of Labor Statistics, *Population and Labor Force Estimates for Texas*, 1950-1972, plus updates for 1973-1976 and *Labor Force Estimates*, Texas (annual issues).
7. Unfortunately, export data by country of destination for the United States and each of its customs regions are not published. However, data are available for groupings of countries so that the authors were able to construct these estimates. For example, Saudi Arabia accounted for 30.0 percent of the export trade from the United States to the Near East Asia group. It was then assumed that exports from the Houston Customs Region destined for Near East Asia would contain the same ratio vis-à-vis Saudi Arabia. Table 3 was generated by repeating this procedure for each OPEC member.
8. Unfortunately, reliable information for this capital inflow is unavailable.
9. Milton L. Holloway, Herbert W. Grubb, and W. Larry Grossman, *An Economic Analysis of Declining Petroleum Supplies in Texas: Income, Employment, Tax, and Production Effects as Measured by Input-Output and Supply-Demand Simulation Models*, State of Texas, Governor's Energy Advisory Council Final Report (Austin, February 1975).

Implementing the Energy Policy and Conservation Act in Texas

Marlan Blissett

The Arab oil embargo of 1973 illustrated dramatically the effects of temporary energy shortages in the United States. And the fuel curtailments and power failures in the winter and summer of 1977 have once again raised serious questions about our long-term ability to meet growing energy demands. Most policymakers agree that these events, and others, point to the need to increase energy production and decrease energy consumption. Yet the proper balance between production and consumption is the object of widespread disagreement.

At the center of debate is concern over the role of energy conservation in economic growth. President Carter's National Energy Plan looks upon conservation measures as the cleanest and cheapest substitute for new sources of energy, but the plan contains no analysis of whether the costs of implementation will equal or exceed the costs of

I wish to thank the Lyndon B. Johnson Foundation for a faculty development grant that made part of this research possible.

energy saved. Such a comparison is difficult to make, but an assessment of state government responses to the federal Energy Policy and Conservation Act of 1975 (EPCA) provides a useful starting point.

The EPCA authorized $150 million over a three-year period (1976 through 1978) to assist states in the development of an energy conservation plan. The purpose of the legislation was to induce states to reduce projected energy consumption for 1980 (both public and private) by at least 5 percent. To qualify for federal funds for this enterprise each state was required to design a detailed energy conservation program covering five mandatory areas:

- Thermal efficiency standards and insulation requirements for all new residential and nonresidential buildings and all renovated buildings designated by the state;
- Lighting efficiency standards for nonfederal public buildings;
- Energy efficiency standards and policies for state-local procurement;
- Programs to increase the use of carpools, vanpools, and public transportation (with the exception of subsidized fares); and
- Traffic laws or regulations permitting a right turn on red.

Optional provisions of a voluntary nature could also be included with state plans, but the legislation did not specify an appropriate mix.

By the summer of 1977 all fifty states had indicated the feasibility of achieving the conservation goals anticipated by the EPCA. However, the mandatory programs are not expected to result in high levels of energy savings. To make the EPCA effective, states have had to develop optional conservation measures appropriate to their resource bases, their industrial structures, and their energy-consumption requirements.

Mandatory Programs

The five programs mandated by EPCA can be subsumed under two larger user categories–transportation and residential/commercial consumption. In 1975, as shown in table 1, these two categories accounted for almost 43 percent of the energy consumed in Texas or about 3,015 trillion Btus. By 1980 (see table 2) the projected energy consumption for both categories is 4,088 trillion Btus, although the percentage of total energy expended remains the same. Since each mandatory measure is addressed to specific end-use activities, the amount of energy that can be conserved depends upon the formulation of a state plan that is not antithetical to existing legal and regulatory requirements.

Thermal Standards

In Texas the prospect of energy savings in plans for new and existing structures is greater than in any other mandatory program area. Commercial heating, ventilating, and air conditioning (HVAC) and residential heating/cooling systems consume 11 percent of the state's energy, or approximately 776 trillion Btus. Since both new construction and renovation are regulated by building codes, energy conservation measures must be achieved through code administration. There are four standard codes: the Basic Building Code (Building Officials and Code Administrators, International, Inc.); the National Building Code (National Board of Fire Underwriters); the Southern Standard Building Code (Southern Building Codes Conference); and the Uniform Building Code (International Conference of Building Officials). Recently, several attempts have been made to standardize thermal requirements. The International Conference of Building Code Officials and the Southern Building Codes Conference have added thermal efficiency provisions to their model codes, and the Department of Housing and Urban Development has developed a set of minimum property standards that define thermal efficiencies for federally financed housing.

From the standpoint of engineering design, the most extensively researched and debated standards for thermal conservation in buildings are those issued by the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE). Developed at the request of the National Conference of State Building Codes and Standards, the ASHRAE provisions set minimum standards for thermal insulation and heating efficiencies in new residential and nonresidential structures. Despite state-of-the-art limitations, these standards are quite broad, excluding only those structures whose peak design rate of energy use is less than one watt per square foot of floor space and whose HVAC system is not mechanically operated.

The guidelines issued by the Federal Energy Administration (FEA) for implementing the Energy Policy and Conservation Act require that thermal standards for new residential and nonresidential buildings be at least as stringent as those developed by ASHRAE. For renovated structures, states are free to define "appropriate" standards and to determine which buildings must meet those requirements.

In formulating an energy conservation plan for Texas, the Governor's Office of Energy Resources[1] calculated 1980 savings for both new and renovated, residential and nonresidential structures by building type (see table 3). Estimates were made for nine different types, using a three-step procedure. First, direct energy savings were established by type for newly constructed buildings; second, savings for renovated structures were calculated. Finally, the savings in steps one and two were multiplied by the relative efficiency of the fuel (fossil or electricity) used for space heating and air conditioning. The result was a projected savings of only .06 percent of the estimated energy consumption in 1980.

Neither the creation of thermal standards nor the development of methods for calculating energy savings can alleviate the problem of code enforcement. Building code law derives from the "police power" of a state and, as a matter of custom and convenience, has been delegated to municipal governments, which are not likely to change as a

result of the EPCA. In Texas the state legislature has given incorporated cities the authority to include thermal standards in their building codes, but no statewide system of inspection and compliance regulation exists.

Since few cities have had experience with thermal requirements, the state energy conservation plan proposes that the Governor's Office of Energy Resources examine existing standards and select one code or parts of existing codes for statewide adoption. Instruction in the implementation of thermal standards would then be provided by a series of regional meetings with local building authorities. To ensure equitable treatment, a technical advisory committee, composed of all parties at interest, would be created to advise the Governor's Office of Energy Resources on standard evaluation and enforcement. But no attempts would be made to alter the present pattern of building regulation.

Lighting Standards

FEA guidelines provide that mandatory lighting efficiency standards be applicable to all public buildings above a certain size, although the size of buildings to be covered is left to the discretion of the state. With respect to new public buildings, requirements are that efficiency standards be at least as stringent as those developed by ASHRAE, whose suggested levels of illumination have been established in accordance with the handbook of the Illuminating Engineering Society and are graded by building type and level of task performance (see table 4). As for existing public buildings, the guidelines are sensitive to two concerns: first, that in a variety of instances it would be unworkable to impose lighting standards keyed to an illumination-energy ratio; second, that considerable latitude exists in formulating standards for use in different types of existing structures. In view of these limitations, the guidelines require only that lighting efficiency standards for existing buildings incorporate provisions deemed appropriate by the state.

In 1975 residential and commercial lighting in Texas consumed 3.6 percent of the state's energy, or about 254 trillion Btus. By applying lighting efficiency standards to five types of new buildings (see table 5) and correcting for a 30 percent generating efficiency, the Governor's Office of Energy Resources estimates that the state can save 1.92 trillion Btus—an amount equal to 0.02 percent of the projected 1980 consumption. The proposed method for achieving this reduction is the same as that for implementing the thermal requirements.

Table 1

Texas Energy Consumption by Sector, 1975

	Trillion Btus	Percentage by sector	Percentage of total
Industry and agriculture	4,038		
Feedstock		30.1	17.2
Process steam		24.1	13.8
Direct heat		23.8	13.6
Electric drive		13.1	7.5
Electrolytic processes		3.5	2.0
Misc. industrial uses		2.1	1.2
Irrigation		1.7	1.0
Misc. agricultural uses		1.2	0.9
		100.0	57.2
Transportation	1,536.4		
Urban auto		52.3	11.4
Intercity auto		22.9	5.0
Truck		10.6	2.3
Aircraft		6.9	1.5
Train		3.2	0.7
Pipeline		2.8	0.6
Misc. transportation		1.3	0.3
		100.0	21.8
Residential and commercial	1,479		
Commercial heating, ventilating, and air conditioning		20.0	4.2
Residential heating		17.1	3.6
Residential cooling		15.7	3.3
Misc. residential appliances		12.4	2.6
Residential lighting		9.0	1.9
Residential hot water		8.1	1.7
Commercial lighting		8.1	1.7
Residential cooking		4.3	0.9
Misc. commercial equipment		2.4	0.5
Commercial cooking		1.9	0.4
Commercial hot water		1.0	0.2
		100.0	21.0
Total	7,053.4	100.0	100.0

Source: U.S. Bureau of Mines.

Table 2

Projected Energy Consumption in Texas by Sector 1976-1980

	Trillion Btus
Industry and agriculture	
1976	4,762.3
1977	4,892.9
1978	5,027.1
1979	5,165.0
1980	5,306.7
Transportation	
1976	1,623.8
1977	1,694.4
1978	1,768.1
1979	1,844.9
1980	1,925.2
Residential and commercial	
1976	1,671.7
1977	1,782.9
1978	1,901.6
1979	2,028.1
1980	2,163.1
Total, all sectors	
1976	8,057.8
1977	8,370.2
1978	8,696.8
1979	9,038.0
1980	9,395.0

Source: U.S. Bureau of Mines, 1975.

Procurement

Procurement policies for the acquisition of energy-efficient commodities must also be included in the state energy conservation plan. Since state/local inventories have been established to satisfy a variety of user needs, perhaps the most promising approach to energy conservation is the selected application of life-cycle costing (LCC). With this technique the lowest total ownership cost of an item can be calculated, including both the acquisition price and the projected operating and maintenance costs during the expected life of a product.

The development of an approach based on life-cycle costing can add another dimension to public contracting. Traditionally, procurements have been made on the basis of sole source or price competition. But for items with measurable service lives and clear performance characteristics, LCC offers a basis for evaluating price differences among competitive bidders by determining the logistical costs (including energy consumption) associated with the product's use.

