Transforming Texas and the Nation: Productivity Through Entrepreneurship and Risk-taking

By: **George Kozmetsky and Raymond W. Smilor**

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Abstract:

The authors call for the state of Texas to meet 25% of its need for new job creation through technology venturing, which they estimate to be 42,500 jobs per year or 820,000 new jobs over twenty years. In order to achieve this goal, they propose a number of measures: the expansion of Federal defense R&D in Texas, which they view as an investment and not simply as expenditure; the development of the Texas entrepreneurial infrastructure; expansion of the capital venture base; and establishment of a state seed-funding program for early-stage tech ventures.

Keywords: Texas; entrepreneurship; economic development; technology venturing

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TRANSFORMING TEXAS AND THE NATION:

PRODUCTIVITY THROUGH ENTREPRENEURSHIP AND RISK-TAKING

by

George Kozmetsky*

and

Raymond Smilor**

* Dr. Kozmetsky is the J. M. West Chair Professor and Professor of Management and Computer Science at The University of Texas at Austin. He also is Director of the University's Institute for Constructive Capitalism.

** Dr. Smilor is Assistant Director of the Institute for Constructive Capitalism.

The authors acknowledge the assistance of Michael Gill in compiling the appendices.

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Productivity enhancement is critical in transforming American society. Only by improving our country's productivity through entrepreneurship and risk taking can we extend the benefits, opportunities and rewards of our way of life to all our citizens.

But productivity must not be viewed from just an economic perspective. Productivity is more than a definition of output per worker; more than a combination of factors that contribute to the bottom line; more than a way to combat inflation; more than a means of increasing the quality of American goods and services. Productivity begins with the human spirit. It is the utilization of each person's creative and innovative abilities, regardless of race, creed, color, sex or intellectual capacity.

This is ideal and does not yet exist to the extent that we would like. But in the decades of the 1980s and 1990s, if we are to transform our society, then we as entrepreneurs, whether we work for ourselves or for large, medium or small organizations in either the public or private sectors, must assume leadership.

Taking risks and being entitled to the rewards of your efforts are basic components of the American ideology as well as integral parts of the private enterprise system. The utilization of the entrepreneurial

spirit to increase productivity to transform American society requires individual risk-taking. Our task is to shape the emerging American society. To be productive, we do not need vast natural resources or cheap energy. To be productive, we need dedication of soul, discipline, economic freedom, and opportunity for all our people. From these will flow savings, investment, innovation--and productivity as well as the required partnership of government, labor, business, and academia.

Entrepreneurial Leadership in Texas

The need for entrepreneurial leadership in Texas has never been greater. Our world is undergoing transformation more rapidly than most of society can cope with.

Throughout our state's history, the Texas economy has been riveted to its own unique myths, songs, poetry and legacy of the past. We should never lose our heritage, mystic and lore that outsiders have embodied in our cowboy hats--black or white--belt buckles and boots, our financial assets derived from cotton, cattle, "black gold," real estate and financial power or even our one-of-a-kind Neiman-Marcus Christmas gifts.

However, Texas must extend its own economy in a way that includes helping to transform the American economy and renew America's prestige in the world. Texas is one of the emerging pivotal entrepreneurial states (along with New Mexico and Florida) to help lead our nation's resurgence in tomorrow's global economy.

This pivotal point has come about because we know that the old myths--namely our past abundance from natural resources of agriculture and cattle to oil, chemicals and burgeoning financial institutions--are not enough for our future. Newer Texas myths will have to come from the experiences and insights shared, argued and shaken down to usable action that will convert our dreams to a shared reality.

Because of complex global developments, Texas is truly in an historic period of transformation--economically, socially, politically, scientifically and culturally. Where are we going? What needs to happen along the way? These questions underlie the need to strengthen and expand our entrepreneurial infrastructure in Texas.

Texas wealth must be used at home to develop a first-class set of capital ventures, business developments and other financial institutions that an expanding entrepreneurial generation will require. Our wealth must be used to develop the means to commercialize science and technology and thus to provide jobs, as well as a tax base, to support our mutual economic and quality-of-life goals. We are very fortunate that today we have the foundation to transform Texas in such a way that it becomes an example to the nation and the world. Our state will continue to attract people, large organizations, small businesses, research, technology and even social styles and cultural trends. Consequently, we need to develop entrepreneurial leadership that focuses attention on our can-do attitude, including the appropriate use of wealth to solve problems.

To do this, Texas entrepreneurs must learn to understand, compete and progress effectively in world markets. We are only now coming to terms with newer international alliances, the concept of a world market and fierce international economic competition.

We should be positioning Texas not simply to react to the changing global economy but to seize the opportunity to create the future. This is what entrepreneurship is all about. It is not reactive; it is proactive. It is not a catch-up game; it is a leap-frogging game.

Technology Venturing

Let's be more specific. Texas needs to provide at least 170,000 jobs per year for the next two decades in order to maintian our current standard of living.[1] We should establish as a goal that 25 percent of the future employment needs of our state will be met through technology venturing; namely, 42,500 jobs a year for the next twenty years or 820,000 jobs! This will add about $4 billion to our state's gross national product each year or about one percent of our state's GNP. Such growth will also provide a tax base that will be twice as high as the current energy industry provides.

Is this a feasible goal? Where are the entrepreneurial opportunities to achieve such a goal? The defense budget is one area that presents an entrepreneurial opportunity for Texas, if we can commercialize our defense research and development.

For example, the 1983-1986 defense R & D test and evaluation outlays are projected to be $21.4 billion in 1983, $26.3 billion in

1984, $30 billion in 1985, and $32 billion in 1986, for a total of over $110 billion. These outlays for the next four years will equal 30 percent of the total Federal R & D investments of the past 18 years.[2]

These are truly significant investments in U.S. future technological resources and should not be viewed solely as expenditures. These R & D investments will result in important technologies which can and should be commercialized.

More revealing of R & D activities in the U.S. is the direct and strong correlation between Federal spending, selected universities, geographical areas and primary companies.

1. Basic research is generally conducted by less than 20 preeminent universities in California, New York, Massachusetts, Maryland and the Washington, D.C. area.

2. In 1981, over 81 percent of Department of Defense (DOD) research was invested in 15 states; 44 percent was in three states--California, Maryland and Massachusetts, in that order.

3. New high technology, non-defense companies tend to cluster in the same states where Federal R & D are invested, namely California, Massachusetts and New York. Maryland seems to be an exception to the general rule.

4. DOD applied research and development research are conducted primarily by less than 20 companies, generally in the same states where Federal R & D is conducted.[3]

America's future comprehensive security depends on our abilities to support and then diffuse, through innovation, the newer technologies of the 1980s. Through their use, we can strengthen our nation's defense posture while improving our state, national and international economic positions. The emerging technologies can become our state's newer growth industries that will help to stimulate a robust economy in the 1983-1990 time frame. Estimates show that in addition to Federal investments, those by industry, universities and colleges, and other non-profit institutions for the 1983-1986 period could result in an investment pool of more than $386 billion, in current dollars.[4] This investment can and should be a major stimulant to our economy.

Commercialization Process

The creation of jobs is a critical issue; employment is now at the heart of the problems throughout the country. The velocity of technical change has been accelerating. The fourth industrial revolution is upon us, and millions of Americans are without appropriate skills to compete in current and future job markets. Therefore, Texas should pursue a three-pronged strategy:

1. Build a diversified and expanding economy;

2. Develop the skills of our people so that they may participate in it; and

3. Provide a strong infrastructure for entrepreneurship.

In other words, Texas must foster a new type of transformation, one in which we can take advantage of the current window of opportunity.

To compete in the global marketplace, Texas entrepreneurs must not simply adapt a technology to the production of a product or service. They must integrate emerging technologies in a commercialization process. Our state must assist in this process. It cannot stop at insuring the best education and understanding of selected science and technology. It must provide the means by which these sciences and technologies can be economically and socially developed and thereby secure a sound economic and quality-of-life environment for all Texans--present and future. This means that we are required to develop national and state policies as well as private sector strategies that nurture the newer technologies and emerging firms while revitalizing the basic industries in an internationally competitive market.[5] This will require creative and innovative cooperative efforts between our state and local governments, universities and colleges, other non-profit institutions and the private sector to insure a more balanced, stable growth in Texas through robust technology venturing.

The Texas Entrepreneurial Infrastructure

Let's examine the current state of our entrepreneurial infrastructure.

1. Governor Mark White has established a state commission on education that includes science and technology. It is chaired by Mr. H. Ross Perot.

2. We have dynamic chambers of commerce in most of our SMSAs that are actively involved in economic development.

3. The Texas Lyceum is bringing together the emerging leadership of our state to focus on critical issues and to extend Texas' influence on the national and international scenes.

