

The Finance and Growth Nexus

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It is difficult to overemphasize the potential benefits of economic growth for improving human welfare. For example, Bangladesh, India, and Pakistan, three of the world's lowest income nations, had real per capita GDP of \$1908, \$1633, and \$1793, respectively, in 1992. In contrast, the equivalent values for three of the world's highest income nations, Denmark, Sweden, and the United States, were \$18,730, \$18,387, and \$23,220, respectively.¹ So average per capita income in these nations was more than 11 times

that in the poorer nations. Consequently, people living in these nations could afford a dramatically higher quality of life involving, for example, the consumption of vastly superior medical care and education. Unfortunately, if income growth in the poor nations continues at its average rate of about 2.84 percent per year—its pace over the

¹The measures of real per capita GDP reported here are taken from the Penn World Tables, which measure output across nations using a common set of international prices to value goods and services. The data are available online at <http://pwt.econ.upenn.edu>. For additional information, see the 1991 paper by Robert Summers and Alan Heston.

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33 years from 1959 to 1992—these nations would not attain the average current income of the higher income group until the year 2079. If they could grow twice as fast, they would reach the current per capita income level of the richer nations in half the time.²

Economic growth is driven, in part, by firms' investments in physical plant and equipment and the research and development of new technologies. Often, investment projects are too costly for firms to finance solely with their retained earnings; in such cases, projects must be financed using the available savings of households. Differences in the information available to households relative to that available to firms and costs of transactions impede the flow of savings into investment. Information costs arise, for example, when households attempt to distinguish between investment opportunities offered by firms in order to isolate the most worthwhile projects. A firm incurs a transaction cost, for example, when its managers expend effort locating potential investors.

Financial markets and intermediaries—the financial system—can raise a household's return on investment and, thus, perhaps the total quantity of investment supplied by reducing the costs associated with lending to firms. The *extent* of the financial system describes the proportion of firms and households able to easily access the services provided by financial markets and intermediaries. The *efficiency* of the financial system refers to how effective these markets and intermediaries are in reducing information and transaction costs for their customers. Economists

refer to improvements in the extent or efficiency of the financial system as financial development. (See *The Extent of Financial Development*.)

CONTROVERSY OVER THE IMPORTANCE OF FINANCIAL DEVELOPMENT FOR ECONOMIC GROWTH

Walter Bagehot's book provides an early discussion of financial development, emphasizing its importance for economic growth. In his study *Lombard Street: A Description of the Money Market*, originally published in 1873, Bagehot argues that the distinguishing characteristic of English financial markets was the relative ease with which they were able to mobilize savings to finance a variety of long-term, illiquid investment opportunities. This easy entrepreneurial access to external finance was critical in facilitating the implementation of new technologies in England.

This early notion that financial development may play a critical role in economic growth has not been uniformly accepted. Indeed, there has been considerable debate on the direction of causation: does economic growth lead to more highly developed financial systems, or does financial development lead to greater economic growth? Adherents to the first view argue that financial markets and institutions appear when needed: when economies grow, business demand for financial services increases and the financial sector expands in response.³ An alternative view is that financial development is not only a result but also an important determinant of economic development. Researchers holding this view accept that the financial sector responds to the increased demand for financial services that occurs as an economy develops. However, they stress that there may also be independent changes in the level of financial development—for example, in response to changes in government policies—and that such changes may spur further economic growth. In particular, they ar-

²Of course, the rich group is also growing, and indeed, as a group they've grown at the slightly faster rate of 2.91 percent per year, over the same period. Hence, the poor nations described above will never actually overtake the rich group unless their rates of growth rise sufficiently. For example, if the rate of growth for Bangladesh, India, and Pakistan could be doubled to 5.68 percent a year, they would overtake Denmark, Sweden, and the United States in the year 2083.

³See, for example, the 1952 book by Joan Robinson.

The Extent of Financial Development (1976 - 93)

The United States economy has a relatively well-developed financial sector. Measures of the extent of the financial system, which provide estimates of the quantity of external finance available, are relatively high. Consider two sources of external finance. Stock markets allow firms to finance current investment by selling shares in future earnings. Loans from banks and other financial intermediaries are an alternative source of finance. For the United States, stock market capitalization, which measures the total value of all shares outstanding, was, on average, 0.57 times GDP over the period 1976–93. Domestic bank credit to the private sector, essentially loans made to nongovernment enterprises, was 0.77 times GDP over the same period. The sum of these two values yields a measure of financial development for the United States equal to 1.34. In contrast, for Bangladesh this measure is just 0.28 times GDP. Interestingly, market capitalization is only about 0.01 of this total; domestic credit comprises the remainder. While debt is generally a larger source of investment financing than equity in most countries, the predominance of debt finance in Bangladesh is extreme (see table).