Texas law does not permit local governments to purchase under state contract, but state agencies must engage in centralized buying through the Board of Control. If local inventories are excluded, it is possible to develop a list of common-use items for state agencies, a list of items amenable to LCC analysis (see table 6). While the state energy conservation plan does not anticipate such application to all commodities on the list, it does designate two categories—automobiles and light bulbs—in which energy savings can be accomplished. From these two categories it is estimated that .03 trillion Btus can be conserved in 1980. Future conservation would depend upon expansion of the product evaluation staff of the Board of Control and enactment of cooperative purchasing legislation to include localities in state-negotiated contracts.

Carpool/Vanpool and Right Turn on Red

Like procurement, the two remaining mandatory programs are not expected to yield significant energy savings. Carpooling efforts have been under way since 1974 in several Texas cities (San Antonio, Fort Worth, Houston, and Dallas), while vanpooling has been confined largely to the private sector (Conoco and Texas Instruments are recognized as having developed successful programs). Through a series of workshops involving municipal, industrial, community, and public interest groups, the Governor's Office of Energy Resources will coordinate a program in which an energy savings of .42 trillion Btus (.01 percent of projected 1980 consumption) is anticipated.

As for the final mandatory provision of the EPCA, the state does not need to take further action, having already passed a right-turn-on-red statute. No calculation of projected energy savings can be made, however, because no intersection-by-intersection data exist.

Optional Programs

When applied to Texas, the mandatory programs of the EPCA will produce an estimated energy saving of less than 1 percent in 1980. To fulfill the statutory obligation of at

Table 3

Estimated 1980 Energy Savings from Application of Mandatory Thermal Standards in New and Renovated Buildings in Texas

	Energy savings in billion Btus	
Building types	Space heating	Air conditioning
Residential buildings		
Single family—one unit detached	868.7	1,067.3
Low density—one unit attached and 2-4 unit structures	173.7	163.9
Low rise—structures with 5 or more units and 3 stories or less	186.1	155.9
High rise—structures with 5 or more units and 4 or more stories	68.2	56.7
Nonresidential buildings		
Office buildings	988.5	252.6
Retail stores and other mercantile buildings	590.4	197.9
Educational buildings	676.0	250.2
Hospitals and other institutional buildings	213.5	72.0
Other	535.3	213.5
Totals	4,300.4	2,430.0

Source: The Governor's Office of Energy Resources, *State of Texas Energy Conservation Plan*, June 1977.

least a 5 percent reduction in 1980 consumption, several optional programs have been incorporated in the state energy conservation plan. These include measures designed to save energy in industrial processes, in new and existing commercial buildings, in new and existing residences, in agriculture, in public schools, and in local governments. While some of the optional programs cover the same areas as those in the mandatory provisions, the difference lies in level of effort. Voluntary measures would go beyond standard performance expectations by taking advantage of technical innovations and improvements in state-of-the-art design.

Industrial Processes

The industrial sector is by far the largest energy consumer in Texas, with 1980 usage estimated to be 43.5 percent of the state total. While aggregated consumption is high, individual industries use varying amounts of energy depending upon their size and technological sophistication. Yet, consumption data for specific plants are extremely difficult to find, and information on the number of Btus expended per unit of product is scarce. In order to arrive at an energy savings potential for industrial processes, the state energy conservation plan is addressed to eleven target groups (see table 7). Through the use of workshops for technical information exchange and an outreach program for small and low technology industries, an estimated 284 trillion Btus can be saved in 1980, or 3.04 percent of the state's projected energy consumption. The Texas Industrial Commission has been designated as the lead agency for implementing both efforts.

Table 4

Suggested Interior Illumination Levels

Office buildings	Footcandles maintained
Private offices	
Reading handwriting in hard pencil or on poor paper, reading fair reproductions	100
Reading handwriting in ink or medium pencil on good quality paper	70
Reading high contrast or well-printed materials	30
Conferring and interviewing	30
General offices	
Reading handwriting in hard pencil or on poor paper, reading fair reproductions, active filing, mail sorting	100
Reading handwriting in ink or medium pencil on good quality paper, intermittent filing	70
Bank lobby	
Writing areas	70
General areas	50
Dental offices	
General operatory	70
Waiting rooms	30
Doctors' offices	
General examination and treatment	50
Waiting rooms	30
Conference rooms	
Conferring	30
Note-taking during projection (variable)	30
Rest rooms and wash rooms	30
Corridors, stairways, elevators	20
Storage rooms	
Active–medium materials	20
Active–rough, bulky materials	10
Inactive storage	5
Stores	
Merchandise requiring close inspection because of detail, fineness, or high value	100*
General merchandise areas	50*
Alteration rooms, fitting rooms, dressing areas	50
Circulation areas, stockrooms	30

*Footcandle values on plane used to display merchandise. Horizontal plane for merchandise displayed horizontally. Vertical plane for merchandise displayed vertically.

Source: Kaufman, John E. and Jack F. Christensen, eds., *Illuminating Engineering Society Lighting Handbook*, fifth ed., 1972.

Commercial Buildings and Residences

New and existing commercial and residential structures offer conservation potentials that are greater than those anticipated by the mandatory programs. Commercial facilities (such as office buildings, supermarkets, hospitals, restaurants, hotels and motels, retail stores, and warehouses) could benefit from design alternatives that take into consideration state-of-the-art improvements in construction practices, operating equipment, and building design. Residential structures could likewise be improved through the introduction of energy-saving features and appliances.

To achieve measurable energy savings from this effort, a large number of interested parties (e.g., designers, builders, financiers, potential buyers, owners, and managers) must be persuaded that the approach is practical, cost effective, and financially sound. The state plan contains provisions for workshops and publicity campaigns–most of them to be sponsored by the Governor's Office–that would address this need. If the program is successful, the 1980 energy savings could run as high as 67 trillion Btus (0.73 percent of projected consumption) for new and existing commercial buildings and 119 trillion Btus (1.3 percent of projected consumption) for new and existing residences.

Agriculture and the Public Schools

Energy consumed in the agricultural sector accounts for less than 2 percent of total state consumption, with principal uses being confined to irrigation and machinery operations (planting, cultivating, fertilizing, and applying pesticide). The types of energy used in these activities are gasoline, diesel, liquified petroleum gas, natural gas, and electricity. By relying on the Agricultural Extension Service of Texas A&M University to disseminate energy conservation information, the state expects to save 10.94 trillion Btus in 1980, or 0.12 percent of projected 1980 consumption.

The prospect for energy efficiencies in the public schools is considerably better than for the agricultural sector, although the overall savings are comparatively small. De-

spite this limitation, the state conservation plan contains a program measure, to be implemented jointly by the Governor's Office and the Texas Education Agency, that would upgrade energy management, improve the operation of mechanical equipment, and add energy conservation modules to the curriculum. The estimated savings for this effort are calculated at 32 trillion Btus, or 0.34 percent of projected 1980 consumption.

Local Governments

The remaining optional program in the state plan concerns the role of local governments in applying conservation measures to a number of routine activities. The assumption is that local elected officials, city managers, department heads, procurement officers, and managers of public facilities are strategically placed to implement energy-saving measures. In such areas as maintenance of city and county vehicle fleets, public purchasing, street lighting, and use of public buildings and recreational facilities, municipal and county governments could include energy efficiency as an additional element in analyzing cost effectiveness. Under the sponsorship of the Governor's Office of Energy Resources, the Texas Municipal League, and the Texas Association of Counties, the state plan calls for the creation of a series of workshops for the purpose of exchanging ideas and information on energy-use patterns at the local level. While it is recognized that local projects will vary considerably, a 1980 energy savings of 12 trillion Btus (0.13 percent of total projected consumption) is anticipated.

Taken together, both the mandatory and optional programs of the state energy conservation plan provide for an estimated savings of 534 trillion Btus in 1980, or slightly over 5.7 percent of total state consumption (see table 8). The cost of this effort is budgeted at $28.3 million, yielding a cost-benefit ratio (dollars to million Btus) of 0.05. This means that for each dollar spent, an average energy savings of between 18 and 19 million Btus can be achieved. However, this aggregate figure must be interpreted carefully. The mandatory programs produce a savings of only 685,000 Btus per dollar, while the voluntary measures are estimated to yield a savings of almost 33 million Btus per dollar. Clearly, implementing the voluntary measures (on which the figures in table 8 are based) will result in significant energy economies.

Moreover, a number of difficulties—some technical, others institutional—stand in the way of implementing the mandatory provisions of the EPCA. In the area of thermal and lighting standards at least three potential obstacles exist: first, the indeterminant task of upgrading local code enforcement; second, the limitations associated with state-of-the-art assumptions about energy use in buildings; and third, the economic impact on markets for materials and equipment within the U.S. construction industry.

At present, the effect that thermal and lighting efficiencies have on total energy use within buildings is imperfectly understood. As more is learned from building experiments, questions of energy savings can be answered with greater degrees of assurance. On the economic side, the extent to which the building industry might be affected by widespread adoption of thermal and lighting standards remains unclear. Existing evidence suggests that market opportunities will increase for manufacturers of building materials (insulation, siding, flat glass, window fabrications) and decrease for suppliers of general building equipment (electric lamps, lighting fixtures, gas and electric meters, hot water heaters) and heating, ventilating, and air conditioning systems (equipment and controls).[2]

The principal barrier to the use of state and local procurement as a method of conservation is the absence of

Table 5

Estimated 1980 Energy Savings from Mandatory Lighting Efficiency Standards in New Public Buildings in Texas

Type of building	Electricity savings in trillion Btus
Office buildings	0.11
Retail stores	0.16
Schools	0.09
Hospitals	0.05
Other	0.17
Total	0.58

Source: The Governor's Office of Energy Resources, *State of Texas Energy Conservation Plan*, June 1977.

Table 6

Energy Consumption by All State Agencies in Texas for Selected Items

Item	Number purchased in 1975	Billions of Btus consumed
40-watt fluorescent bulbs	210,349	231.4
Automobiles	1,336	208.7
Arc welders	3,589	91.9
Photo copiers	1,933	59.3
100-watt incandescent bulbs	70,000	58.8
Floor polishers	9,377	42.2
Air conditioners (window unit)	1,800	32.0
Refrigerators and freezers	869	21.2
Clothes dryers	248	13.7
Vacuum cleaners	1,924	13.1
Electric ovens	292	8.3
Electric ranges	296	7.1
Electric typewriters	19,845	5.9
Clocks	10,915	5.5
Dishwashers	150	2.0
Lathes	600	1.7
Table saws	274	1.7
Air compressors	384	1.6
Clothes washers	355	1.0
Movie projectors	3,000	0.9
Coffee makers	109	0.8
Food blenders	48	0.5
Drill presses	93	0.2
Total		809.5

Source: Figures provided by the Stanford Research Institute and the Texas Board of Control.