4. Both public and private colleges and universities are directly involved in entrepreneurial education. In fact, Texas entrepreneurial education is in the forefront in the United States.

5. Our flagship university systems, Texas A & M and The University of Texas, are fostering technology venturing: Texas A & M, through project INVENT, and The University of Texas through research institutes that are privately financed and innovatively operated. For example, the UT System is establishing one of the leading institutes for biotechnology at the UT Health Science Center in San Antonio.

6. Technology-sharing is already occurring in Texas. This includes MCC in Austin, the start of a technopolis in San Antonio by Mayor Henry Cisneros, and the Houston Area Research Center which is a consortium of four major Texas universities (Texas A & M University, Rice University, The University of Houston, and The University of Texas at Austin) as well as the Texas Medical Center. There are many more joint business-government-university ventures that are helping to insure that the entrepreneurial spirit remains alive and well within a robust environment.

Expanding the Capital Venture Base

In addition to these developments, what else do we currently need to insure the entrepreneurial success of Texas in meeting our goal of 42,500 jobs each year for the next 20 years? One of our most critical needs is to expand our capital venture base. Capital is the lifeblood of all entrepreneurs. Our ability to provide that capital is essential to the economic well-being of our state. Currently, Texas ranks sixth in terms of resources for capital venturing. Texas had a cumulative total of $259 million of capital venture funds to invest through 1982. Using New York as a standard, we had funds equal to only 14 percent of the total in New York and a mere 4 percent of the total nationwide sources. In fact, the states ahead of Texas are New York, California, Massachusetts, Illinois and Connecticut.

Fortunately, because of changes in the capital gains tax, there is a growing community of Texas capital venture institutions. (See

appendix.) They are located as follows: Houston - 21; Dallas - 15; Austin - 3; San Antonio - 3. All other cities in Texas have 8.

As you would expect, Texas capital venture firms invest in other states. The Houston capital venturers invested only 40 percent in Texas-based firms. Austin capital venturers invested only 20 percent in Texas-based firms. And San Antonio venturers invested 50 percent in Texas-based firms.

In what technologies are Texas capital venturers investing? We have looked at 61 ventures and noted the following: oil and gas - 14; computer-related -10; and telecommunications - 9. These three areas have over 50 percent of the investments. Robotics and medical firms are notable for their small numbers. When you think of 600 firms in robotics in the U.S. now with most in California, Massachusetts and Michigan, it is easy to identify Texas as lagging in this field. Medically-related firm start-ups in Texas are small and completely overshadowed by start-ups in California. Consequently, while we have a growing venture capital base in Texas, we still need to do more to build this industry here.

The average size of Texas capital ventures including partnerships, SBICs, and banks is at best small. The majority have between $1 and $5 million for such investments. Only a few can claim between $5 and $20 million of capital. When we consider that $1.5 - $2.5 million of capital is required for each "hi-tech" start-up we really aren't in the business of doing much private technical venturing in Texas.

Building the capital venturing industry is essential if we are to expand the numbers of entrepreneurs in Texas, increase the number of jobs and diversify our economy. We must realize, however, that this is not easy to do. Capital venture professionals in the U.S. totaled less than 1,050 persons at the end of 1982. Over 53 percent has less than five years of experience; 21 percent had none. There are few if any institutions where capital venturing is taught. In truth, it's not currently a teachable profession--one has to get experience on the job.

Texans with experience may need to redirect their professional futures from expanding technically-based companies to establishing capital venturing operations that provide the necessary funds, technical expertise, financial and marketing know-how to new entrepreneurs who want to start and build robust companies.

State Commercialization Program

Most capital ventures in the 1970s and 1980s did not provide seed capital, namely money to start companies. They usually invested after the companies were started, e.g., 4 years or so. For these and other reasons it is important for Texas to consider the establishment of a state commercialization program. Such a program could help to take advantage of the natural, human and technological resources available within the state, to expand entrepreneurial activity, and to create a new type of technological wealth through a coordinated effort between the public and private sectors, in the creation of joint partnerships

and ventures. This program could specifically help Texas gain its full economic and technological potential through the commercialization of technology. It could help stimulate local economies and increase the creation of new jobs. It could also maintain a diversity of efforts from basic and service industries to high technology industries.

A state commercialization program would include the appropriate liaison and feedback to the federal government agencies involved in the technology creation and diffusion process. The state could enhance rapid dissemination of the available technology within the state derived from public and/or private sector sources.

State-level, technology task forces would also be organized. They would be composed of private professionals from within and outside of the state as required. The state task forces would review and target R & D technologies within the state for commercialization and for the creation of products and services for U.S. domestic and international trade.

Our state legislature could provide, through the means and sources available at its disposal, seed monies as state public equity investment in private/public technology ventures. These would be true investments credited as equity in specific enterprises and not grants or give-aways. The use of tax relief or other economic development enticements would still be available to the state to encourage development.[6]

Factors Transforming American Society

Let us now examine the current state of the economy, the newer ideology and the resources that will drive our society for the next five or ten years.

Current Economic Situation. The 1983 economic situation as characterized in the first half of the year was one of dramatic upturn. The third quarter outlook is more perplexing. Some view expansion for years to come; others see another slump. Let us review some of the critical measures of the economy.

Where most economists expected a GNP growth of 2 to 3 percent in 1983, we are currently at 6 percent. Where we expected productivity growth of 3 to 4 percent for the year, we are above 8 percent. Where we expected inflation at 5 to 6 percent, we are 2 to 3 percent. Where we expected unemployment at 10.5 percent, it is below 9.5 percent.

Some of the factors that will sustain the economy in the short run are all consumer demand driven. Among them are the following key factors:

1. Three successive federal cuts have reduced the personal tax bite meaningfully.

2. Inflation is no longer sapping away much buying power, nor dampening confidence.

3. Credit is plentiful and the cost of borrowing a lot less than it was a year ago.

4. Large numbers of automobiles and other kinds of durables must be replaced shortly.

5. Vacancy rates are quite low for most housing units, and occupied homes are selling well.

6. The 18-to-25-year-olds of the 1970s are turning 25 to 35 years old, the big consuming ages.

7. Whole new types of products (e.g., personal computers, videogames, VTRs) are stimulating spending.

8. Inventories of most goods are so low relative to sales that production schedules will remain strong. This will necessitate further hiring, and will stiffen wage rates.

As a result of these developments and others, capital for entrepreneurship has never been in a better situation. Since 1980, we have invested over $8 billion to start new entities. This is quite a step forward compared to the 1970s when less than a half-billion dollars was invested annually. In fact, in 1983 alone, $2.5 billion has been invested.

Ideology. The 1980s and 1990s can and will become periods for larger scale entrepreneurial growth than the 1950s, 60s, and 70s. This time there will be more minorities and women participation in transforming America's economy through entrepreneurship. This requires risk taking by either starting companies or moving up in larger companies through risk taking leadership--what is now generally called intrapreneurship.[7]

Minorities and women have each rightfully become separate and distinct influential power groups. Admittedly there are more steps to be taken before true equality of opportunity is achieved. The next steps are for the minorities and women who make up the power groups to utilize their entrepreneurial abilities to broaden the opportunities for others. In this context, all entrepreneurial leaders of the 1980s must assume the burden of being responsible for their actions and accountable for their decisions. As entrepreneurs, we must share the rewards as well as the risks involved in transforming our state and nation through increased productivity.

Resources (Mid-term Drivers). "Push and pull drivers" of the 1970s did little to stablize our economy or coalesce our entrepreneurial strengths. The externalities of the 1970s created demands that reduced capital for new industries and limited productivity investments for basic industries. Too much was invested in unproductive programs that did not add to our nations's wealth resources. In fact, the diversion of resources resulted in worn-out basic industries, a dramatic decline in productivity, and the reduction of entrepreneurial opportunities.

There is plenty of evidence today that both the private and public sectors of our society are in the process of making productive investments that will increase our nation's productivity, strengthen our international competitive position, and provide meaningful futures for all Americans. Let us now turn to why the next five years will provide us with more sustainable five- to ten-year opportunities that can transform Texas and the nation.

One of the more obvious mid-term signs of emerging opportunities are the changes being made in high technology industries. The most visible signs we have are to be found in a new burst of activity initiated by state governments. They have started over 150 programs to promote high technology at a time when the Federal government is groping for a policy to help the U.S. regain its dominant position for high technology. These programs help to finance in various ways high technology companies as well as provide for newer ways of sharing the technology as a major source of new jobs and economic growth. The state programs include:

-- Redoing their higher educational programs by adding schools of science, mathematics and engineering.