Country	Bank Credit as a Fraction of GDP	+	Stock Market Capitalization as a Fraction of GDP	=	The Extent of Financial Development
Luxembourg	2.27		2.45		4.72
Singapore	1.50		1.29		2.79
Japan	1.96		0.66		2.62
Hong Kong	1.19		1.24		2.43
United States	0.77		0.57		1.34
Sweden	0.87		0.31		1.18
Denmark	0.69		0.19		0.87
India	0.46		0.10		0.55
Pakistan	0.45		0.07		0.53
Bangladesh	0.27		0.01		0.28

gue that a poorly functioning financial system may hamper development, but an efficient one can boost the rate of growth above what it otherwise would have been.

This article discusses some recent evidence that appears to support this second viewpoint: financial development may have a significant impact on a nation's rate of economic growth.⁴ Thus, poor nations, or those in transition to market economies, may be able to sustain higher rates of growth by avoiding policies that frustrate the

development of the financial system. Additionally, economies with such policies already in place may stimulate economic development by eliminating them. (See *Financial Repression*.) A stronger interpretation of the evidence—that policymakers may actually be able to boost rates

⁴For an excellent and accessible survey of this evidence, the interested reader should consult Ross Levine's 1997 paper, on which this article has drawn heavily.

Financial Repression

A famous example of economic policies that distort financial markets is the phenomenon of *financial repression* first discussed by Ronald I. McKinnon in his 1973 book. In some less developed economies, government policy sought to promote targeted industries, ones considered important for rapid development, by allowing them to borrow cheaply. This often resulted in excessive and inefficient investment in such industries. Less favored sectors of the economy could not obtain investment financing for worthwhile projects. The consequence was a misallocation of funds that reduced the overall return to investment in the economy, since many productive opportunities were left unfunded while unproductive projects in targeted industries obtained funds.

In chapter 6 of his book, McKinnon discusses the case of Ethiopia, where the government capped the nominal interest rate on bank loans at 12 percent. This interest rate was too low to clear the market for investment loans. Consequently, an arbitrary system of loan allocation arose whereby firms in strategic industries targeted by the government, such as manufacturing and hotel building, experienced excessive investment that generated poor returns for savers. At the same time, farmers were unable to obtain short-term loans from banks. Instead, they had to borrow from informal moneylenders who charged them 100 to 200 percent a year.

of growth by devoting resources to subsidizing the development of the financial system—is more controversial, and the evidence to date is not strong enough to support this interpretation.

WHAT DOES THE FINANCIAL SYSTEM DO AND HOW COULD IT PROMOTE ECONOMIC GROWTH?

To understand how the financial system might influence economic growth, we need to review the roles of the financial system in greater detail.

First, the financial system *mobilizes savings*. Since an individual saver may be unable or unwilling to completely fund a borrower, financial markets and institutions pool the savings of diverse households and make these funds available for lending. This activity reduces the transaction costs associated with external finance for both firms and households. By going directly to a financial institution, firms seeking to borrow avoid the costs of having to contact a diverse group of savers. Similarly, savers avoid the costs of evaluating every potential borrower by placing their funds with a financial institution.

Second, the financial system *allocates savings* by determining which borrowers obtain loans. Since financial institutions are specialists, they can determine worthwhile investment opportunities and judge the creditworthiness of borrowers at lower cost than the average small investor.

The third role of the financial system is to *reduce risk* by spreading investors' savings across many different investment opportunities. Spreading savings diversifies risk for households and reduces their exposure to the uncertainty associated with individual projects. This reduction in risk encourages savings.

The fourth role of the financial system derives from its ability to *generate liquidity*. Some investments with potentially high returns involve projects that require long-term commitments of capital. However, some investors may unexpectedly need access to their savings. Fortunately, when the financial system pools the investments of many households, it allocates funds to both short- and long-term projects. Thus, investors obtain higher returns on their savings than they would if their investments were limited to short-term projects, but they still have access to their savings in unforeseen circumstances. Further, mixing investments in this way ensures that worthwhile long-term projects are funded.⁵

Sixth, the financial system *facilitates trade* by extending credit and guaranteeing payments. For example, currency, demand deposits, and credit card accounts all allow individuals to ex-

change goods and services without having to resort to barter. Additionally, letters of credit help firms order the inputs for current production when they experience delays in payment for past sales.

The financial system also *exerts corporate control* and *monitors managers*. Entrepreneurs' or managers' information about the operation and outcome of their projects tends to be superior to information that outside creditors and shareholders have. Insiders' attempts to exploit this informational advantage by engaging in opportunistic behavior would tend to discourage savings. For example, managers might underreport their firms' profits to lenders and shareholders in order to raise their own earnings. To offset this information advantage, banks monitor borrowers, and equity markets allow shareholders to discipline managers by voting out poor management.

These roles suggest that a well-functioning financial system might permit a higher level of saving and investment and, therefore, economic growth.

THE EVIDENCE FOR CAUSALITY

The earliest examination of the relationship between finance and growth across countries was a 1969 study by Raymond Goldsmith. Goldsmith used the value of financial intermediary assets, relative to GNP, as a measure of financial development. Examining data on 35 countries over 103 years (1860 – 1963) he found that, in general, financial and economic development appeared to occur simultaneously. Although

⁵In his famous and influential 1969 study, Sir John Hicks (page 144) emphasized the importance of this role of the financial system during the English Industrial Revolution. Extending Walter Bagehot's theme that financial development facilitates adoption of technology, Hicks argued that financial development, in particular the increased provision of liquidity, allowed the adoption of new technologies, such as the steam engine, that required long-term investment.