Table 7

Selected Industry Target Groups for Voluntary Energy Conservation in Texas

Industry	Number of establishments		
	Small*	Medium#	Large†
Food and kindred products	1,104	321	68
Textiles	51	19	5
Lumber and wood products	1,012	150	16
Paper and allied products	119	67	11
Chemicals and allied products	580	110	50
Petroleum and coal products	98	31	26
Rubber and misc. plastics	305	65	9
Stone, clay, and glass products	731	130	21
Primary metals	172	50	28
Fabricated metal products	1,161	232	50
Machinery	1,745	166	58

*Under 50 employees.
#50-250 employees.
†Over 250 employees.
Source: The Governor's Office of Energy Resources, *State of Texas Energy Conservation Plan*, June 1977; data compiled from U.S. Bureau of the Census, *Census of Manufactures*, 1974, and U.S. Bureau of the Census.

a cooperative purchasing statute. Such a law would give Texas cities, counties, and special-purpose governments an opportunity to participate in state contract prices for energy-efficient items.

As for the remaining mandatory programs—state/local procurement, right turn on red, and carpools/vanpools—the principal barriers to implementation can be stated briefly. State/local procurement is hampered in general by a restricted application of life-cycle costing techniques (largely the result of inadequate staff) and in particular by the absence of a state cooperative purchasing statute that would give cities, counties, and special-purpose governments an opportunity to participate in state contract prices for energy-efficient items. Right turn on red is permitted by Texas law, but impediments associated with the collection and analysis of intersection-by-intersection data exist. The carpool/vanpool measure, while simple in concept, suffers not only from complex suburban residential patterns in the state but also from lack of individual incentives.

The technical and institutional complexities that will be encountered in applying the state plan should not, however, obscure the need for an effective conservation program. The economic well-being of the state depends on the prudent use of existing and newly discovered sources of energy. By resorting to a plan that emphasizes optional measures over mandatory ones, the Governor's Office of Energy Resources has indicated its preference for a voluntary approach. Whether a different balance will be struck in the future is not known. What is clear is that the Texas response to the EPCA demonstrates the enormous potential for energy savings in industrial processes and residential/commercial buildings, while providing a framework within which all parties at interest can assess both mandatory and optional programs for their possible impacts and consequences. This approach may lack the excitement of a grand design for energy conservation, but in the end it may prove more effective.

Notes

1. Actual calculations were performed by Planergy, an Austin-based energy planning and consulting firm, under contract to the Governor's Office. With the exception of state/local procurement, all energy savings estimates for mandatory programs were based on FEA methodology and data.
2. Craig Lentz, "ASHRAE Standard 90-75—Economic Impact on Selected Industries and the Design Profession," *ASHRAE Journal*, June 1976.

Table 8

Estimated 1980 Savings and Costs of Mandatory and Optional Program Measures in the State Energy Conservation Plan

Program measure	Estimated savings		Estimated cost	Cost-benefit
	Trillion Btus	Percentage	Millions of dollars	Dollars per million Btus
Thermal and lighting standards	7.91	0.08	11.9	1.50
Vanpool-carpool	0.42	0.00	0.2	0.48
Government purchasing	0.03	0.00	0.1	3.33
Industrial processes	283.81	3.04	2.2	0.01
New commercial buildings	10.90	0.12	0.7	0.06
Existing commercial buildings	56.52	0.61	1.0	0.02
New residential buildings	10.17	0.11	0.6	0.06
Existing residential buildings	109.16	1.17	6.5	0.06
Agriculture	10.94	0.12	0.4	0.04
Local energy conservation	12.00	0.13	1.7	0.14
Public schools	32.10	0.34	1.8	0.06
Coordination and monitoring	—	—	1.2	—
	534.06	5.72	28.3	0.06

Source: The Governor's Office of Energy Resources, *State of Texas Energy Conservation Plan*, June 1977.

The Lower Rio Grande Valley

An Area of Rapid Growth

Charles P. Zlatkovich

Carol T.F. Bennett

The Lower Rio Grande Valley is one of the most rapidly growing metropolitan areas in the nation. Among Texas metropolitan areas, the Brownsville-Harlingen-San Benito and McAllen-Pharr-Edinburg SMSAs have growth rates equaled only by Killeen-Temple. The two South Texas SMSAs, consisting of Cameron and Hidalgo counties respectively, compose most of the Lower Rio Grande Valley. Two other counties, Willacy and Starr, are generally considered to be part of the Lower Rio Grande Valley but are not metropolitan counties and are dealt with only indirectly in this article.

Although the Lower Rio Grande Valley consists of two SMSAs, it is an integrated metropolitan region in many ways. The Valley has a number of formal and informal arrangements that provide evidence of its functional integration—a common telephone directory, an area-wide chamber of commerce, a well-connected roadway network, and a regional transit system. Some fragmentation, however, results from the fact that the Valley contains a large number of incorporated communities—fourteen in Cameron County and sixteen in Hidalgo County.

No single city dominates the Valley. The largest three cities—Brownsville, McAllen, and Harlingen—together contain less than 40 percent of the population of the two counties. While evidence exists that many other metropolitan regions increasingly resemble the Valley in this respect, the lack of a central focal point causes something of an image problem. One can say "Houston" or even "Dallas-Fort Worth" with far less effort than "McAllen-Pharr-Edinburg," let alone "Brownsville-Harlingen-San Benito." Only a few SMSAs in the nation have wordier titles than the two in the Valley.

The separate designation of the two metropolitan areas also reduces their apparent importance in statistical comparisons with other parts of the state and nation. In 1975 population estimates the McAllen-Pharr-Edinburg and Brownsville-Harlingen-San Benito SMSAs rank tenth and twelfth respectively among the twenty-five Texas SMSAs. Combined, the two Valley SMSAs would have a total population of 404,784 and would rank as the state's fifth largest metropolitan area, behind El Paso but ahead of Austin. Relatively few Texans, and even fewer out-of-state

residents, would be likely to identify the Lower Rio Grande Valley as such a large metropolitan area.

Another factor of some importance in considerations of the Lower Rio Grande Valley of Texas is the other half of the Valley across the Rio Grande, in Mexico. The principal cities on the Mexican side of the Rio Grande are Matamoros and Reynosa, each of which had a population of about 138,000 in 1970. Growth along the border has been even more rapid than in the interior of Mexico in recent years, and the total population on the Mexican side of the Lower Rio Grande Valley probably exceeds 500,000 at the present time. The economies on the Texas and Mexican sides of the Rio Grande are linked in many ways—some obvious and some subtle.

Shrimp boat harbor, Port of Brownsville

Population Growth

The Lower Rio Grande Valley has grown rapidly in recent years. The latest population estimates by the Bureau of the Census indicate that the Brownsville-Harlingen-San Benito SMSA grew 26.0 percent between 1970 and 1975, while the McAllen-Pharr-Edinburg SMSA grew 25.5 percent. The Brownsville-Harlingen-San Benito growth rate ties with that of the Killeen-Temple SMSA for the highest metropolitan area growth rate in the state, and the McAllen-Pharr-Edinburg SMSA is not far behind. Both Lower Rio Grande Valley SMSAs are among the fastest-growing metropolitan areas in the nation.

Many population researchers are quick to point out the difficulty of developing accurate statistics for areas along the Mexican border, including the Lower Rio Grande Valley. The difficulty is evidenced by the wide variation between the earlier and the revised July 1, 1975, population estimates for the Lower Rio Grande Valley released by the Bureau of the Census. The revised estimates raised the population total from the earlier estimates for each county by more than 7,000. The revised estimated populations are 227,853 for Hidalgo County and 176,931 for Cameron County.

About half of the growth of the Lower Rio Grande Valley since 1970 is attributable to in-migration, with the remainder a result of natural increase. While the revised 1975 population estimates by the Bureau of the Census do not include a breakdown of population change into natural and in-migration components, a comparison of the revised estimates and the reported vital statistics for the area indicates that about 20,000 persons have migrated to the Brownsville-Harlingen-San Benito SMSA since 1970, while about 22,000 have relocated in the McAllen-Pharr-Edinburg SMSA. Both components of Valley growth are well above corresponding state and national levels.

The historical growth of the Lower Rio Grande Valley has been fairly steady except during the 1960s. Cameron County lost population during the 1960s, partially as a result of the closing of military bases, and Hidalgo County grew very slowly during the decade. Prior to 1960, the record of the Lower Rio Grande Valley was one of consistent growth.

No single city dominates the Valley. The largest three cities together contain less than 40 percent of the population of the two counties.

Employment Structure and Income Sources

Despite a high degree of social interaction and economic integration, significant differences between the two Lower Rio Grande Valley metropolitan areas exist. Of the two, the Brownsville-Harlingen-San Benito SMSA economy more closely resembles the economy of the state. The McAllen-Pharr-Edinburg SMSA economy has a much higher concentration in agriculture and a lower level of manufacturing. Both areas have a relatively low level of federal government employment and a relatively high level of transfer payments.

Agriculture is very important to the Lower Rio Grande Valley, and Valley agriculture is important to Texas. Principal Valley crops include citrus fruit, cotton, vegetables, grain sorghum, and sugarcane. Although the rapid

growth of other segments of the Valley economy in recent years has reduced the percentage contributed to Valley personal income by agriculture, the importance of agriculture in the Valley should not be underestimated. Recently released 1975 personal income source estimates by the Bureau of Economic Analysis show that agriculture accounts for 7.08 percent of all personal income in the Valley, against 2.68 percent of Texas personal income. The percentage contribution of agriculture has been somewhat higher in other recent years, ranging between 12.03 and 15.70 percent in Hidalgo County for 1970 through 1974 and between 5.03 percent and 7.15 percent in Cameron County for the same period. Among the factors responsible for the relative drop are the growth of other segments of the Valley economy and the fact that 1975 was not a particularly good year for agriculture in the Valley. Furthermore, it is possible that the initial B.E.A. income estimates for 1975 understated farm income as they did for both Cameron and Hidalgo counties in the preliminary 1974 estimates.

Agricultural services, forestry, and fisheries are included with "other industries" by the Bureau of Economic Analysis. The "other industries" sector is larger than average in both Valley metropolitan areas. The above-average size of the sector in Hidalgo County is largely attributable to agricultural services, including such activities as cropdusting. The Cameron County "other industries" total reflects the importance of the shrimping industry. Some four hundred commercial fishing boats are based in the area, principally at the Port of Brownsville. According to data contained in *County Business Patterns*, some 48 percent of all commercial fishing activity in Texas is based in Cameron County. The Brownsville area became a popular base for commercial fishing operations because of its location near the center of prime shrimping waters, which extend roughly from Louisiana to the Yucatan peninsula. The recent extension of national territorial fishing limits by the United States and Mexico may have an adverse impact on the Valley as a base for shrimping fleet operations in the future, since the stated policy of Mexico is to reduce the currently licensed volume of fishing in Mexican waters by U.S. fishing boats. The elimination of access to Mexican waters would shift the center of the fishing grounds for U.S. boats up the coast. Thus far, permits to fish in Mexican waters have been available to U.S.-based boats, and there are indications that the permits may remain available for the foreseeable future.