-- Requiring university researchers to work more closely with private industry.

-- Establishing research parks to stimulate development of businesses using advanced technology.

-- Investing in private companies to develop innovative technology where no other seed money is available.

-- Establishing facilities for small businesses to conduct research, test inventions, and manufacture prototypes.

-- Providing training for workers for jobs in microelectronics, robotics, and biotechnology.

-- Developing programs and restructuring current agencies to promote small business growth and entrepreneurial activity.

-- Encouraging the starting of as well as investing in new high technologyventures and advanced research centers in conjunction with major companies that form the industry.

All of these efforts bode well for increased productivity and entrepreneurship. Equally important is the fact that local governments, school boards and other community groups are working together to reduce technology illiteracy.

All the state and local efforts clearly show that they will continue for some time. They are "productive programs" that add to the wealth resources of our states and nation. Such productive investments can justify budget deficits. These are not just expenditures; they are necessary investments for securing growth and ensuring entrepreneurship.

Federal Government. For too long federal expenditures were not viewed as investments. For example, during the next three years over $110 billion of federal DOD budget will be spent for R & D test and evaluation outlays. These will be more than 60 percent of all U.S. R & D expenditures. They will provide the necessary investments for newer technology. They can be a major contributor to a stronger and more balanced economy in the development of national and state policies as well as private sector strategies that nurture the emerging technologies for new industries while renewing the older basic industries in an international competitive market.[8]

If the emerging DOD investments in R & D are extended to other states than those used in the 1960s, then the base of R & D producers will expand the range of commercialization of technology. In addition, it will help overcome regional economic inequities resulting from technological growth as well as broaden the base of technology entrepreneurship.[9]

Private Sector. The basic industries' economy and productivity are undergoing fundamental changes.[10] How well they readapt could hold the key to the resurgence of American competitiveness. We already see that the automobile industry has turned the corner. They have managed to change their strategy from "planned design obsolescence" to meeting foreign competition and satisfying domestic and consumer demand for higher quality and durability.

As a nation, we are beginning to adapt to an economic environment characterized by more expensive and less abundant resources, an

emphasis on efficiency and savings over borrowing, and a stress on quality over quantity. All this reflects the resurgence of the entrepreneurial spirit in the U.S. which in turn is having a direct and positive impact on productivity.

Conclusion

Entrepreneurs themselves are in the minority in the United States. But creative and innovative management in both the public and private sectors and at both the state and national levels is focusing on the essence of what it takes to transform American society.[11] Three ideas are emerging loud and clear from this transformation process:

1. Opportunity has not diminished. Entrepreneurs are individuals who have the most flexibility to take advantage of these opportunities in a way that reshapes American values and increases American productivity at the same time.

2. Enterprise and risk taking encompass the right to fail as well as the right to succeed. Failure is not an end; it is a learning experience essential for ultimate success.

3. Entrepreneurship and risk taking are the very heart of the American private enterprise system. They must and will supplant those traditional professional management practices that are no longer adequate in a global economy.

Entrepreneurs are diverse, opportunistic, creative and innovative leaders. Their attributes include persistence, an ability to learn from mistakes, a talent to simplify, a willingness to take calculated risks, a capacity to keep abreast and ahead, personal dedication, and an overwhelming desire not just to make money but to better all things for all people with whom they associate.

Entrepreneurship will solve our productivity problems. Entrepreneurship will transform American society. Entrepreneurship will restore the pride of being an American.

NOTES

[1] Texas 2000 Commission, Report and Recommendations, March, 1982, p. 6. For an assessment of the growth industries in Texas, see Thomas R. Plant, "A Supply-Side Model of Texas Manufacturing Growth," Bureau of Business Research, The University of Texas at Austin, October, 1982.

[2] Eugene B. Konecci and George Kozmetsky, Commercial Applications of Defense R & D: Data Book, The Institute for Constructive Capitalism (IC^2), The University of Texas at Austin, March, 1983.

[3] Ibid.

[4] Ibid.

[5] Robert L. Kuhn, Commercializing Defense-Related Technology, forthcoming from Praeger Publishing Company.

[6] Eugene B. Konecci, "Private/Public Ventures: State Technology Commercialization Program," IC^2, August, 1983.

[7] Raymond W. Smilor and Robert L. Kuhn, Breaking the Mold: Robust Companies and the Entrepreneurial Spirit, forthcoming from Praeger Publishing Company.

[8] Raymond W. Smilor, editor, "Initiatives for Accelerating the Technology Diffusion Process," IC^2, April, 1983.

[9] George Kozmetsky, "The Transformation of Technological Resources to Economic Wealth," IC^2, March, 1983.

[10] George Kozmetsky, "Impact of the National Economic Initiatives on Steel and Other Basic Industries," IC^2, February, 1983.

[11] A. Charnes and W. W. Cooper, Creative and Innovative Management, forthcoming by Ballinger Publishing Company.

APPENDIX 1

TEXAS CAPITAL VENTURE INSTITUTIONS:

BY CITIES, AREA OF INVESMENT AND INVESTMENT BY STATES

Note on sources for Appendices 1 and 2: This information was drawn and synthesized from selected Venture Capital Journal issues over the period January, 1982 through June, 1983.

VENTURE INVESTMENT INSTITUTIONS

DALLAS

	Computer Related	Robotics	Medical	Telecommunications	Manufacturing	Oil & Gas Related	Semi-Conductor	Broadcasting	Food Service	Other
Capital Venture Partnerships										
1) Capital Southwest $ 37.2 million				X	X	X				X
2) MSI Capital Capitalization Unknown				X	X					X
3) Sunwestern Investment $ 9.0 million	X			X		X				
SBICs										
4) Brittany Capital $ 0.5 million					X	X		X	X	
5) Commerce Southwest Capital* $ 1.0 million						X				
6) Interfirst Venture* $ 12.5 million	X		X			X		X	X	X
7) MESBIC of Dallas $ 2.0 million	X					X			X	
8) Republic Venture Group* $ 8.3 million	X		X	X		X				
TOTAL CAPITALIZATION $100.2 million										

*Denotes a bank subsidiary

VENTURE INVESTMENT INSTITUTIONS

INVESTMENT BY STATE

HOUSTON

SBICs \ Area Of Investment CAPITAL	Computer Related	Robotics	Medical	Telecom-munications	Manufacturing	Oil & Gas Related	Semi-Conductor	Broadcasting	Food Service	Other
1) Allied Bancshares Capital* $ 11.7 million		X	X	X						X
2) American Energy Investment $ 2.5 million						X				
3) Bow Lane Capital $ 2.5 million	X			X	X	X				
4) Charter Venture Group* $ 3.0 million		X								
5) Energy Capital $ 12.0 million						X				
6) Evergreen Capital $ 2.0 million					X			X	X	X
7) Red River Ventures Capitalization Unknown						X				
8) SBI Capital $ 1.0 million	X					X				
9) Texas Capital $ 17.0 million	X		X		X	X				
10) Texas Commerce* $ 5.1 million	X	X								
TOTAL CAPITALIZATION $ 78.5 million										

*Denotes a bank subsidiary.

VENTURE INVESTMENT INSTITUTIONS

SAN ANTONIO

	Computer Related	Robotics	Medical	Telecommunications	Manufacturing	Oil & Gas Related	Semi-Conductor	Broadcasting	Food Service	Other
Capital Venture Partnerships										
Hixon/Southwest Venture Partners $20.0 million	X		X	X						
SBICs										
Cameron Financial $ 0.5 million										
San Antonio Venture Group $ 1.0 million										
TOTAL CAPITALIZATION $ 21.5 million										

VENTURE INVESTMENT INSTITUTIONS

AUSTIN

	Computer Related	Robotics	Medical	Telecom-munications	Manufacturing	Oil & Gas Related	Semi-Conductor	Broadcasting	Food Service	Other
Capital Venture Partnerships										
Business Development Partners $ 2.6 million	X			X						
SBICs										
FSA Capital $ 1.95 million				X		X				
Rust Capital $ 7.0 million			X		X			X		
TOTAL CAPITALIZATION $ 11.55 million										

VENTURE INVESTMENT INSTITUTIONS

INVESTMENT BY STATE

HOUSTON

SBICs \ Area Of Investment CAPITAL	AL	AK	AR	CA	CO	FL	GA	IL	KS	MA	MS	NY	NC	OH	OK	TN	TX	UT	VA	DC
1) Allied Bancshares Capital* $ 11.7 million																	X			
2) American Energy Investment $ 2.5 million															X		X			
3) Bow Lane Capital $ 2.5 million				X								X				X	X			
4) Charter Venture Group* $ 3.0 million																	X			
5) Energy Capital $ 12.0 million																	X			
6) Evergreen Capital $ 2.0 million						X		X		X							X			X
7) Red River Ventures Capitalization Unknown																	X			
8) SBI Capital $ 1.0 million				X										X	X		X			
9) Texas Capital $ 17.0 million	X			X	X												X		X	
10) Texas Commerce* $ 5.1 million																	X			
TOTAL CAPITALIZATION $ 78.5 million																				

*Denotes a bank subsidiary.