Goldsmith's measure of financial development would be correlated with the *extent* of financial services, it's less likely that it would be closely related to the *quality* of those services. Unfortunately, the paucity of data on the quality of financial services makes its measurement problematic for any study of financial development. A further difficulty in Goldsmith's study is that he did not control for the many other factors that, at least in part, determine the rate of economic growth. Economic theory indicates that a nation's propensity to save, supply of human capital, fiscal and monetary policy, political and economic stability, the rule of law, the rate of population growth, and the initial level of GDP are all possible determinants of an economy's rate of growth.

Perhaps the most thorough study of finance and growth in the tradition of Goldsmith is the 1993 work of Robert King and Ross Levine. This work remedied many of the problems of the original study. Acknowledging the lack of good measures of overall financial development, the authors examined a variety of alternatives. They used four measures. Two of these measures are intended to gauge the extent of the financial sector: liquid liabilities of the financial system as a fraction of GDP; and the quantity of credit provided to private enterprises, by both private-sector banks and the central bank, as a fraction of GDP.⁶ King and Levine also used two measures of the efficiency of the financial system. The first measured the share of total credit actually provided by private-sector banks instead of the central bank. The second measured the share of total credit allocated to private nonfinancial firms. Implicit in the use of these two measures is the belief that an economy with more lending by private-sector banks and more lending to pri-

⁶Liquid liabilities of the financial system include currency held outside the banking system as well as demand and interest-bearing liabilities of banks and non-bank financial intermediaries.

vate firms will have a more efficient allocation of external finance. A private-sector bank, seeking to maximize profits, is likelier to fund worthwhile investment projects than is a government lender that may have to follow another criterion for loan evaluation.

King and Levine also used three separate measures of economic growth: the per capita growth rates of both GDP and the capital stock and the growth rate of total factor productivity.⁷ Finally, to isolate the effect of financial development, they controlled for several alternative determinants of economic development. That is, they evaluated the ability of the measures of financial development discussed above to explain that part of an economy's overall rate of growth not already explained by other factors. The authors found a positive and statistically significant relationship between their measures of financial development and economic growth; in other words, countries with higher levels of financial development tend to have higher economic growth and vice versa. (See *Financial Development and Economic Growth Across Countries*.)

The issue of causality remains. Does finance cause growth? In other words, do higher levels of financial development

independently generate economic growth? Or does financial development come about only as a result of economic development? If financial development causes economic development, policies that hinder the formation of those markets and financial intermediaries may reduce long-term growth rates. For example, such policies could include imposing disproportionately large taxes on financial firms relative to other corporations. Reforms that eliminate distortionary policies may promote growth and development to an extent that more than compensates for the revenue lost.

Goldsmith was skeptical that researchers would ever be able to resolve the issue of causality. Nonetheless, King and Levine do provide

Financial Development and Economic Growth Across Countries

For a sample of 47 countries over the period 1976 - 91, the figure on page 9 plots the unexplained component of economic growth against a measure of the contemporaneous level of the extent of financial development. Unexplained growth is the remaining component of average annual growth of per capita GDP that is not explained by a set of nonfinancial factors. The data are from the 1998 paper by Ross Levine and Sara Zervos. The nonfinancial factors are (1) initial GDP per capita, (2) secondary school enrollment, (3) a measure of political stability, (4) government spending relative to GDP, (5) inflation, and (6) the black market exchange rate premium. Financial development is measured as the sum of stock market capitalization and domestic bank credit to the private sector, each divided by GDP. This measure of financial development differs from that used by King and Levine in that it includes stock market data. Higher values of this variable indicate larger stock markets and more lending, relative to the size of the economy. This is commonly assumed to imply a higher level of external finance.

The figure clearly shows that, on average, nations characterized by higher levels of financial development, as measured along the horizontal axis, also exhibited higher growth rates than could be explained by nonfinancial factors, as measured along the vertical axis.

⁷Total factor productivity growth is the part of GDP growth that cannot be explained by changes in the capital stock or hours worked.