Percentage of Personal Income by Major Sources Brownsville-Harlingen-San Benito and McAllen-Pharr-Edinburg SMSAs and Texas, 1975

Source	Brownsville-Harlingen-San Benito SMSA	McAllen-Pharr-Edinburg SMSA	Texas
Agriculture	2.84	10.74	2.63
Mining	0.18*	1.97	3.52
Construction	4.31	4.08	5.56
Manufacturing	13.17	5.53	15.14
Transportation, communication, and public utilities	4.90	3.13	5.84
Wholesale and retail trade	15.88	16.56	14.54
Finance, insurance, and real estate	3.70	2.14	4.04
Services	9.49	8.64	11.45
Other industries	3.71*	1.32	0.27
Total private labor and proprietor income	58.18	54.10	63.00
Federal civilian	2.49	3.08	3.28
Federal military	0.82	0.69	2.79
State and local	10.32	12.11	7.66
Total government earnings	13.63	15.88	13.73
Total labor and proprietor income (place of work)	71.81	69.98	76.73
Less: Personal contributions for social insurance	3.46	2.98	3.78
Residence adjustment	−0.15	0.28	0.15
Net labor and proprietor income (place of residence)	68.21	67.28	73.11
Dividends, interest, and rent	15.86	16.50	15.64
Transfer payments	15.94	16.23	11.26
Total personal income (place of residence)	100.00	100.00	100.00

*Authors' estimates.
Source: Developed from data compiled by Regional Economics Information System, Bureau of Economic Analysis, U.S. Department of Commerce.

Wholesale and retail trade is another sector of the economy that provides a larger share of personal income in the Valley than at the state level. In the McAllen-Pharr-Edinburg SMSA nearly 40 percent of all trade employment is involved in wholesale trade, against about 27 percent of statewide trade employment. More than half of the Hidalgo County wholesale trade sector is concentrated in the wholesaling of fruit and vegetables. The Brownsville-Harlingen-San Benito SMSA, with less than 23 percent of its trade employment in wholesaling, is more oriented toward retail trade. Frequent shopping visits by Mexican residents boost the importance of retail trade in Brownsville and other border cities. Many Valley merchants depend on the Mexican trade and suffered severe losses of volume following the recent devaluation of the Mexican peso. The devaluation reduced the equivalent value of the peso from its traditional level of 8 cents to about 4.3 cents, although many Valley merchants offer slightly more favorable exchange rates as a part of their marketing efforts.

Manufacturing forms a smaller part of the economic base of the Valley than of the state. The Brownsville-Harlingen-San Benito SMSA approaches the state level of 15.14 percent of total personal income derived from manufacturing with 13.17 percent of its personal income from that


Condominiums, South Padre Island

source, but manufacturing provides only 5.53 percent of total personal income in the McAllen-Pharr-Edinburg SMSA.

In each case, with the exception of the "other industries" category noted above, the other private sector segments of the economy provide lower percentages of total personal income in the Valley than in the state. The Brownsville-Harlingen-San Benito SMSA economy more nearly resembles the state economy in each of the other sectors, with the exception of mining.

Federal government employment also accounts for a smaller percentage of Valley personal income than of Texas personal income. The level of federal civilian employment is relatively higher in the McAllen-Pharr-Edinburg SMSA. Federal military earnings in the Valley are minimal. There are no significant military installations in the Valley.

While federal government earnings are comparatively low in the Valley, state and local government earnings are relatively high. The number of significant incorporated communities in the Valley is a factor in the high level of local government employment and earnings. The major educational institution in the Valley is Pan American University at Edinburg, with about 7,000 students and a faculty of 330. Other higher educational institutions in the Valley are Texas Southmost College at Brownsville and the Texas State Technical Institute Rio Grande Campus at Harlingen.

Transfer payments are a relatively large source of personal income in the Valley. The area suffers from a high unemployment rate and a low per capita income level, both of which contribute to a high level of transfer payments. Unemployment levels in the Valley have been about twice as high as the state level recently. The unemployment rate for the Brownsville-Harlingen-San Benito SMSA has averaged 10.8 percent for the most recent twelve months for which data are available, while unemployment in the McAllen-Pharr-Edinburg SMSA has averaged 11.2 percent. The statewide unemployment average for the same period

Nonagricultural Civilian Payroll Employment Percentages Brownsville-Harlingen-San Benito and McAllen-Pharr-Edinburg SMSAs and United States March 1977

Category	Brownsville-Harlingen-San Benito SMSA	McAllen-Pharr-Edinburg SMSA	United States
Mining	0.1	1.8	1.0
Contract construction	5.2	5.9	4.3
Manufacturing	18.4	13.1	23.8
Transportation, communication, public utilities	5.5	3.8	5.6
Trade	28.3	35.7	22.1
Finance, insurance, and real estate	5.4	3.0	5.5
Services	16.0	11.4	18.6
Government	21.0	25.3	19.0

Sources: Data for Brownsville-Harlingen-San Benito and McAllen-Pharr-Edinburg obtained from *Manpower Trends*, May 1977, published by Texas Employment Commission; U.S. data obtained from *Monthly Labor Review*, May 1977.

Pan American University campus, Edinburg

was 5.4 percent. Of the 261 metropolitan areas for which the Bureau of Economic Analysis publishes per capita personal income estimates, the Brownsville and McAllen SMSAs rank 259th and 261st respectively, separated in the rankings by Laredo. These statistics tend to give the Valley an unreasonably poor image, in relation to areas away from the border.

Key Manufacturing Industries

Food processing was the first major industry in the Lower Rio Grande Valley and remains the most important. Both agriculture and commercial fishing provide raw materials for the Valley food-processing industry. More than 31 percent of all manufacturing employment in the Valley is concentrated in the food-processing industry, while the figure for the state is 10 percent of total manufacturing employment, according to data contained in *County Business Patterns*. Of the nineteen major manufacturing plants in the Lower Rio Grande Valley with more than 250 employees listed in the *Directory of Texas Manufacturers*, nine are food-processing facilities.

Apparel manufacturing is the second largest industry in the Valley in employment and number of major plants. The manufacture of apparel and related products represents about 18 percent of the Valley manufacturing work force, against about 9 percent of the state manufacturing employment total. Five Valley apparel plants have more than 250 employees each.

Durable goods manufacturing in the Valley is concentrated in Brownsville. The largest plants produce offshore platforms and equipment, patio and pool equipment, and buses. Major plants in other parts of the Valley produce rubber seal rings and polyethylene products. Other notable activities in the Valley include the manufacture of electronic components and the construction and repair of marine vessels. A sizable ship-dismantling industry has also developed at the Port of Brownsville, with four operations currently active.

The industrial potential of the Valley is enhanced by its climate and by the availability of ample, eager labor. The

Manufacturing Plants with More Than 250 Employees Brownsville-Harlingen-San Benito and McAllen-Pharr-Edinburg SMSAs, 1976

Name of company and community	Establishment date	Primary products
Aquaslide 'N' Dive Corp., Brownsville	1972	Patio and pool equipment
Booth Fisheries, Brownsville	1956	Frozen shrimp
The William Carter Co., Harlingen	1972	Apparel
Eagle International, Brownsville	1973	Buses
Edinburg Mfg. Co., Edinburg	1968	Apparel
W. R. Grave & Co., Brownsville	1958	Frozen shrimp
Hygeia Dairy Co., Harlingen	1927	Dairy products
Knapp-Sherrill Co., Elsa	1943	Canned vegetables
Levi Strauss & Co., Brownsville	1921	Apparel
Levi Strauss & Co., Harlingen	1973	Apparel
Levi Strauss & Co., San Benito	1959	Apparel
Marathon LeTourneau Offshore Co., Brownsville	1971	Offshore platforms
Parker Seal Co., McAllen	1974	Rubber O rings
Rio Grande Valley Sugar Growers Inc., Santa Rosa	1973	Sugar
Taormina Co., Donna	1932	Canned vegetables
Texas Plastics Inc., Elsa	1953	Polyethylene products
Texsun Corp., Weslaco	1935	Fruit juices
Vahlsing Inc., Monte Alto	1966	Frozen vegetables
Winter Garden Inc., Brownsville	1945	Frozen vegetables and seafood

Source: *1976 Directory of Texas Manufacturers* (Austin: Bureau of Business Research, 1976).

Valley also benefits from access to water transportation and its proximity to Monterrey, one of the major industrial centers of Mexico. The primary detriment to industrial location in the Valley is the distance from major U.S. markets. A recently announced plan to construct a new natural gas pipeline from the interior of Mexico to the Valley will provide the area with a new energy supply and resource and should enhance the industrial potential of the area.

Population and Income Profile

The population of the Lower Rio Grande Valley is substantially younger than the state population. The median ages in the Brownsville-Harlingen-San Benito and McAllen-Pharr-Edinburg SMSAs are 22.3 and 22.4 respectively. Both are much lower than the statewide median age of 27.2 years.

Income levels in the Lower Rio Grande Valley are also low. The median household effective buying income (the total income of all household members after taxes) is only 67 percent of the state median level in Cameron County and 60 percent of the state level in Hidalgo County.

Texsun Corporation plant, Weslaco

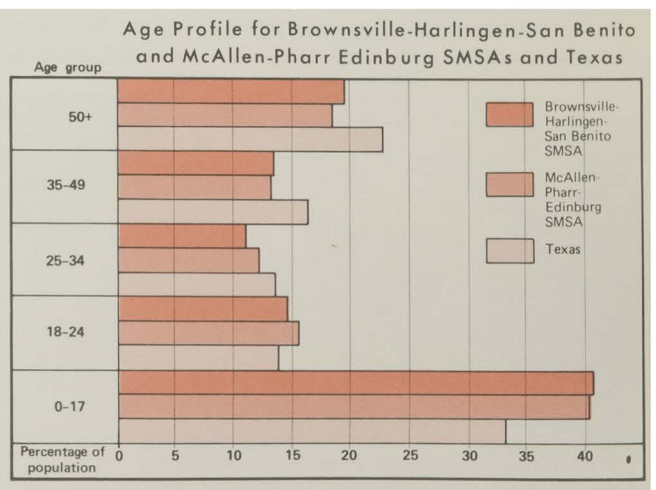
Socioeconomic Characteristics

The Lower Rio Grande Valley may be described as an area with the following characteristics:

- A very high growth rate,
- An economy closely related to agriculture,
- A concentration of employment in trade,
- Relatively low federal employment,
- Manufacturing activity concentrated in food processing and apparel,
- A youthful population, and
- Low per capita and household income levels.

Significant Factors

The Lower Rio Grande Valley is a unique part of Texas. The tropical climate of the Valley provides a growing season and opportunity for year-round outdoor activity



Source: *Sales and Marketing Management*, July 26, 1976.

found in only a few parts of the nation. In addition, the Valley is located on the coast and adjacent to the border. The Valley is an attractive area to which many people have moved in recent years and to which more can be expected to relocate in the future.