ADDITIONAL VENTURE INVESTMENT INSTITUTIONS
SBICs

DALLAS

Capital Marketing Corp.
$ 7.8 million

CSC Capital Corp.
$ 3.0 million

Dallas Business Capital
$ 6.3 million

Diman Financial Corp.
$ 0.5 million

Mercantile Dallas
$11.5 million

Trammell Crow
$ 0.5 million

West Texas Central Capital
$ 0.1 million

HOUSTON

Aspen Financial
$ 0.5 million

Energy Assets, Inc.
$ 0.5 million

Enterprise Capital
$ 11.3 million

First Business Investment
$ 0.5 million

Grocers SBI Corp.
$ 0.5 million

Livingston Capital
$ 1.0 million

Mapleleaf Capital
$ 3.3 million

Rainbow Capital
$ 0.5 million

Retail Capital
$ 0.8 million

Rice Investment Co.
$ 1.3 million

Zenith Capital
$ 0.5 million

OTHER

Central Texas SBI
Waco $0.3 million

First Bancorp Capital*
Corsicana $0.5 million

First Capital Corp.
Fort Worth $1.0 million

Great American Capital
Wichita Falls $0.5 million

Permian Basin Capital
Midland $0.5 million

Race County Capital
Eagle Lake $0.4 million

South Texas SBIC
Victoria $0.4 million

Southwestern Venture Corp.
Seguin $1.0 million

*Denotes a bank subsidiary.

VENTURE INVESTMENT INSTITUTIONS

INVESTMENT BY STATE

DALLAS

	AL	AK	AR	CA	CO	FL	GA	IL	KS	MA	MS	NY	NC	OH	OK	TN	TX	UT	VA	DC
Capital Venture Partnerships																				
1) Capital Southwest $ 37.2 million																	X			
2) MSI Capital Capitalization Unknown																	X			
3) Sunwestern Investment $ 9.0 million		X		X													X			
SBICs																				
4) Brittany Capital $ 0.5 million											X						X			
5) Commerce Southwest Capital* $ 1.0 million																	X			
6) Interfirst Venture* $ 12.5 million							X			X					X		X	X	X	
7) MESBIC of Dallas $ 2.0 million																	X			
8) Republic Venture Group* $ 8.3 million	X			X	X										X		X			
TOTAL CAPITALIZATION $100.2 million																				

*Denotes a bank subsidiary.

VENTURE INVESTMENT INSTITUTIONS

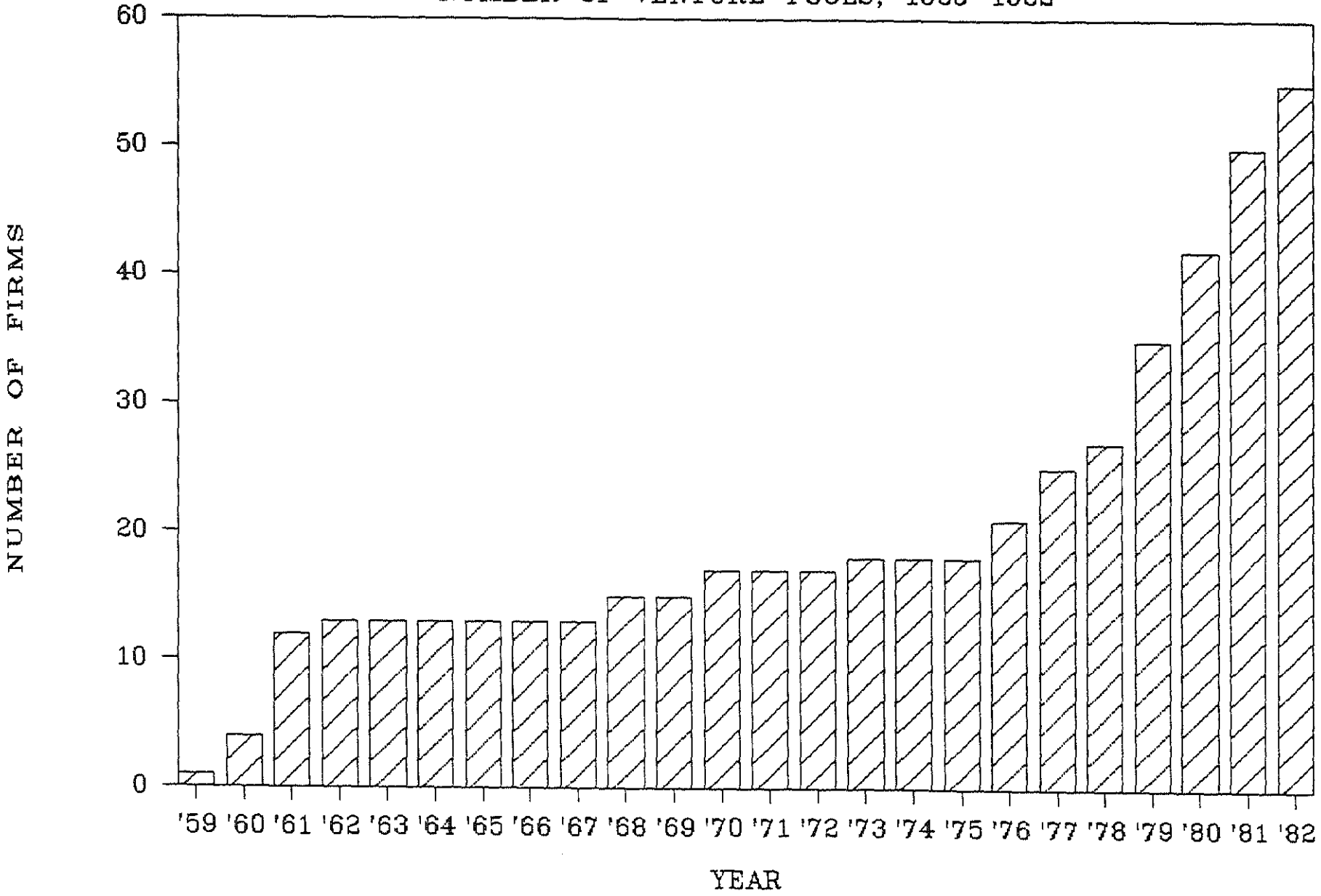
INVESTMENT BY STATE

AUSTIN

	AL	AK	AR	CA	CO	FL	GA	IL	KS	MA	MS	NY	NC	OH	OK	TN	TX	UT	VA	DC
Capital Venture Partnerships																				
Business Development Partners $ 2.6 million									X				X					X		
SBICs																				
FSA Capital $ 1.95 million																	X			
Rust Capital $ 7.0 million			X	X						X		X		X			X			
TOTAL CAPITALIZATION $ 11.55 million																				

CAPITAL VENTURE IN TEXAS

NUMBER OF VENTURE POOLS, 1959–1982



VENTURE INVESTMENT INSTITUTIONS

INVESTMENT BY STATE

SAN ANTONIO

	AL	AK	AR	CA	CO	FL	GA	IL	KS	MA	MS	NY	NC	OH	OK	TN	TX	UT	VA	DC
Capital Venture Partnerships																				
Hixon/Southwest Venture Partners $20.0 million										X							X			
SBICs																				
Cameron Financial $ 0.5 million																				
San Antonio Venture Group $ 1.0 million																				
TOTAL CAPITALIZATION $ 21.5 million																				