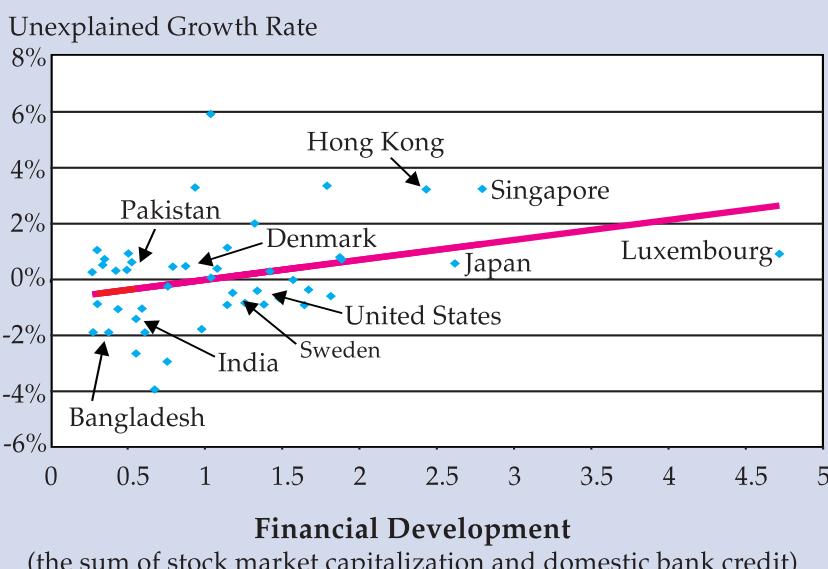
evidence to suggest a causal relationship between finance and growth. Their data indicate that the initial level of financial development in 1960 predicted the subsequent average rate of economic growth over the next 29 years across countries. In other words, economies that were more financially developed at the beginning of the period experienced, on average, more rapid growth. This finding supports the views of researchers who feel that financial development causes economic growth. (See *Financial Development Predicts Economic Growth*.) But this is not conclusive evidence of causality, since the initial level of financial development may respond to how participants in the economy expect the rate of economic growth to change in the future.

CAUSALITY REVISITED

Despite the finding by King and Levine that financial development predicts economic growth, skepticism is still justified. As discussed in the 1998 work of Raghuram Rajan and Luigi Zingales, two possible sources of error prevent researchers from using evidence that finance *predicts* growth to conclude that it *determines* growth. The first source of error involves the role of expectations; the second, the possibility of important omitted factors.

Expectations of future economic development may induce current financial development. If entrepreneurs anticipate future economic growth, which will mean higher demand for financial services, they may invest in the creation of additional financial intermediaries today in anticipation of future profits. In this scenario, finance is completely determined by growth but precedes it.

The other source of error lies in the possibility of missing factors. A variable such as the savings rate might determine both current financial development and future economic growth. Generally, an economy with a younger population, provided it is not too young, will tend to save more relative to GDP—and thus supply a greater quantity of external finance—than an economy with an older population. The financial system will expand to allocate the higher supply of savings, and so the economy will be more financially developed. Moreover, if these funds



are then invested in projects that promote growth, we will see a higher subsequent growth rate for the economy. In this case, finance does not cause growth at all. Both are driven by demographic structure; yet, the data will again indicate finance precedes growth.

Rajan and Zingales attempted to address the issue of causality and to isolate a mechanism through which finance may influence growth. Since the financial system helps reduce the information and transaction costs associated with the external financing of investment, the authors argue that if finance causes growth, financial development should disproportionately affect industries that rely more on external finance, as opposed

to retained earnings, for investment. In such industries it generally takes longer for investments to yield cash flows. Thus, financial development should have a stronger impact on industries such as drugs and pharmaceuticals, plastics, and computers, which typically require large amounts of external funding for R&D, than on the tobacco industry, which requires little.⁸ Specifically, industries with a greater need for external finance should grow relatively faster in more financially developed economies than in less financially developed ones.

Financial Development Predicts Economic Growth

The figure on page 11 illustrates the result that the initial level of the extent of financial development helps determine future economic growth. The unexplained growth rate computed in the figure on page 9 is plotted against the initial level of financial development, in 1976. Note the positive relationship between the initial level of financial development and subsequent economic growth summarized by the regression line.

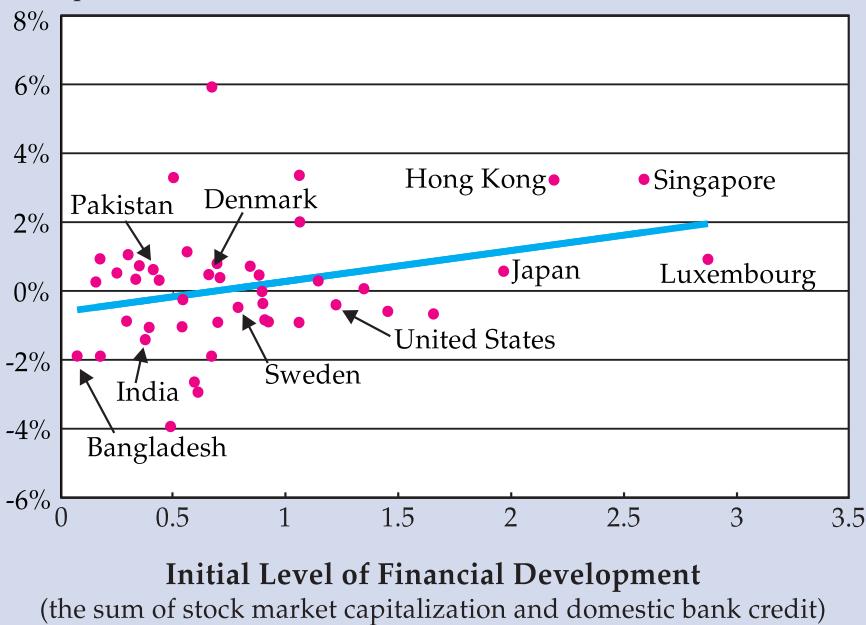
The data presented in the figure here imply a regression coefficient for financial development equal to 1.86. This means that a one-percentage-point rise in a nation's level of financial development tends to raise its annual rate of per capita economic growth by almost twice that amount. For example, Bangladesh's initial level of financial development in 1976 was 0.07. But suppose it had instead an initial value of financial development equal to that of the United States, 1.34. According to the regression, in this second scenario, Bangladesh would have grown 2 percentage points more each year over the next 17 years than it actually did. This is a short span in the history of economic development, but it would have been sufficient to allow the poor nation to raise its per capita income more than 43 percent.