A substantial group moves to the Valley once a year and then moves away again. These are the "Winter Texans" who arrive in the Valley in the fall and depart in the spring. The actual number of Winter Texans is not known, but estimates range upward from 30,000. The recreational vehicle parks that are members of the Lower Rio Grande Valley Chamber of Commerce provide more than 11,500 spaces for winter visitors. High occupancy levels are reported, and there are numerous other recreational vehicle parks and other facilities in the Valley. According to a survey by the Bureau of Business and Economic Research at Pan American University, the typical winter visitor party consists of two persons in their sixties. About 70 percent of the winter visitors stay in their own travel trailers, motor homes, or mobile homes while in the Valley. The median length of stay in the Valley is seventeen weeks. More than half of the winter visitors come from the five states of Iowa, Minnesota, Illinois, Michigan, and Missouri, with other portions of the upper Midwest and central Canada accounting for most of the rest.

Another group of migrants to the Valley enters under less favorable circumstances. Illegal aliens from Mexico are consistently drawn across the border by the prospect of higher earnings and better opportunities in the United States. The gap between earnings and opportunities in Mexico and those in the United States is much wider than the Rio Grande. Semiskilled entry-level workers at one modern, air-conditioned electronics plant in Matamoros earn about eighty-seven cents per hour. Other, less desirable jobs on the Mexican side of the border pay considerably less. The average wage, income, and unemployment levels in the Rio Grande Valley of Texas do not look so unfavorable from the opposite side of the Rio Grande. Little short of a "Berlin Wall" is likely to keep illegal aliens from entering the Valley and other parts of the United States unless the economic gap between the United States and Mexico is narrowed.

Pan American Bank, Brownsville

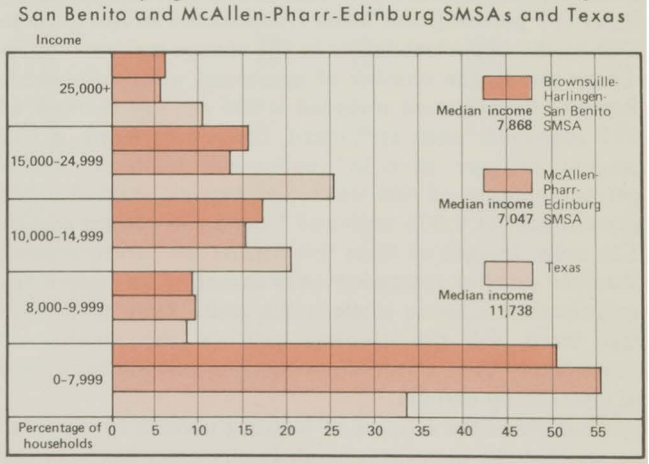
Other problems will confront the Valley in the future. Increased growth may create a conflict between agricultural and other land uses. Such conflicts have arisen in other sections of the country with far less justification than in the Valley. There is certainly no shortage of land for agricultural purposes in other parts of Texas. However, agricultural land of the quality found in the Lower Rio Grande Valley is very scarce. While some crops grown in the Valley could be grown elsewhere, others, such as grapefruit, can be produced only in limited areas.

Water resources may also become a problem. Development on booming South Padre Island comes to an abrupt halt some five miles up the coast from Brazos Santiago Pass because there are no water rights allocated to the upper portion of the island. The development of a more economical desalinization process seems to offer the best hope for a long-term solution of Valley water problems.

Increased cooperation will be required to solve some Valley problems. For example, transportation is critical to the Valley because it is a long distance from other major population and production centers. Valley air transportation resources are thinly spread among three airports with scheduled airline service. While many observers agree that more efficient service would be provided at fewer facilities, proposals for a reduction in the number of air terminals are not greeted with much enthusiasm in the Valley. In the meantime, Harlingen, which has captured 60 percent of the Valley air traffic in recent months, may be in effect becoming the regional airport for the area.

Despite its problems, the Valley has grown rapidly and can be expected to grow rapidly in the future. One man who shared in the growth of the Valley is Lloyd Bentsen, Sr., father of Senator Bentsen. He came to the Valley to learn to fly after World War I and stayed to become a major developer of the Valley. Bentsen believes that the Valley will continue to grow to a level comparable to that of other areas, such as Southern California and parts of Florida, with similar resources. He is not alone in his vision of a bright future for the area, as evidenced by the continuing stream of new residents.

Effective Buying Income Profile for Brownsville-Harlingen-San Benito and McAllen-Pharr-Edinburg SMSAs and Texas



Source: *Sales and Marketing Management*, July 26, 1976.

Texas Construction

Susanne Ethridge Cannon

The seasonally adjusted index of total construction authorized in Texas in July hit the third highest level ever recorded, 295.3. Although the index was down from June's 376.9, it was still higher than in any month in 1976. The index for residential permits was up 40 percent in year-to-date comparisons, but residential permits for the month of July were down from the total in June.

Although the number of building permits issued in Texas in July 1977 was substantially larger than in July 1976, the estimated value of total construction permits fell from 618.4 million in June to 460.3 million in July. The one-month figures show similar declines in most categories. Total residential permits fell 28 percent in value—single-family 21 percent and multifamily 50 percent. The value of building permits for nonresidential construction and for additions, alterations, and repairs fell 22 percent.

In each case the substantial drop in month-end figures did not cause the total to drop below the count for the same period in 1976. On the contrary, the estimated values of construction permits for the year show total construction up 28 percent, new construction up 29 percent, residential construction up 48 percent, and nonresidential construction up 8 percent. Permit value for additions, alterations, and repairs climbed 17 percent.

The seven standard metropolitan statistical areas showing the greatest increase in the number of residential units authorized for the year were Bryan-College Station (80 percent), Dallas-Fort Worth (83 percent), El Paso (57 percent), Lubbock (85 percent), San Antonio (82 percent), Tyler (57 percent), and Waco (79 percent). In five of these SMSAs the important factor in the change was an extraordinary rise in the number of apartment units authorized. Bryan-College Station recorded a 208 percent increase of 791 apartment units authorized; Dallas-Fort Worth, a 193 percent increase of 6,707 units; and Lubbock, a 106 percent increase of 608 units. San Antonio showed a 192 percent gain of 1,075 units and Tyler a 158 percent gain of 126 units. In each of these five SMSAs the percentage and absolute gains in apartment units exceeded the percentage and absolute gains in single-family units. Only in El Paso and Waco did the absolute gain in the number of single-family units outpace the absolute gain in the number of multifamily permits.

Analysis of the number of building permits for the year shows that the increase in single-family units has been the most consistent factor statewide. Fourteen of the twenty-five SMSAs reported increases of more than 15 percent in the number of single-family permits for the first seven months of 1977; only five had any decline from 1976 figures. The greatest change in the number of single-family permits occurred in the Dallas-Fort Worth SMSA, where there were 3,224 more permits than last year. The largest percentage increase, 64 percent, was in Lubbock. In the apartment permit category eight SMSAs had more than a 100 percent gain from last year, one SMSA had a 90 percent decline, and another registered an 88 percent decline. Clearly the erratic multifamily market can have a drastic impact both on the statistics as collected for the Department of Commerce and on the economic health of smaller SMSAs.

After the spate of newspaper articles proclaiming apartment shortages in the larger cities it is useful to ask just what the numbers mean. First, is it possible to estimate a trend based on the last four or five years of residential construction? Certainly not. In any of the small SMSAs a decision by one builder to construct even one medium-sized apartment complex can cause the statistics as collected to vary widely from present figures. When one considers that the purchase of a building permit is only one step in a lengthy process of development and construction and that the purchase is not necessarily made immediately prior to site work, the use of permits as a predicting tool is certainly not warranted. Even if a permit issued in a given year meant construction in that year, one could not use the count as a predicting tool.

The table "Dwelling Unit Construction in Selected SMSAs, 1972-1977" shows the actual number of dwelling units constructed in the six SMSAs that reported decreases in residential permits. The case of Amarillo is instructive. A trend line drawn for the years 1972 through 1976 would have predicted 700 apartment units for the first seven months of 1977. However, the single unusual entry of only 66 units in 1977 results in a trend line prediction for 1978 of 367 units. The impact of such substantial shifts causes wide variations in any trend line analysis and limits its usefulness.

If the statistics cannot be used as predictors, can they be used as accurate reflections of the cost of construction? No. The differences in average cost per dwelling unit, based on building permits issued within SMSAs, cannot be attributed simply to differences in average square foot size in the various markets.

The building permit process varies from city to city. Austin uses the recently revised Uniform Building Code guide of $24 per square foot for residential construction and charges builders $.03 per square foot for the permit. The average unit this year is estimated at a cost of $44,000.

Laredo, which has many owner-builder requests for very small houses, introduced its first building code in May 1975. Prior to that time the cost of a building permit was $1 per unit; now it is based on the estimated cost of the unit. Contractor estimates for the permits run approximately $18 to $20 per foot. The city uses the builder's estimate as the value per unit unless the estimate seems too low.

Wichita Falls uses a $12 estimate for the living area and one half the garage to arrive at a unit value. San Antonio officials estimate $12 per square foot for an owner-builder and use the contractor's estimate for other residential units.

Estimated Values of Building Authorized in Texas#

Classification	Jul[p] 1977 (thousands	Jan-Jul[p] 1977 of dollars)	Percent change Jul 1977 from Jun 1977	Percent change Jan-Jul 1977 from Jan-Jul 1976
All Permits	460,264	3,424,739	− 26	28
New construction	413,601	3,079,258	− 26	29
Residential (housekeeping)	235,609	1,847,923	− 28	48
One-family dwellings	192,320	1,411,192	− 21	42
Multiple-family dwellings	43,289	436,731	− 50	74
Nonresidential	177,992	1,231,335	− 22	8
Hotels, motels, and tourist courts	24,545	54,602	104	− 38
Amusement buildings	1,999	36,605	− 74	215
Churches	5,159	47,561	− 22	32
Industrial buildings	24,576	138,051	− 2	83
Garages (commercial and private)	1,089	24,391	− 82	48
Service stations and repair garages	633	5,291	− 23	− 19
Hospitals and institutions	14,897	87,655	16	− 26
Office-bank buildings	22,945	260,075	− 55	11
Works and utilities	2,168	36,910	− 33	− 58
Educational buildings	23,199	164,367	− 39	− 2
Stores and mercantile buildings	48,369	316,463	− 9	45
Other buildings and structures	8,413	59,364	− 32	− 21
Additions, alterations, and repairs	46,663	345,481	− 22	17
SMSA vs. non-SMSA				
Total SMSA†	417,835	3,110,646	− 25	27
Central cities	299,718	2,070,830	− 18	25
Outside central cities	118,117	1,039,816	− 38	32
Total non-SMSA	42,429	314,093	− 29	33
10,000 to 50,000 population	22,789	173,052	− 33	29
Less than 10,000 population	19,640	141,041	− 24	39

#Only building for which permits were issued within the incorporated area of a city is included. Federal contracts and public housing are not included.