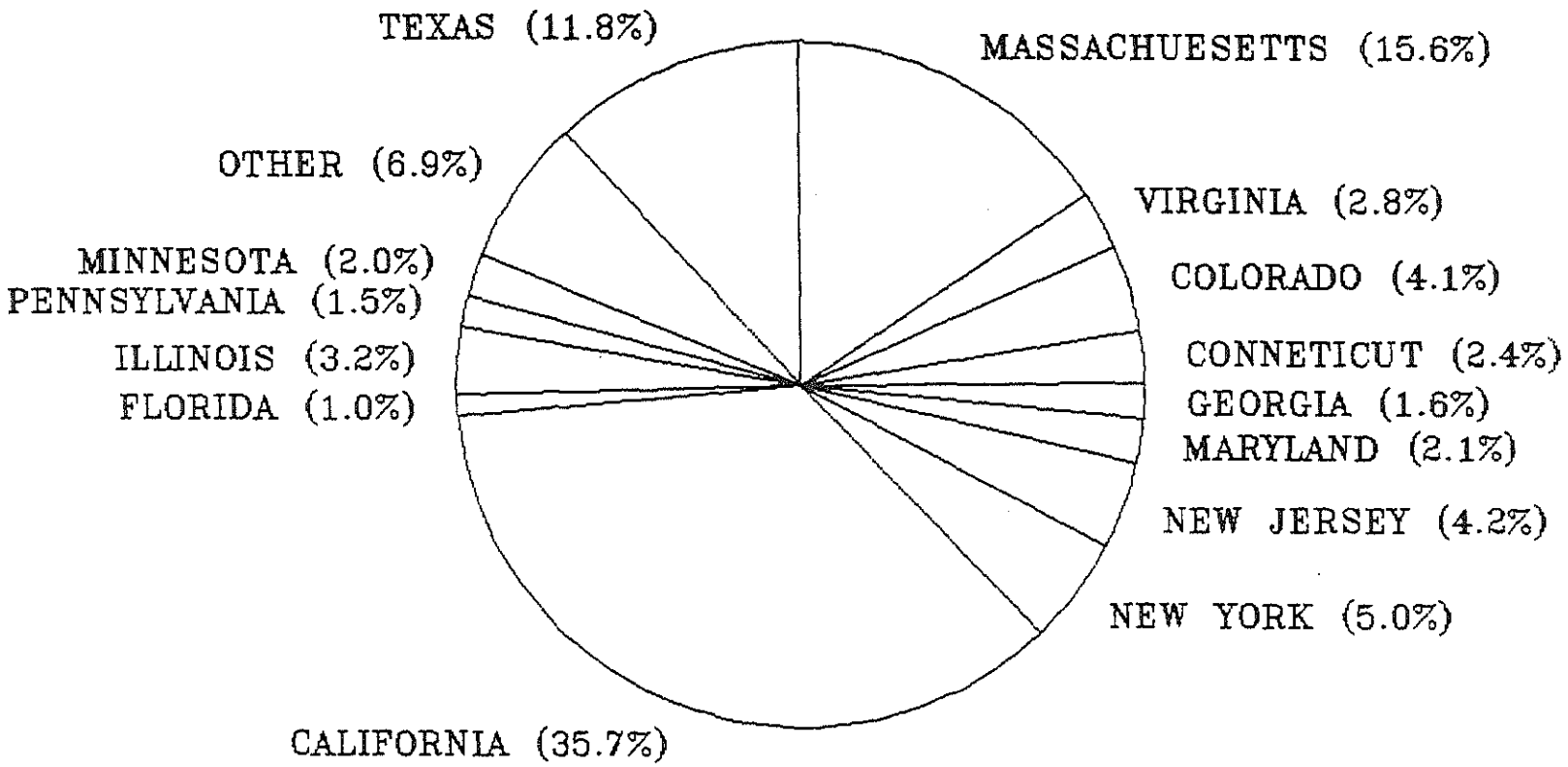
APPENDIX 2

U.S. VENTURE CAPITAL:

DISTRIBUTION AND DISBURSEMENTS

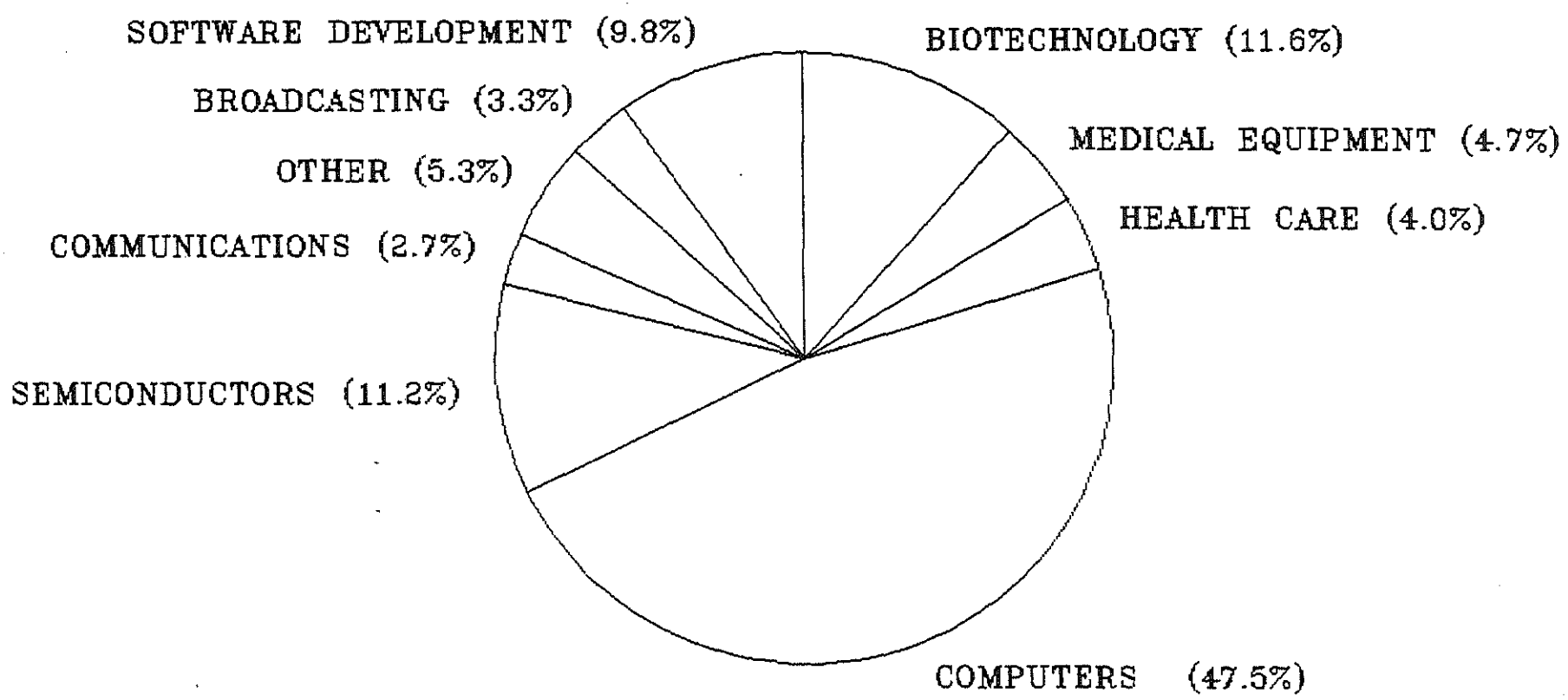
U. S. VENTURE CAPITAL DISBURSEMENTS

DISTRIBUTION BY STATE, 1981–1982



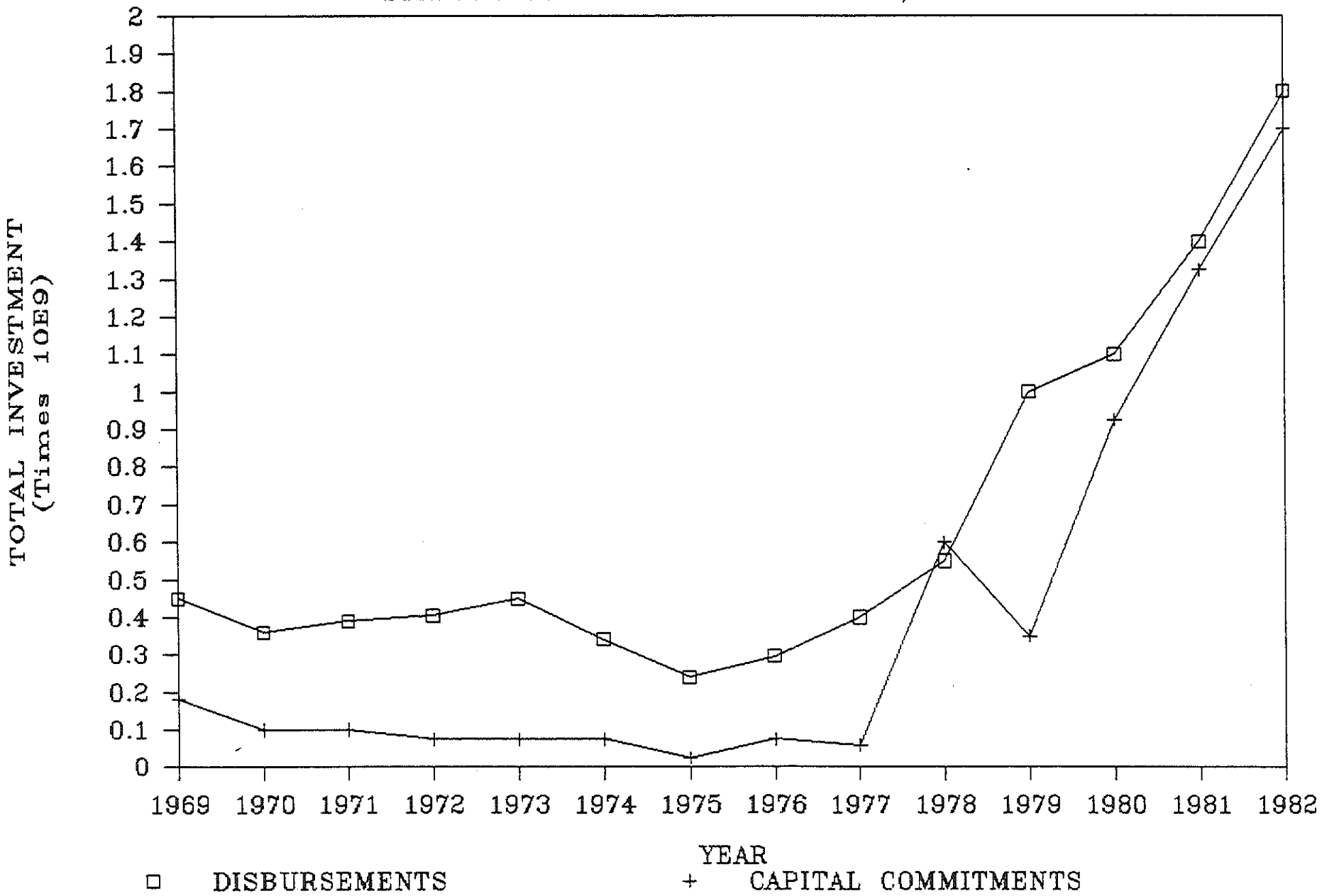
VENTURE-BACKED INITIAL PUBLIC OFFERING

DOLLAR DISTRIBUTION, BY TECHNOLOGY



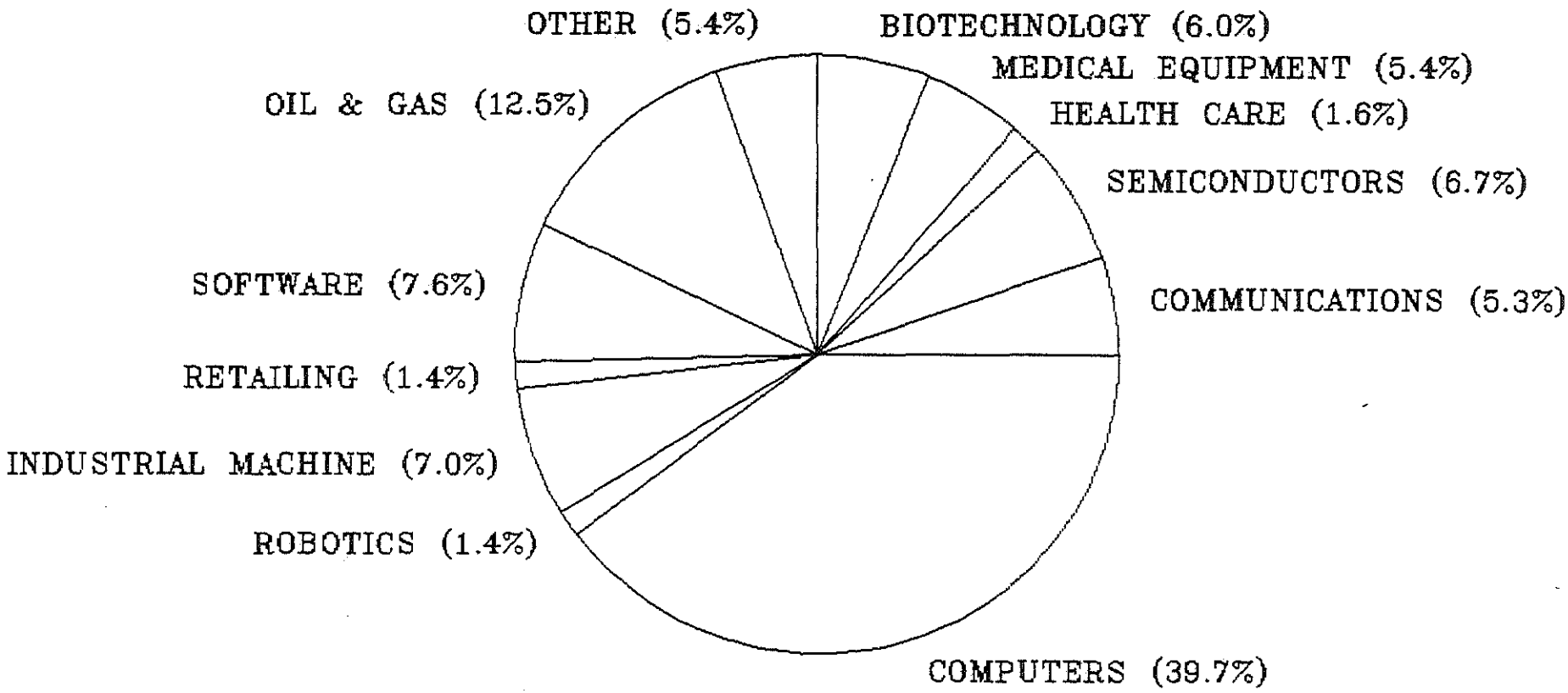
VENTURE CAPITAL

DISBURSMENTS AND COMMITMENTS, 1969–1982



U.S. VENTURE CAPITAL DISTRIBUTION

EARLY STAGE FINANCING, 1981–1982



APPENDIX 3

TEXAS CAPITAL VENTURE COMPANIES

SELECTED SBIC'S
and
VENTURE CAPITAL COMPANIES

1. Allied Bancshare Capital Corporation

SBIC since 1979
Wholly owned subsidiary of Allied Bancshares
Located in Houston
Manages $11.7 million dollars

Investments:

Robotics--Automated Robotic Systems Inc., Arlington, Texas
-leveraged buyout
-$1.6 million, participation

Medical--Nautilus Environmentals, Inc., Houston, Texas
-sole capital venture investor, investment unknown

Communications--Quest Microwave, Dallas, Texas
-sole capital venture investor, investment unknown
-has provided 2 stages of financing

Transportation--Railtex, Inc, San Antonio, Texas
-sole capital venture investor, investment unknown

2. American Energy Investment, Inc.

SBIC
Licensed 1981
Privately held
Located in Houston
$2.5 million, ability to leverage it 3 to 1 with the SBA
Is a primary secured lender with characteristics similar to a commercial bank--takes equity positions convertible to debt
Overseas connections
Investments: all in oil and gas industry

Oil and Gas

High Plains Exploration, Midland, Texas
-lead investor
-$4 million capital venture financing, 2 million bank financing
-$6 million total

National Tubular Systems, Tulsa, Oklahoma
-participated in $4 million financing

Sere Corporation, Houston, Texas
-oil and gas exploration
-lead financier, $600,000

Soltex Oil and Gas, Dallas, Texas
-participated in $8 million second-stage financing

3. Bow Lane Capital Corporation

SBIC
Licensed 1980
Located in Houston
$2.5 million private capital, 1 million in SBA leverage
Investment plan:
--early stage financing
--expansion financing
--leveraged buyouts

Investments:

Oil Patch Communications--Drilling Information Service Corporation, Houston, Texas
-sole institutional investor
-early stage financing, investment unknown

Semiconductors--Morgan Semiconductor, Garland, Texas
-Gallium arsenide semiconductors
-leveraged buyout and expansion financing
-lead investor, $475,000 financing

--California Microdevices, Sunnyvale, California

Communications--Dalsat, Inc, Plano, Texas
-earth station manufacturer, investment unknown

--Venus Scientific, Inc.
-TV cameras and power supplies, investment unknown

Computer Systems--Numeric Micro Corporation, Dallas, Texas
-computer systems for machine tool users, investment unknown

Wheel Axles--Village Company, Fort Worth, Texas, investment unknown

Christmas Ornaments--Decon Noel, Memphis, Tennessee, investment unknown

4. Brittany Capital Corporation

SBIC
Privately financed $500,000 capitalization
Formed in 1969
Located in Dallas
Investments strategy: Oil and Gas, real estate, light industrial distributing

Oil Field Services--Diagnostic Services, Dallas, Texas
-technological approach to solving oil field

problems
-Brittany originated start-up financing, amount unknown

--Global High Energy, Inc., Arlington, Texas
-explosives for oil field
-participated in early stage financing of $500,000