The results are weaker, though still significant, when the three countries with the highest measured levels of financial development, Hong Kong, Luxembourg, and Singapore (all of which provide a large percentage of their financial services to nonresidents), are eliminated from the regression. It should be noted, however, that the model examined here is intentionally simple. As such, it abstracts from the effect of economic growth onto financial development. The absence of such effects in the model may exaggerate the importance of initial financial development on subsequent economic growth.

To test their hypothesis, the authors had to address two issues of measurement. First, they had to determine industries' need for external finance. They did this using data for U.S. firms, under the assumption that U.S. financial markets are sufficiently developed so as to provide each industry with its desired level of external finance. Second, to implement their test, Rajan and Zingales had to measure financial development. As an alternative to the measures used by King and Levine, Rajan and Zingales measured a nation's extent of financial development by the size of its stock market plus the amount of credit provided by the banking sector relative to the country's GDP.⁹ They also measured the efficiency of the financial sector using an index of

⁸Rajan and Zingales (1998), page 560 and Table 1.

Unexplained Growth Rate



Initial Level of Financial Development

(the sum of stock market capitalization and domestic bank credit)

the quality of accounting standards in the country. Better accounting standards help overcome the informational problems associated with providing external finance and lead to a more efficient financial system.

Rajan and Zingales used a statistical approach that ameliorated the problem of omitting explanatory variables and controlled for the size of each industry. They found that it was indeed the case that industries that were more dependent on external finance tended to grow faster in nations that were more financially developed

than in those that were less financially developed. Another interesting finding was that within industries, financial development was more important for young firms. Since such firms were more likely to have a need for external finance, the authors took this as additional confirmation of their thesis.

Rajan and Zingales' exercise provided evidence on a specific way that finance may promote economic growth: by reducing the costs of external finance for firms. Moreover, since they looked at particular industries across a large number of countries, they were able to eliminate the effect of country-specific and industry-specific factors that may influence economic development

but are unobservable to the researcher. This approach entails difficulties, however. As an economy develops, the structure of industry evolves. In using the United States to estimate industries' need for external finance worldwide, the authors assumed that the process of production within industries was essentially invariant to the level of economic development. If this strong assumption is not true, doubt is cast on their measure of an industry's need for external finance. However, the related work of Asli Demirguc-Kunt and Vojislav Maksimovic provides additional evidence of the importance of external finance.

Using firm-level data across a number of economies, Demirguc-Kunt and Maksimovic es-

⁹This is the same measure we used in the figure on page 9 and the one above.

timated firms' maximum constrained growth rates—the maximum rates of growth that firms may achieve in the absence of access to external finance for investment. Demirguc-Kunt and Maksimovic found that a larger proportion of firms grew above their constrained growth rates in economies that were more financially developed. In particular, economies with relatively efficient legal systems, active stock markets, and large banking sectors allowed more firms access to external finance.

LAW AND FINANCE: CAUSALITY RESOLVED?

A possible resolution of the causality controversy may arise from the 1998 work of Rafael LaPorta, Florencio Lopes-de-Silanes, Andrei Shleifer, and Robert Vishny. These researchers exploited the fact that legal systems worldwide originated from a small group of legal traditions: English common law, and French, German, or Scandinavian civil law. Importantly, legal traditions do not vary systematically with respect to a nation's income or GDP per capita. Rich and poor economies share similar traditions because, in many instances, a nation's colonial history predetermines its legal system. Nations also vary widely in the level of investor protection they offer—that is, the legal rights of shareholders and creditors—and in how effectively those rights are enforced.

One example of a legal right that increases investor protection is proxy voting by mail. The ability to vote by mail frees shareholders from the necessity of having to attend shareholder meetings to vote on management decisions, thereby raising the likelihood that they will be able to protect their investment. While this method of voting is allowed in 40 percent of English common law nations, it exists in only 5 percent of French civil law nations. Common law nations are also more likely to enforce one share-one vote laws that prevent businesses from raising capital by selling nonvoting shares. This ensures that shareholders' control over a corpo-

ration is proportional to their investment in that business and that no shareholder is powerless to influence decisions that affect the value of his or her investment.