[p]Preliminary.

†Standard metropolitan statistical area as defined in 1975 census.

Source: Bureau of Business Research in cooperation with the Bureau of the Census, U.S. Department of Commerce.

Recent estimates for brick veneer construction have been running approximately $15 per square foot.

It is impossible to use estimated value figures to analyze any trends in construction costs because of the considerable differences in local methods governing permit authorizations and estimations of value. Additionally, interpretation of estimated value trends for individual cities or SMSAs is complicated by the fact that the individual estimating techniques may change without regard to past practices. The Laredo experience demonstrates this continuity problem. It would be reasonable for local decision makers to examine the practices of their local officials prior to attempting any analysis of estimated values.

Accurate analysis of residential permit authorizations can be made on the basis of the number of dwelling units. However, such an analysis cannot be done for nonresidential units. Housing statistics can be used to analyze the results of all the factors that go into housing decisions—financing, vacancies, demographics—but not to predict the future or to assess the impact of inflation.

Dwelling Unit Construction in Selected SMSAs 1972-1977*

SMSA and year	Type of unit: One-family	Two-family	Apartment	Total
Amarillo				
1972	346	52	120	518
1973	363	22	532	917
1974	428	30	490	948
1975	564	20	338	922
1976	736	14	668	1,418
1977	956	62	66	1,084
Galveston-Texas City				
1972	281	2	715	998
1973	150	0	423	573
1974	442	2	113	557
1975	190	0	215	405
1976	491	12	176	679
1977	422	12	118	552
Midland				
1972	104	0	26	130
1973	96	2	123	221
1974	73	68	0	141
1975	257	18	0	275
1976	218	30	496	744
1977	381	42	301	724
Odessa				
1972	98	20	104	222
1973	96	0	198	294
1974	99	16	188	303
1975	196	2	600	798
1976	356	36	532	924
1977	365	0	312	677
Texarkana				
1972	115	4	82	201
1973	56	12	0	68
1974	54	12	218	284
1975	67	6	0	73
1976	56	4	104	164
1977	44	6	12	62
Wichita Falls				
1972	217	0	272	489
1973	209	0	237	446
1974	168	0	240	408
1975	214	0	0	214
1976	364	0	6	370
1977	350	6	0	356

*Period reflected is January through July of each year.

Source: Tabulations by the Bureau of Business Research.

Local Business Conditions

Statistical data compiled by Mildred Anderson, Kay Davis, Marylyn Donaldson, and Joan Holloway.

Standard metropolitan statistical areas (SMSAs) include one or more entire counties, as shown. All SMSAs are designated as such by the U.S. Bureau of the Census. Population figures are from the 1970 census and 1975 estimates by the Bureau of the Census.

Building permit data are collected from municipalities by the Bureau of Business Research in cooperation with the Bureau of the Census. They represent only building authorizations within city limits and exclude federal contracts and public works projects, such as highways, waterways, and reservoirs. Building statistics for the latest month are subject to revision.

Employment estimates include only wage and salary workers and are compiled by the Texas Employment Commission in cooperation with the U.S. Bureau of Labor Statistics.

Indicators of Local Business Conditions for Texas Standard Metropolitan Statistical Areas

Reported area and indicator	Jul 1977	Percent change from Jun 1977	Percent change from Jul 1976
ABILENE SMSA			
Callahan, Jones, and Taylor Counties; population: 122,164 (1970); 128,400 (1975 est.)			
Urban building permits ($1,000)	5,569	38	132
Nonfarm employment	46,700	– 1	1
Manufacturing employment	5,670	– 4	– 20
Unemployed (percent)	5.0	4	14
AMARILLO SMSA			
Potter and Randall Counties; population: 144,396 (1970); 152,000 (1975 est.)			
Urban building permits ($1,000)	7,555	– 22	34
Nonfarm employment	67,260	**	2
Manufacturing employment	8,010	– 8	– 11
Unemployed (percent)	3.4	– 3	– 15
AUSTIN SMSA			
Hays and Travis Counties; population: 323,158 (1970); 394,800 (1975 est.)			
Urban building permits ($1,000)	19,274	– 21	– 2
Nonfarm employment	180,200	**	4
Manufacturing employment	19,300	2	12
Unemployed (percent)	4.9	4	– 4
BEAUMONT-PORT ARTHUR-ORANGE SMSA			
Hardin, Jefferson, and Orange Counties; population: 347,568 (1970); 349,500 (1975 est.)			
Urban building permits ($1,000)	10,591	– 42	24
Nonfarm employment	137,950	**	**
Manufacturing employment	41,250	**	– 1
Unemployed (percent)	7.4	**	– 5
BROWNSVILLE-HARLINGEN-SAN BENITO SMSA			
Cameron County; population: 140,368 (1970); 169,300 (1975 est.)			
Urban building permits ($1,000)	5,259	– 3	119
Nonfarm employment	50,090	1	2
Manufacturing employment	8,930	– 1	**
Unemployed (percent)	10.2	– 8	– 10
BRYAN-COLLEGE STATION SMSA			
Brazos County; population: 57,978 (1970); 72,300 (1975 est.)			
Urban building permits ($1,000)	5,173	50	194
(Monthly employment reports are not available for the Bryan-College Station SMSA.)			
CORPUS CHRISTI SMSA			
Nueces and San Patricio Counties; population: 284,832 (1970); 297,300 (1975 est.)			
Urban building permits ($1,000)	8,775	– 4	83
Nonfarm employment	103,750	1	**
Manufacturing employment	11,800	– 1	– 7
Unemployed (percent)	6.9	– 5	5
DALLAS-FORT WORTH SMSA			
Collin, Dallas, Denton, Ellis, Hood, Johnson, Kaufman, Parker, Rockwall, Tarrant, and Wise Counties; population: 2,378,353 (1970); 2,552,800 (1975 est.)			
Urban building permits ($1,000)	133,766	– 19	57
Nonfarm employment	1,161,000	**	4
Manufacturing employment	256,500	1	4
Unemployed (percent)	3.8	– 3	– 22
EL PASO SMSA			
El Paso County; population: 359,291 (1970); 414,700 (1975 est.)			
Urban building permits ($1,000)	13,340	– 45	24
Nonfarm employment	136,150	– 1	– 2
Manufacturing employment	30,500	**	– 2
Unemployed (percent)	11.6	– 6	16
GALVESTON-TEXAS CITY SMSA			
Galveston County; population: 169,812 (1970); 182,000 (1975 est.)			
Urban building permits ($1,000)	4,008	1	80
Nonfarm employment	72,340	2	8
Manufacturing employment	11,840	– 1	– 2
Unemployed (percent)	7.2	– 13	– 5
HOUSTON SMSA			
Brazoria, Fort Bend, Harris, Liberty, Montgomery, and Waller Counties; population: 1,999,316 (1970); 2,297,300 (1975 est.)			
Urban building permits ($1,000)	105,213	– 20	4
Nonfarm employment	1,161,000	**	6
Manufacturing employment	190,900	1	1
Unemployed (percent)	4.9	– 6	– 20
KILLEEN-TEMPLE SMSA			
Bell and Coryell Counties; population: 159,794 (1970); 210,500 (1975 est.)			
Urban building permits ($1,000)	11,343	56	120
(Monthly employment reports are not available for the Killeen-Temple SMSA.)			

Reported area and indicator	Jul 1977	Percent change from Jun 1977	Percent change from Jul 1976
LAREDO SMSA			
Webb County; population: 72,859 (1970); 78,100 (1975 est.)			
Urban building permits ($1,000)	1,950	48	− 18
Nonfarm employment	25,870	1	3
Manufacturing employment	1,910	1	9
Unemployed (percent)	13.0	− 6	− 4
LONGVIEW SMSA			
Gregg and Harrison Counties; population: 120,770 (1970); 125,300 (1975 est.)			
Urban building permits ($1,000)	9,435	**	140
Nonfarm employment	52,000	1	4
Manufacturing employment	16,780	1	4
Unemployed (percent)	6.6	**	− 7
LUBBOCK SMSA			
Lubbock County; population: 179,295 (1970); 196,700 (1975 est.)			
Urban building permits ($1,000)	9,947	− 18	38
Nonfarm employment	79,640	1	6
Manufacturing employment	12,440	1	12
Unemployed (percent)	3.3	− 11	− 23
McALLEN-PHARR-EDINBURG SMSA			
Hidalgo County; population: 181,535 (1970); 220,700 (1975 est.)			
Urban building permits ($1,000)	7,319	− 6	42
Nonfarm employment	56,230	− 6	3
Manufacturing employment	7,600	− 11	6
Unemployed (percent)	11.1	14	− 10
MIDLAND SMSA			
Midland County; population: 65,433 (1970); 69,700 (1975 est.)			
Urban building permits ($1,000)	5,409	9	469
Nonfarm employment	28,870	**	2
Manufacturing employment	1,960	− 2	4
Unemployed (percent)	3.1	− 3	− 24
ODESSA SMSA			
Ector County; population: 92,660 (1970); 98,800 (1975 est.)			
Urban building permits ($1,000)	1,786	5	− 44
Nonfarm employment	44,160	1	7
Manufacturing employment	5,960	**	7
Unemployed (percent)	3.1	− 6	− 31
SAN ANGELO SMSA			
Tom Green County; population: 71,047 (1970); 74,800 (1975 est.)			
Urban building permits ($1,000)	1,471	− 51	− 86
Nonfarm employment	28,900	1	6
Manufacturing employment	5,410	− 1	2
Unemployed (percent)	3.2	7	− 32
SAN ANTONIO SMSA			
Bexar, Comal, and Guadalupe Counties; population: 888,179 (1970); 977,200 (1975 est.)			
Urban building permits ($1,000)	25,254	− 33	48
Nonfarm employment	332,600	**	1
Manufacturing employment	41,750	**	1
Unemployed (percent)	8.3	2	− 2
SHERMAN-DENISON SMSA			
Grayson County; population: 83,225 (1970); 79,000 (1975 est.)			
Urban building permits ($1,000)	2,462	− 48	493
Nonfarm employment	30,760	**	5
Manufacturing employment	11,110	1	9
Unemployed (percent)	8.1	11	− 22
TEXARKANA SMSA			
Bowie County, Texas; Little River and Miller Counties, Arkansas; population: 113,488 (1970); 114,700 (1975 est.)			
Urban building permits ($1,000)	3,993	97	31
Nonfarm employment	40,730	1	4
Manufacturing employment	8,310	2	11
TEXARKANA SMSA (continued)			
Unemployed (percent)	7.2	**	− 27
(Since the Texarkana SMSA includes Bowie County in Texas and Little River and Miller Counties in Arkansas, all data, including population, refer to the three-county region.)			
TYLER SMSA			
Smith County; population: 97,096 (1970); 107,400 (1975 est.)			
Urban building permits ($1,000)	6,538	− 24	108
Nonfarm employment	43,190	**	5
Manufacturing employment	12,210	− 1	6
Unemployed (percent)	5.6	14	− 7
WACO SMSA			
McLennan County; population: 147,553 (1970); 156,700 (1975 est.)			
Urban building permits ($1,000)	4,814	27	34
Nonfarm employment	62,620	1	2
Manufacturing employment	14,700	2	2
Unemployed (percent)	5.5	**	**
WICHITA FALLS SMSA			
Clay and Wichita Counties; population: 128,642 (1970); 130,700 (1975 est.)			
Urban building permits ($1,000)	1,798	− 78	− 41
Nonfarm employment	46,850	**	3
Manufacturing employment	8,170	**	7
Unemployed (percent)	3.9	**	− 13