Cable TV--Lamar Cable Partners, Jackson, Mississippi
-investment unknown

Restaurant--Chili's, Dallas, Texas
-planning an IPO
-investment unknown

Miscellaneous--Precept, Inc., Dallas, Texas
-investment originated and later sold to G. D. Searle
-investment unknown
-manufacturing

5. Business Development Partners

Capital venture partnership, private
Formed by Brentwood Associates, Hambrecht & Quist, Northwest Growth Fund and Rothschild, Inc.
Formed early 1981
$2.6 million
Located in Austin
Focuses on early stage technology related companies

Computers--Compupsych, Kansas City, Kansas
-computerized testing, software for psychologists
-sole institutional investor
-early stage financing
-investment unknown

--Micro Perepherals, Salt Lake City, Utah
-dot matrix printers
-early investor, later participated in a $1.1 million financing

Communications--Telamco, Corporation, Charlotte, North Carolina
-alternate long distance telephone company
-participated in starting financing of $1.2 million

Additionally,

Computer instructional video tapes--seed financing, amount unknown
Cable network computer show--seed financing, investment unknown

6. Capital Southwest Corporation

Publically held venture capital
Formed 1961
Has SBIC subsidiary
Located in Dallas
$34.5 million net asset value, has declined since 1977 high of $37.2

Oil and Gas Portfolio--Rectoseal Corporation
-lubricants

--Alamo Group
-steel castings

--Gulf Energy and Development
-investments unknown

--Hercules Offshore Drilling Company
-workover services

Communications--International Signal and Control

--U.S. Telephone, Dallas, Texas
-long distance carrier
-has invested $612,000 in a $8.2 million financing

Manufactured Housing--Palm Harbor Homes, Inc
-investment unknown

Printing--Pandick Press
-investment unknown

7. Charter Venture Group, Inc.

SBIC
Charter Bankshares, Inc. subsidary
Located in Houston
Licensed 1980
$3 million potential for investments
Texas investments preferred, contiguous states accepted

Robotics--Automated Robotic Systems, Inc., Arlington, Texas
-participated in leveraged buyout $1.6 million

8. Commerce Southwest Capital

SBIC
BancTexas Dallas subsidary
Licensed 1981
$1 million private capital
Wants second stage financings or bridge financings--prefers Dallas area
$100,000 to $150,000 investment range

Oil and Gas--Endevco, Inc., Dallas, Texas
-natural gas processing, investment unknown

--American Well Servicing, Dallas, Texas
-investment unknown

9. Curtin and Company, Inc./Red River Ventures, Inc.

SBIC
Located in Houston
Licensed 1974
Private capitalization, $751,000 private capital, $1,800,000 SBA leverage
Invest preference in energy, high tech and heavy manufacturing
Subsidiary of an investment bank (Curtin & Co.)

Oil and Gas Related--Modrill, Inc.
-Red River provided $150,000 start-up financing, other participated
-workover rigs

--Superior Hydraulics, Inc.
-provided $100,000 of $500,000 financing
-oil field equipment

10. Energy Capital Corporation

SBIC
Institutional capital of $12 million
Located in Houston
Licensed 1981
Energy related businesses
Commitments: $5.2 million unsecured loans
$1.0 million common and preferred stock
$3.5 millin unadvanced commitments
Does not provide risk drilling money, but will lend for a longer period of time than a petroleum bank and expects an equity kicker in the form of royalty interests of one form or another
Specific investments unknown

11. Evergreen Capital

SBIC
Located in Houston
$2 million private capital, $10 million leveraged ability
Evergreen investors are also principals in Rust Investments
Licensed 1979

Broadcast Communications--American Cable Systems, Boston, Massachusetts
-$397,000 Evergreen investment in participation of second stage financing

--GRB Communications, Inc, Dallas, Texas
-$385,000 of $700,000 financing lead by Evergreen

--King's Bay Cable Vision, Inc., St. Mary's, Georgia
-$360,000 of $550,000 participation by Evergreen

Publishing--Airline Publishing Group, Washington, D.C.
-lead investor, provided half of a $500,000 financing

Utilities--Atlantic Utilities Corporation, Miami, Florida
-put up $267,500 of $749,000 of venture capital

Manufacturing--Heico, Inc., Chicago, Illinois
-provided $325,000 of a $5.8 million leveraged buyout

Food Service--TGIF, Texas, Dallas, Texas
-restaurants
-$275,000 of $725,000 financing participation

12. FSA Capital, Ltd.

SBIC
Affiliate of Financial Services of Austin, Inc.
Licensed May 1982
$1.95 million private financing
Located in Austin
Prefers energy, telecommunications and technology investments

Oil and Gas--DWS Energy, Charlotte, Texas
-well servicing
-expansion financing participation, $1.34 million

--Solids International, Houston, Texas
-cleaning of drilling fluids
-sole investor, $1.2 million financing

--Texas Gas Transport, Austin, Texas
-participated in $3.3 million financing

Communications--U.S. Telephone
-long distance resale common carrier
-$8.2 million financing

13. Hixon Venture Company/Southwest Venture Partners

Southwest Venture Partners--Capital Venture Firm
$20 million private financing
Located in San Antonio with offices in Dallas
Founded 1975

Start-up and early stage financing
Technology, medical, communications, energy related investments

Computer Related--Scott Systems, Inc., Southborough, Massachusetts
-airline reservation terminals and computers
-participated in $3.2 million financing, $800,000 from Southwest Venture Partners

--Ferix Corporation, Sunnyvale, California
-non-impact printing, $300,000 investment

--Electronics Systems Products, Inc., Titusville, Florida
-color video projectors, investment unknown, follow-on financing

Communications--VMX Inc., Richardson, Texas
-voice message retrieval, follow-on investment, investment unknown

--Commterm, Inc., Burlington, Massachusetts
-voice message storage and retrieval
-investment unknown

Medical--Bio Diagnostics, Inc., Arlington, Texas
-blood serum agents, follow-on investment, amount unknown

--Medical 21 Corporation, Dallas, Texas
-free standing surgical centers, follow-on investment, amount unknown

14. InterFirst Venture Corporation

SBIC
InterFirst Bank subsidiary
Located in Dallas
$12.5 million private capital plus $9.5 leveraged capital with the SBA
Licensed 1961

Investments:

Oil and Gas--Hrubetz Petroleum Corporation, Dallas, Texas
-IFVC sole venture investor, amount unknown

--Tescorp, Inc., San Antonio, Texas
-oil field service, unknown investment

--Titan Rig, Tulsa, Oklahoma
-unknown investment

Cable TV--American Cablesystems, Boston, Massachusetts
-unknown investment

--Prime Cable Corporation, Austin, Texas
-unknown investment

Medical--Surgicare Corporation, Houston, Texas
-participated in $4 million start-up financing
-outpatient surgery centers

Food Service--D'Lites of America, Norcross, Georgia
-$2 million participation

--European Bakers, Tucker, Georgia
-$1 million participation

Computers--Micro Peripherals, Salt Lake City, Utah
-$1.1 million participation

Other--Flight America, Lynchberg, Virginia
-charter air services

--TEI Fluid Power, Arlington, Texas
-sole venture investor
-$1 million acquisition, hydrolic components

15. MESBIC Financial Corporation of Dallas

MESBIC
Licensed 1970
$2 million private capitalization
Located in Dallas

Technology Related--Moreno Group, Richardson and Dallas, Texas
-printed circuit boards
-led $600,000 financing, obtained $1.25 million debt

Food Service--Ninfas Restaurants, Dallas, Texas
-investment unknown

Oil and Gas--Star/Adair Insulation, Odessa, Texas
-oil field service
-investment unknown

16. MSI Capital Corporation

Capital Venture
Located in Dallas
Founded 1976
Private capitalization, amount unknown

Communications--Near Space Communications, Dallas, Texas
-PBX equipment
-lead financing and start-up investment

-participated in financings of $500,000 and $2.25 million

Other--Able Enterprises, Ennis, Texas
-custom van windows
-provided funds for company's take over
-investment unknown

--Forms Systems, Inc.
-specialty business forms
-only institutional investor, provided seed financing
-investment unknown

17. Republic Venture Group

SBIC
Republic National Bank Subsidiary
Licensed 1961
$8.3 million capitalization
Investments in oil and gas production and servicing, specialized semiconductor manufacturing, computer processing equipment, wine production, agriculture and automotive supply
Located in Dallas

Oil and Gas--Maze Exploration, Inc., Denver, Colorado
-$1 million financing participant

--Titan Rig Corporation, Tulsa, Oklahoma
-follow-on financing, investment unknown