Variations in investors' rights and protection across countries cannot be explained solely by differences in GDP per capita; they are systematically related to differences in legal traditions. This finding that investor protection varies with legal traditions is important because the degree of investor protection affects the availability of external finance. The lack of such protection raises the risks of investing for outsiders not directly able to control a firm's decisions—that is, small shareholders or creditors. Weak investor protection fails to reassure creditors and shareholders that a firm will not engage in opportunistic behavior that will lead to poor returns on their investment. As a result, investors may reduce their supply of external finance, which, in turn, would reduce the need for financial services. This reduced need would then most likely result in an equivalent reduction in the size of the financial system. A relatively smaller financial system would be associated with a lower level of financial development.

Thus, the legal tradition of a nation, given its implication for the rights of investors, is likely to determine, at least in part, the level of financial development. In other words, legal tradition can be used to isolate some part of an economy's overall financial development that is independent of its current level of economic development. If this component of financial development is found to determine economic growth, we finally have a firm basis for concluding that finance causes growth.¹⁰

Using measures of shareholders' and creditors' rights, the enforcement of these rights, and

¹⁰This conclusion does require us to assume that the component of financial development that is independent of current GDP per capita will also be independent of future economic growth.

data on overall legal tradition, a 1997 paper by Rafael LaPorta, Florencio Lopes-de-Silanes, Andrei Shleifer, and Robert Vishny confirms that the quantity of external finance is, in part, determined by legal tradition. Furthermore, employing their measures of creditors' rights, a 1997 paper by Ross Levine shows that these measures of investor protection can explain a component of banking-sector development. This component, part of the component of overall financial development that is independent of per capita GDP, is itself able to explain some of the observed international differences in rates of economic growth.

CAVEATS

While the law and finance approach offers us strong evidence that finance causes growth, this finding must be viewed with some caution. For example, one of the measures of creditors' rights used in these studies presumes that creditors' rights are stronger in economies that do not require an automatic stay on a firm's assets during reorganization. An automatic stay on assets, which prevents liquidation of the firm, harms secured creditors who have claims to the firm's property. However, unsecured creditors, without such claims, benefit from an automatic stay; preventing liquidation of the firm increases the probability of their obtaining repayment on their loan. Thus, it is unclear whether the absence of an automatic stay on assets is a positive creditors' right as the authors assume. Moreover, deficiencies in commercial law need not constrain external financing, since creditors and shareholders may have contractual rights not required by law, and firms would have an interest in honoring such agreements to protect their reputation and thereby their ability to borrow in the future. Another potential difficulty with the research discussed here is its failure to account for the role of financial services provided from abroad. One nation with a relatively underde-

veloped financial system, perhaps due to poor investor protection, may make extensive use of the financial services available in another nation. Some economies with unusually high levels of financial development, for example, Hong Kong, Singapore, and Luxembourg, provide exactly such services for other nations.

CONCLUSION

Over the course of an economy's development, its financial sector grows in size relative to the rest of the economy. But whether financial development *causes* economic growth has been difficult to determine. Recent efforts have accumulated compelling evidence that it does.

The finding that the development of an economy's financial system can positively influence its subsequent rate of economic growth has implications for economic policy. In particular, it indicates a potentially high cost of pursuing policies that deter financial development.

While the sheer volume of complementary evidence makes it difficult to reject the thesis that finance causes growth, there exists, to date, little work indicating exactly which roles of the financial system are most relevant. In fact, although researchers have developed formal theories of financial development over the last decade, there has been no empirical evaluation of these theories.¹¹ Thus, we do not yet have a clear understanding of the mechanism through which improvements in the extent and efficiency of the financial system speed economic growth. A clearer understanding of this causal mechanism would, of course, be a valuable addition to our knowledge of the process of economic development.

¹¹For formal economic theories that explain the observed interaction between financial and economic development, see the 1990 work of Jeremy Greenwood and Boyan Jovanovic and my 1999 paper.

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Agriculture in the Third District: Fertile Fields Outside the Farm Belt

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The large, diversified nature of the Third District economy sometimes obscures the importance of its farm sector. The tri-state region (Pennsylvania, New Jersey, and Delaware) is not part of the nation's agricultural heartland and does not supply a large percentage of the total agricultural production of the United States. However, the region does supply a significant percentage of some commodities, and in some parts of the region, agriculture is a significant part of the local economy. For example, Pennsylvania ranks high nationally in the production of milk,

mushrooms, and Christmas trees; New Jersey is among the leaders in the production of blueberries, cranberries, and garden plants; and Delaware is a leading poultry state. Several counties in the three states rank among the top 100 in the nation in output of these products. This article presents some measures of the relative importance of the region's farm sector and describes the region's major agricultural products. It also gives an overview of the financial situation of agriculture in the region and takes a look at major issues facing the farm sector.

THE REGION'S FARM SECTOR

The size of the farm sector can be measured by output (the value of agricultural products

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sold) or by input (the amount of resources, such as land and labor, used in the sector). By each of these measures, Pennsylvania and New Jersey rank below the U.S. average. Delaware matches the average for output and land use, but falls short in terms of employment.