**Absolute change is less than one half of 1 percent.

Selected Barometers of Texas Business
(Indexes—Adjusted for seasonal variation—1967=100)

Index	Jul 1977	Jun 1977	Year-to-date average 1977	Percent change: Jul 1977 from Jun 1977	Percent change: Year-to-date average 1977 from 1976
Crude oil production	101.4[p]	102.1[p]	102.4	− 1	− 4
Total electric power use	203.0[p]	200.3[p]	205.0	1	12
Residential	230.3[p]	234.7[p]	258.3	− 2	12
Industrial	171.7[p]	168.6[p]	171.8	2	13
Total industrial production	139.8[p]	139.4[p]	137.4	**	4
Urban building permits issued	295.3[p]	376.9[p]	293.6	− 22	27
New residential	354.3[p]	449.0[p]	349.5	− 21	48
New nonresidential (unadjusted)	244.3[p]	314.9[p]	241.4	− 22	8
Total nonfarm employment	148.6[p]	148.6[p]	148.1	**	4
Manufacturing employment	132.9[p]	132.3[p]	132.1	**	3
Average weekly earnings—manufacturing	200.6[p]	200.8[p]	192.3	**	6
Average weekly hours—manufacturing	98.3[p]	98.8[p]	96.5	− 1	− 2
Total unemployment	157.2	148.0	168.8	6	− 5
Insured unemployment	268.0	264.8	249.5	1	− 4

[p]Preliminary.
**Change is less than one half of 1 percent.

Gross Retail Sales by Kind of Business for Texas Standard Metropolitan Statistical Areas

Reported area and kind of business	Jan-Mar 1977 ($000)	Percent change Jan-Mar 1977 from Oct-Dec 1976	Percent change Jan-Mar 1977 from Jan-Mar 1976
ABILENE SMSA			
Apparel, accessories	4,073	– 35	46
Automotive dealers, service stations	48,848	11	76
Building materials, farm equipment	8,224	– 6	8
Drugstores	2,505	– 5	2
Eating and drinking	8,409	2	18
Food	22,808	– 6	31
Furniture, home furnishings	6,292	– 6	20
General merchandise	11,924	– 38	2
Liquor	1,379	– 11	27
Miscellaneous retail	26,290	– 2	28
AMARILLO SMSA			
Apparel, accessories	8,487	– 32	8
Automotive dealers, service stations	63,843	– 3	23
Building materials, farm equipment	13,277	– 20	20
Drugstores	7,185	– 28	10
Eating and drinking	14,149	– 9	11
Food	32,578	– 5	29
Furniture, home furnishings	11,823	**	47
General merchandise	18,321	– 41	2
Liquor	3,849	– 21	9
Miscellaneous retail	31,226	– 18	32
AUSTIN SMSA			
Apparel, accessories	15,960	– 24	24
Automotive dealers, service stations	80,207	– 3	17
Building materials, farm equipment	39,192	19	45
Drugstores	9,229	– 9	12
Eating and drinking	37,016	– 2	18
Food	75,254	1	70
Furniture, home furnishings	20,598	– 5	24
General merchandise	44,702	– 36	8
Liquor	5,920	– 18	15
Miscellaneous retail	47,912	– 13	– 16
BEAUMONT-PORT ARTHUR-ORANGE SMSA			
Apparel, accessories	7,853	– 31	10
Automotive dealers, service stations	76,142	– 8	12
Building materials, farm equipment	18,956	– 9	18
Drugstores	13,353	– 5	8
Eating and drinking	22,797	1	22
Food	74,328	– 8	5
Furniture, home furnishings	14,422	– 16	19
General merchandise	40,451	– 36	9
Liquor	4,537	– 19	14
Miscellaneous retail	36,796	– 15	– 1
BROWNSVILLE-HARLINGEN-SAN BENITO SMSA			
Apparel, accessories	6,984	– 16	– 11
Automotive dealers, service stations	22,953	– 2	4
Building materials, farm equipment	8,741	– 20	10
Drugstores	3,357	– 5	– 13
Eating and drinking	10,969	18	16
Food	28,557	1	23
Furniture, home furnishings	6,203	– 10	– 7
General merchandise	25,962	– 8	– 10
Liquor	1,008	– 7	8
Miscellaneous retail	13,460	– 17	– 5
BRYAN-COLLEGE STATION SMSA			
Apparel, accessories	2,051	– 27	26
Automotive dealers, service stations	14,986	– 9	8
Building materials, farm equipment	8,148	18	52
Drugstores	1,223	– 16	42
Eating and drinking	5,249	– 2	25
Food	13,907	**	29
Furniture, home furnishings	2,221	– 24	25
General merchandise	7,707	– 33	14
Liquor	851	– 16	15
Miscellaneous retail	5,189	– 7	21
CORPUS CHRISTI SMSA			
Apparel, accessories	9,130	– 9	42
Automotive dealers, service stations	68,913	11	14
Building materials, farm equipment	17,257	4	14
Drugstores	6,091	– 35	– 2
Eating and drinking	19,431	2	13
Food	58,042	– 3	64
Furniture, home furnishings	12,754	1	40
General merchandise	24,323	– 38	3
Liquor	2,914	– 20	8
Miscellaneous retail	47,438	– 19	– 2
DALLAS-FORT WORTH SMSA			
Apparel, accessories	139,060	– 18	**
Automotive dealers, service stations	783,558	– 5	15
Building materials, farm equipment	187,094	4	26
Drugstores	86,169	– 15	9
Eating and drinking	204,473	– 12	5
Food	477,490	– 5	20
Furniture, home furnishings	136,426	– 12	8
General merchandise	274,241	– 36	23
Liquor	44,727	– 16	9
Miscellaneous retail	543,659	– 17	28
EL PASO SMSA			
Apparel, accessories	13,943	– 33	– 5
Automotive dealers, service stations	128,093	– 5	3
Building materials, farm equipment	11,721	2	14
Drugstores	10,904	– 13	6
Eating and drinking	22,714	– 1	11
Food	59,434	– 2	12
Furniture, home furnishings	16,548	– 8	– 4
General merchandise	50,023	– 25	– 2
Liquor	4,747	– 22	8
Miscellaneous retail	46,356	– 13	– 11
GALVESTON-TEXAS CITY SMSA			
Apparel, accessories	4,425	– 27	11
Automotive dealers, service stations	129,389	– 14	320
Building materials, farm equipment	8,572	3	14
Drugstores	5,075	– 22	5
Eating and drinking	13,290	7	13
Food	36,139	– 4	15
Furniture, home furnishings	4,483	– 12	14
General merchandise	13,678	– 34	2
Liquor	2,458	– 17	13
Miscellaneous retail	16,073	– 14	6

Reported area and kind of business	Jan-Mar 1977 ($000)	Percent change Jan-Mar 1977 from Oct-Dec 1976	Percent change Jan-Mar 1977 from Jan-Mar 1976
HOUSTON SMSA			
Apparel, accessories	96,588	– 25	24
Automotive dealers, service stations	991,105	9	4
Building materials, farm equipment	220,977	– 9	26
Drugstores	71,186	– 28	4
Eating and drinking	198,911	– 12	20
Food	505,626	– 5	17
Furniture, home furnishings	123,279	– 7	23
General merchandise	308,436	– 33	3
Liquor	36,705	– 34	11
Miscellaneous retail	578,789	– 11	31
KILLEEN-TEMPLE SMSA			
Apparel, accessories	5,419	– 18	41
Automotive dealers, service stations	28,783	– 35	8
Building materials, farm equipment	9,850	– 2	24
Drugstores	2,069	– 12	1
Eating and drinking	10,466	1	25
Food	24,239	– 3	57
Furniture, home furnishings	5,131	– 7	15
General merchandise	15,617	– 31	14
Liquor	780	– 31	– 14
Miscellaneous retail	10,388	– 18	20
LAREDO SMSA			
Apparel, accessories	7,229	– 16	– 33
Automotive dealers, service stations	12,911	17	12
Building materials, farm equipment	3,617	17	19
Drugstores	1,792	– 23	– 16
Eating and drinking	3,646	**	– 3
Food	15,499	– 15	13
Furniture, home furnishings	5,574	24	– 21
General merchandise	16,912	– 12	– 19
Liquor	266	– 10	33
Miscellaneous retail	11,856	– 17	– 15
LONGVIEW SMSA			
Apparel, accessories	4,843	– 34	...
Automotive dealers, service stations	43,693	1	...
Building materials, farm equipment	11,996	– 8	...
Drugstores	4,256	– 14	...
Eating and drinking	9,247	– 6	...
Food	32,630	24	...
Furniture, home furnishings	6,015	– 16	...
General merchandise	12,774	– 35	...
Liquor	5,396	10	...
Miscellaneous retail	20,420	– 13	...
LUBBOCK SMSA			
Apparel, accessories	9,152	– 26	10
Automotive dealers, service stations	71,290	23	44
Building materials, farm equipment	27,904	26	52
Drugstores	3,059	– 11	– 5
Eating and drinking	16,925	– 16	24
Food	49,814	3	35
Furniture, home furnishings	14,673	– 16	23
General merchandise	24,018	– 36	13
Liquor	4,354	– 13	7
Miscellaneous retail	38,526	– 20	– 9
McALLEN-PHARR-EDINBURG SMSA			
Apparel, accessories	8,741	– 15	– 7
Automotive dealers, service stations	38,725	5	2
Building materials, farm equipment	13,619	– 32	5
Drugstores	4,529	14	4
Eating and drinking	11,701	17	15
Food	44,113	5	39
Furniture, home furnishings	7,340	– 6	1
General merchandise	23,239	– 18	– 10
Liquor	933	– 29	9
Miscellaneous retail	44,303	69	55
MIDLAND SMSA			
Apparel, accessories	3,184	– 24	18
Automotive dealers, service stations	19,908	**	26
Building materials, farm equipment	5,537	7	13
Drugstores	4,727	– 17	– 4
Eating and drinking	4,839	2	15
Food	13,743	– 8	32
Furniture, home furnishings	4,166	– 5	11
General merchandise	8,948	– 25	6
Liquor	914	– 24	– 2
Miscellaneous retail	47,498	– 2	36
ODESSA SMSA			
Apparel, accessories	4,107	– 24	32
Automotive dealers, service stations	42,657	– 6	5
Building materials, farm equipment	8,038	– 7	5
Drugstores	1,537	– 23	3
Eating and drinking	8,279	4	13
Food	20,652	– 3	17
Furniture, home furnishings	5,267	– 8	17
General merchandise	17,272	– 30	6
Liquor	3,040	– 28	4
Miscellaneous retail	64,285	1	5
SAN ANGELO SMSA			
Apparel, accessories	2,530	– 26	21
Automotive dealers, service stations	21,313	31	5
Building materials, farm equipment	6,896	**	22
Drugstores	3,496	– 17	– 1
Eating and drinking	7,186	55	68
Food	13,557	– 5	43
Furniture, home furnishings	3,372	– 8	22
General merchandise	8,856	– 37	5
Liquor	743	– 24	11
Miscellaneous retail	6,430	– 10	27
SAN ANTONIO SMSA			
Apparel, accessories	31,958	– 28	12
Automotive dealers, service stations	229,096	– 2	19
Building materials, farm equipment	50,081	16	24
Drugstores	16,931	– 5	11
Eating and drinking	65,590	**	10
Food	156,866	– 2	48
Furniture, home furnishings	33,630	– 15	14
General merchandise	84,564	– 35	11
Liquor	11,297	– 22	34
Miscellaneous retail	94,603	– 18	9