Semiconductors--International Microelectronics Products, San Jose, California
-MOS integrated circuits
-$5.6 million first stage participation

Medical--Care Medical Products, Inc., Huntsville, Alabama
-patient monitoring systems
-participated in $1 million financing

Communications--RF Monolithics, Inc., Dallas, Texas
-participated in second stage financing
-investment unknown

18. Rust Capital, Ltd.

SBIC, $7 million private capital, $2.8 million SBA leverage
Located in Austin
Rust Group manages Rust Capital
Formed February 1979

Broadcast Communication--Apple Broadcasting, Siloam Springs, Arkansas
-FM radio station
-participated in leveraged buyout of $500,000

--Chrysostom Corporation
-VHF TV station
-sole VC investor, expansion financing
-investment unknown

Manufacturing--CNR, Inc., Walden, New York
-$900,000 leveraged buyout participation
-outdoor furniture

--Rostra Holdings, Inc., Alliance, Ohio
-led a leveraged buyout of $600,000
-specialty aluminum equipment

--Rubo Enterprises, El Monte, California
-leveraged buyout without partners, $700,000
-paperboard mounts

Medical--H & M Laboratory Services, Boston, Massachusetts
-led a $2.6 million leveraged buyout
-dental laboratory business

Also: American Cable Systems, Boston, Massachusetts
TGIF Texas, Fort Worth, Texas, restaurants, follow-up financings, investment unknown

19. SBI Capital Corporation

SBIC
$1 million private capital
Licensed 1981
Located in Houston
Particular interests: Computers and Energy

Oil and Gas--Amicor, Inc., Tulsa, Oklahoma
-stand-by generators
-participated in a $3.5 million financing

--Fabricated Systems International, Katy, Texas
-seamless tubing
-participated in $15 million financing

--Sunnybrook Oil and Gas, Tyler, Texas
-$4 million second stage participation
-oil and gas exploration

Computer Related--Capro, Inc., Garden Grove, California
-participated in first stage financing of $3 million
-software company

20. Sunwestern Investment Fund

Capital Venture
$9 million, private, institutional

Formed 1981
Located in Dallas

Oil and Gas--Baker North Slope Wireline Service Company, Anchorage, Alaska
-participated in a $2.4 million start-up

Communications--Promet, Inc., Dallas, Texas
-radio paging service
-participated in a $2 million second stage financing

Semiconductors--Drexler Technology Corporation
-invested in this public company
-amount unknown

21. Texas Capital Corporation/Texas Capital Venture Investments Corporation

TCC is an SBIC, TCVIC an unregulated investments corporation
Founded 1959
Located in Houston
$17 million private capitalization
Prefers investments in high technology, energy and manufacturing

Medical--Care Medical Products, Inc., Huntsville, Alabama
-patient monitoring systems
-participated in $1 million expansion financing

--Stuart Riess Laboratories, Inc., Tarzana, California
-infusion pumps
-follow-up investment, amount unknown

Manufacturing--Catalitic Damper Corporation, Flint Hill, Virginia
-exhaust systems
-participated in start-up financing of $200,000

--Marlin Lewis, Inc., Dallas, Texas
-wood lattice manufacturer
-sole investor in $270,000 third stage financing

--Quail Plastics, Dallas, Texas
-PVC pipe
-leveraged buyout, sole institutional participation, amount $600,000

Oil and Gas--Venna Corporaiton, Houston, Texas
-invested in this public electric and power oil company, amount unknown

Semiconductors--Abek, Inc., Colorado Springs, Colorado
-follow-on investment in this lithography firm, amount unknown

22. Texas Commerce Investment Company

SBIC
Texas Commerce Bank subsidiary
Located in Houston
Licensed 1982
$5.1 million private capital

Computer Related--Sunrise Systems, Inc., Dallas, Texas
-leveraged buyout, sole investor, amount unknown
-brought to them by parent bank

Robotics--Automated Robotic Systems, Inc., Arlington, Texas
-participated in $1.6 million leveraged buyout

Additional SBIC's

Aspen Financial Corporation
SBIC
Houston, Texas
$505,000 private capital, no SBA leverage
Licensed 1981
--Specific investments not known

Cameron Financial Corporation
SBIC
San Antonio, Texas
$512,000 private capital, $300,000 SBA leverage
Licensed 1979
--Specific investments not known

Capital Marketing Corporation
SBIC
Dallas, Texas
$7,796,838 private capitalization, $23,390,000 SBA leverage
Licensed 1968
--Specific investments not known

Central Texas Small Business Investment Corporation
SBIC
Waco, Texas
$300,000 private capitalization, $212,500 in SBA leverage
Licensed 1962
--Specific investments not known

CSC Capital Corporation
SBIC
Dallas, Texas
$3,065,585 private capitalization, $6,000,000 SBA leverage
Licensed 1961
--Specific investments not known

Dallas Business Capital Corporation
SBIC
Dallas, Texas
$6,330,830 private capitalization, $1,900,000 SBA leverage
Licensed 1960
--Specific investments not known

Diman Financial Corporation
SBIC
Dallas, Texas
$444,000 private capitalization, $1,330,000 SBA leverage
Licensed 1976
--Specific investments not known

Energy Assets, Inc.
SBIC
Houston, Texas
$546,000 private capitalization, $500,000 SBA leverage
Licensed 1979
--Specific investments not known

Enterprise Capital Corporation
SBIC
Houston, Texas
$750,000 private capital, $2,924,853 SBA leverage
Licensed 1980
--Specific investments not known

First Bancorp Capital
SBIC
Corsicana, Texas
$505,000 private capital
Licensed 1977
--Specific investments not known

First Business Investment
SBIC
Houston, Texas
$542,000 private capitalization, $789,166 SBA leverage
Licensed 1960
--Specific investments not known

First Capital Corporation
SBIC
Fort Worth, Texas
$1,000,310 private capitalization
Licensed 1960
--Specific investments not known

Great American Capital Investors
SBIC
Wichita Falls, Texas
$510,000 private capitalization,
$500,000 SBA leverage
Licensed 1978
--Specific investments not known

Grocers SBI Corporation
SBIC
Houston, Texas
$1,000,000 private capitalization,
$2,000,000 SBA leverage
Licensed 1977
--Specific investments not known

Livingston Capital Ltd.
SBIC
Houston, Texas
$1,000,000 private capitalization,
$950,000 SBA leverage
Licensed 1980
--Specific investments not known

Mapleleaf Capital Corporation
SBIC
Houston, Texas
$3,331,625 private capitalization,
$2,000,000 SBA leverage
Licensed 1980
--Specific investments not known

Mercantile Dallas Corporation
SBIC
Dallas, Texas
$11,500,000 private capitalization,
$28,000,000 SBA leverage
Licensed 1976
--Specific investments not known

Permian Basin Capital Corporation
SBIC
Midland, Texas
$500,000 private capitalization, no
SBA leverage
Licensed 1973
--Specific investments not known

Rainbow Capital Corporation
SBIC
Houston, Texas
$500,000 private capitalization, no
SBA leverage
Licensed 1981
--Specific investments not known

Retail Capital Corporation
SBIC
Houston, Texas
$510,000 private capitalization,
$1,000,000 SBA leverage
--Specific investments not known

Rice Country Capital
SBIC
Eagle Lake, Texas
$405,000 private capitalization, no
SBA leverage
Licensed 1978
--Specific investments not known

Rice Investment Company
SBIC
Houston, Texas
$1,320,001 private capitalization,
$3,815,500 SBA leverage
Licensed 1961
--Retail grocers is the primary
investment area

San Antonio Venture Group
SBIC
San Antonio
$1,050,000 private capitalization,
no SBA leverage
Licensed 1978
--Specific investments not known

SouthTexas SBIC
SBIC
Victoria, Texas
$400,000 private capitalization, no
SBA leverage
Licensed 1961
--Specific investments not known

Southwestern Venture Capital of Texas, Inc.
SBIC
Seguin, Texas
$1,001,000 private capitalization, no SBA leverage
Licensed 1980
--specific investments not known

Trammell Crow Investment Company
SBIC
Dallas, Texas
$529,000 private capitalization, $150,000 SBA leverage
Licensed 1961
--All investments in real estate

TSM Corporation
SBIC
El Paso, Texas
$499,847 private capitalization, $1,150,000 SBA leverage
Licensed 1976
--Specific investments not known

West Central Capital
SBIC
Dallas, Texas
$152,853 private capitalization, $75,000 SBA leverage
Licensed 1962
--Specific investments not known

Zenith Capital Corporation
SBIC
Houston, Texas
$505,000 private capitalization, no SBA leverage
Licensed 1980
--Specific investments not known