Farm Output. Agriculture in the United States is concentrated in relatively few states in the Midwest, the South, and the West. The top five farm states (California, Texas, Iowa, Nebraska, and Kansas) account for one-third of the value of the nation's agricultural production.¹ The top 20 farm states produce three-fourths of agricultural products in dollar value. Among the three states in the Third Federal Reserve District, only Pennsylvania is in this group, ranking 19th. New Jersey and Delaware rank 39th and 40th, respectively. Pennsylvania had the largest agricultural output—\$4.6 billion—among the three states in 1997; New Jersey had \$900 million in output, and Delaware, \$840 million. The three states combined account for 2.8 percent of total agricultural output in the nation.

The gross value of farm output does not necessarily reflect the importance of agriculture for the states' economies. For example, Delaware ranks 40th in total output, but as a percentage of gross state product (GSP), Delaware's agricultural output matches the average for the country—3 percent (Table 1). Agriculture's share of GSP in Pennsylvania and New Jersey is considerably below its share of national GDP. Not only is agricultural production a larger proportion of economic output in Delaware than in Pennsylvania or New Jersey, it has also been growing faster in Delaware than in the other two states or in the nation (Figure 1).

Farming is concentrated in a limited number of counties within each of the three states in the Third District (Map and Appendix). In Pennsyl-

¹Data on farms and agricultural production used in this article are from the 1997 Census of Agriculture, published by the U.S. Department of Agriculture, National Agricultural Statistics Service.

TABLE 1
**Agriculture's Share
of the Economy**

	Percent of Total*		
	Gross Product	Employment	Land
United States	3	2.6	41.2
Pennsylvania	1.4	1.2	25
New Jersey	0.3	0.6	17.5
Delaware	3	1.4	45.4

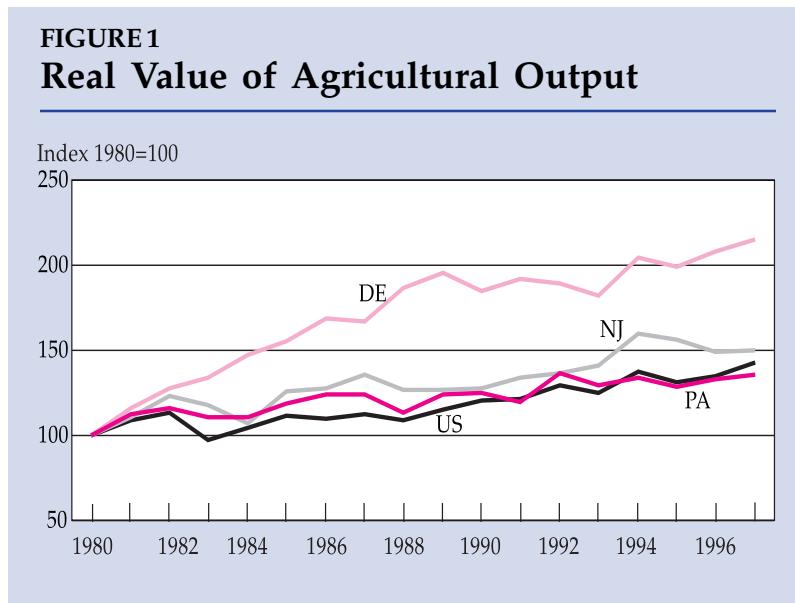
*1997 figures are used for land and employment, 1996 for gross domestic and state product.

vania, farming is most important in a string of counties in the south central and southeastern part of the state.² The major farm products in this region are dairy products, beef cattle, and grain. A few other counties in northern and central Pennsylvania also produce large amounts of dairy products and fruit.³ In New Jersey, farming is a significant part of the landscape in some southern counties, where the major crops are vegetables and fruits.⁴ In Delaware, farming—primarily poultry—is concentrated in Kent and Sussex counties.

²Counties with the highest dollar value of agricultural production are, east to west, Bucks, Chester, Berks, Lancaster, Lebanon, York, Adams, Cumberland, and Franklin counties.

³Dollar value of production is highest in Bradford and Erie counties in the north and Snyder County in the center.

⁴The southern agricultural counties with the greatest dollar value of agricultural production are Burlington, Cumberland, and Salem. Monmouth County, in the middle of the state, also has a relatively large production by dollar value.



Farm Employment. Farm jobs are a small fraction of total employment in the nation and in the states of the Third District. (For an explanation of how farm employment is measured, see *Farm Employment*.) The latest Census of Agriculture, conducted in 1997, counted 3.4 million people who were hired to work on farms at some time during that year, including paid members of the farm operator's family. This represents only 2.6 percent of total U.S. resident employment. Agricultural workers make up even smaller percentages of total employment in Pennsylvania, New Jersey, and Delaware (Table 1).

Farm employment has been declining for decades. Most of the decline is a result of the transition to nonfarm occupations by people in traditionally agricultural areas where family farming as a way of life has waned. A National Agricultural Statistics Service study of farm labor found that from 1910 to 1990, total farm labor declined by three-fourths and hired farm labor declined by two-thirds.⁵ The trend has continued in recent decades: from the 1982 Census of Agriculture to the 1997 Census, hired farm labor in the United States declined nearly one-third.

The decline in Delaware was similar, but Pennsylvania and New Jersey recorded smaller decreases in farm employment.