Reported area and kind of business	Jan-Mar 1977 ($000)	Percent change Jan-Mar 1977 from Oct-Dec 1976	Percent change Jan-Mar 1977 from Jan-Mar 1976
SHERMAN-DENISON SMSA			
Apparel, accessories	2,405	− 36	12
Automotive dealers, service stations	19,606	− 4	32
Building materials, farm equipment	5,207	− 31	22
Drugstores	2,723	− 21	− 1
Eating and drinking	3,936	− 5	4
Food	14,535	− 7	42
Furniture, home furnishings	2,633	− 20	**
General merchandise	8,970	− 30	16
Liquor	866	− 28	14
Miscellaneous retail	10,180	− 10	41
TEXARKANA			
Apparel, accessories	1,703	− 35	11
Automotive dealers, service stations	20,647	26	58
Building materials, farm equipment	7,463	− 14	41
Drugstores	1,495	− 11	5
Eating and drinking	3,761	1	16
Food	13,420	− 9	17
Furniture, home furnishings	2,518	− 33	− 28
General merchandise	6,966	− 37	4
Liquor	§	. . .	. . .
Miscellaneous retail	6,721	− 6	18
TYLER SMSA			
Apparel, accessories	5,792	− 31	34
Automotive dealers, service stations	28,033	− 17	25
Building materials, farm equipment	13,440	− 6	17
Drugstores	3,002	− 13	9
Eating and drinking	6,777	**	25
TYLER SMSA (continued)			
Food	21,165	49	− 10
Furniture, home furnishings	5,241	− 29	16
General merchandise	13,246	− 31	24
Liquor	§	. . .	. . .
Miscellaneous retail	14,151	− 11	29
WACO SMSA			
Apparel, accessories	4,146	− 25	17
Automotive dealers, service stations	45,487	− 9	10
Building materials, farm equipment	20,650	6	16
Drugstores	3,754	− 11	12
Eating and drinking	12,802	1	17
Food	32,813	− 2	74
Furniture, home furnishings	5,639	− 11	20
General merchandise	15,364	− 35	6
Liquor	1,660	− 19	− 16
Miscellaneous retail	20,383	− 16	12
WICHITA FALLS SMSA			
Apparel, accessories	4,086	− 31	7
Automotive dealers, service stations	35,264	− 8	8
Building materials, farm equipment	8,598	− 24	16
Drugstores	5,079	− 5	68
Eating and drinking	8,343	− 2	7
Food	22,339	− 5	42
Furniture, home furnishings	5,378	− 9	11
General merchandise	12,963	− 37	5
Liquor	2,192	− 10	9
Miscellaneous retail	17,990	− 16	17

§Omitted to avoid disclosure.
**Absolute change is less than one half of 1 percent.
. . .No data, or inadequate basis for reporting.
Source: Sales Tax Division, State Comptroller of Public Accounts.

Barometers of Texas Business

(All figures are for Texas unless otherwise indicated.)

All indexes are based on the average months for 1967=100 except where other specification is made; all except annual indexes are adjusted for seasonal variation unless otherwise noted. Employment estimates are compiled by the Texas Employment Commission in cooperation with the Bureau of Labor Statistics of the U.S. Department of Labor. The symbols used below impose qualifications as indicated here: p–preliminary data subject to revision; r–revised data; *–dollar totals for the fiscal year to date; †–employment data for wage and salary workers only.

	Jul 1977	Jun 1977	Jul 1976	Year-to-date average 1977	Year-to-date average 1976
GENERAL BUSINESS ACTIVITY					
Wholesale prices in U.S. (unadjusted index)	194.8	194.4	184.3	192.7	181.3
Consumer prices in Houston (unadjusted index)	191.6	...	177.4	188.0	174.6
Consumer prices in U.S. (unadjusted index)	182.6	181.8	171.1	179.3	168.6
Sales of ordinary life insurance (index)	272.3	301.6	249.0	277.4	247.0
PRODUCTION					
Total electric power use (index)	203.0^{p}	200.3^{p}	182.2^{r}	205.0	183.0
Residential electric power use (index)	230.3^{p}	234.7^{p}	208.3^{r}	258.3	231.1
Industrial electric power use (index)	171.7^{p}	168.6^{p}	156.1^{r}	171.8	152.0
Crude oil production (index)	101.4^{p}	102.1^{p}	105.9^{r}	102.4	107.1
Average daily production per oil well (bbl.)	17.9	18.0	19.1	18.0	18.9
Industrial production–total (index)	139.8^{p}	139.4^{p}	131.5^{r}	137.4	131.5
Industrial production–total manufactures (index)	147.8^{p}	146.9^{p}	137.6^{r}	144.5	137.0
Industrial production–durable manufactures (index)	153.7^{p}	149.9^{p}	139.0^{r}	145.2	136.9
Industrial production–nondurable manufactures (index)	143.2^{p}	144.5^{p}	136.5^{r}	144.0	137.1
Industrial production–mining (index)	117.0^{p}	117.6^{p}	113.4^{r}	115.3	113.9
Industrial production–utilities (index)	173.2^{p}	173.2^{p}	162.9^{r}	179.8	168.9
Industrial production in U.S. (index)	139.0^{p}	138.3^{p}	130.7^{r}	135.9	128.6
Urban building permits issued (index)	295.3^{p}	376.9^{p}	230.6^{r}	293.6	231.5
New residential building authorized (index)	354.3^{p}	449.0^{p}	253.8^{r}	349.5	237.4
New residential units authorized (index)	167.3^{p}	223.2^{p}	129.1^{r}	175.9	127.4
New nonresidential building authorized (unadjusted index)	244.3^{p}	314.9^{p}	191.1^{r}	241.4	222.8
AGRICULTURE					
Prices received by farmers (unadjusted index)	184	185^{r}	203^{r}	195	194
Prices paid by farmers in U.S. (unadjusted index)	203	204^{r}	194^{r}	202	192
Ratio of Texas farm prices received to U.S. prices paid by farmers	90.6	90.7^{r}	104.6^{r}	96.5	101.0
FINANCE					
Bank commercial loans outstanding (index)	202.5	206.2	183.9	201.1	184.3
Weekly condition report of large commercial banks, Dallas Federal Reserve District					
Loans (millions)	$ 13,110	$ 12,902	$ 11,234	$ 12,478	$ 10,990
Loans and investments (millions)	$ 19,450	$ 19,231	$ 17,058	$ 18,802	$ 16,665
Adjusted demand deposits (millions)	$ 4,982	$ 5,258	$ 4,748	$ 5,108	$ 4,839
Revenue receipts of the state comptroller (thousands)	$ 622.8	$ 702.8	$ 641.3	$ 634.9	$ 583.9
Federal Internal Revenue collections (millions)	$ 1,775.4	$ 2,866.8	$ 1,503.0	$18,512.8*	$14,279.1*
Securities registrations–original applications					
Mutual investment companies (thousands)	$ 108,222	$ 72,972	$ 95,088	$ 982,534*	$ 728,805*
All other corporate securities					
Texas companies (thousands)	$ 5,275	$ 30,453	$ 22,973	$ 160,095*	$ 145,035*
Other companies (thousands)	$ 10,288	$ 28,608	$ 9,175	$ 150,998*	$ 118,745*
Securities registration–renewals					
Mutual investment companies (thousands)	$ 18,606	$ 41,180	$ 38,683	$ 461,939*	$ 450,599*
Other corporate securities (thousands)	$ 356	$ 350	$ 740	$ 4,816*	$ 6,132*
LABOR					
Total nonagricultural employment (index)†	148.6^{p}	148.6^{p}	144.4^{r}	148.1	143.0
Manufacturing employment (index)†	132.9^{p}	132.3^{p}	129.4^{r}	132.1	128.2
Average weekly hours–manufacturing (index)†	98.3^{p}	98.8^{p}	97.8^{r}	96.5	98.7
Average weekly earnings–manufacturing (index)†	200.6^{p}	200.8^{p}	183.6^{r}	192.3	180.9
Total nonagricultural employment (thousands)†	4,845.8^{p}	4,864.2^{p}	4,710.2^{r}	4,806.3	4,640.0
Total manufacturing employment (thousands)†	891.6^{p}	892.0^{p}	868.1^{r}	876.0	850.3
Durable-goods employment (thousands)†	490.5^{p}	492.2^{p}	475.8^{r}	481.4	465.5
Nondurable-goods employment (thousands)†	401.1^{p}	399.8^{p}	392.3^{r}	394.6	384.8
Total civilian labor force in selected labor market areas (thousands)	4,588.4^{p}	4,591.8^{p}	4,456.6^{r}	4,500.3	4,349.8
Nonagricultural employment in selected labor market areas (thousands)†	3,988.9^{p}	3,985.8^{p}	3,845.5^{r}	3,942.4	3,813.0
Manufacturing employment in selected labor market areas (thousands)†	733.0^{p}	730.8^{p}	717.7^{r}	720.0	707.5
Total unemployment in selected labor market areas (thousands)	252.3^{p}	261.0^{p}	281.6^{r}	244.7	267.8
Percent of labor force unemployed in selected labor market areas	5.5^{p}	5.7^{p}	6.3^{r}	5.4	6.1
Percent of total labor force unemployed	5.3^{p}	5.4^{p}	6.0^{r}	5.2	5.9

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