The decrease in farm employment is not indicative of a declining agricultural sector. On the contrary, even as employment in the sector has fallen, output has increased as a result of advances in productivity. A recent study by the Agriculture Department determined that total real farm output increased from 1948 to 1994 at a compound annual average rate of 2 percent,

despite an annual decrease in labor usage on farms of 3 percent.⁶

Farmland. The percentage of Delaware land in farms (45.4 percent) is very close to the U.S. average (41.2 percent). Farmland is a smaller percentage of total land area in Pennsylvania (25 percent) and New Jersey (17.5 percent) than in the nation as a whole. The amount of land in farms has been declining. Nationally, farmland acreage declined 4 percent from 1987 to 1997. Regionally, the declines were 10 percent in Pennsylvania, 7 percent in New Jersey, and 5 percent in Delaware.

Nationwide, the number of farms has been

⁵Farm Employment and Wage Rates 1910-1990, U.S. Department of Agriculture, National Agricultural Statistics Service, Estimates Division, Statistical Bulletin No. 822, March 1991. Nonhired labor consists of self-employed farmers and their unpaid family members working on their farms.

⁶Agricultural Productivity in the United States, U.S. Department of Agriculture, Economic Research Service, April 1999.

Farm Employment

Farm employment differs from most types of nonfarm employment in two significant ways: it is more likely to be seasonal than year-round, and farm workers are more likely to hold multiple jobs. For these reasons farm employment is estimated in surveys by the Department of Agriculture at different seasons of the year rather than in the monthly surveys of employment by the Bureau of Labor Statistics. The number of people employed on farms is highest in the summer and lowest in the winter. Throughout the nation only about one-fourth of hired farm workers work more than 150 days on a farm. In Delaware, this percentage is the same as the national average, but in Pennsylvania and New Jersey, about one-third of hired farm workers spend 150 days or more working on a farm.

Many farm workers hold multiple jobs, most commonly in service occupations, manufacturing, and transportation. Even farm operators (those managing their own farms or employed as farm managers) tend to hold other jobs. In fact, half of all farm operators in the nation list an occupation other than farming as their principal occupation. In Delaware and Pennsylvania, a smaller percentage of farm operators have another principal occupation—39 percent and 43 percent, respectively—and in New Jersey a larger than average percentage of farm operators, 56 percent, have another principal occupation. Operators of large farms (measured by value of production) are less likely to have another principal occupation than operators of small farms, and they are less likely to spend time working off the farm. Farms in Delaware and Pennsylvania are larger, on average, than farms in New Jersey, and their operations are steadier through the year. There are proportionately more dairy and poultry farms in Pennsylvania and Delaware, respectively, on which activity is less seasonal than on crop farms, which predominate in New Jersey. Large farms and farms on which production is less seasonal require more regular attention from farm operators during the year.

declining faster than farmland acreage. In the decade between the agriculture censuses of 1987 and 1997, the number of farms in the nation fell 9 percent. The decreases in Pennsylvania and Delaware were greater: 13 percent and 21 percent, respectively. In New Jersey, the number of farms actually increased just under 1 percent. In 1997, there were nearly two million farms in the 50 states. In that same year, there were approximately 26,000 farms in Pennsylvania, 4,000 in New Jersey, and 1,500 in Delaware.

Although the number of farms has declined, the size of farms has increased as farm families leave the land for other employment and technology enables more land to be farmed by fewer farmers. For the whole country, the size of the average farm in 1997 was 487 acres, an increase of 5 percent from 1987. In Pennsylvania, the size of the average farm in 1997 was 158 acres,

an increase of 3 percent from 1987. In New Jersey, farms averaged 91 acres in 1997, a decrease of 8 percent from 1987. And in Delaware farms averaged 236 acres, an increase of 15 percent. These numbers reveal that farms in the three states are smaller than the national average; however, poultry farms, the most numerous type of farm in Delaware, are nearly as large as the national average.

AGRICULTURAL PRODUCTS OF THIRD DISTRICT STATES

The mix of major crops and agricultural products in Third District states reflects both the region's geography and the initiative of the region's farmers. For example, land in Pennsylvania is more suitable for hay and pasturage than row crops; hence, dairy farming is a more efficient use of the land. New Jersey farmers were

early leaders in the cultivation of blueberries, and the state has a long history of producing nursery crops. Farmers in Delaware started large-scale commercial poultry production 70 years ago, and the industry has developed extensively since then. As a result of geographic and historical factors, the predominant types of farms in the three states are different from the predominant types nationally, and the three states provide significant portions of the national supply of certain products (Table 2).

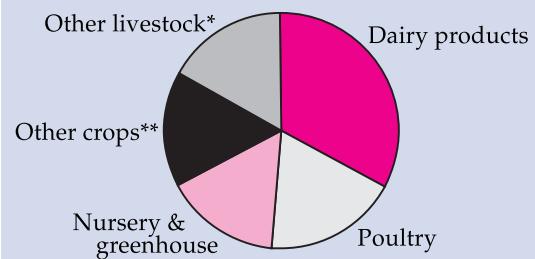
Pennsylvania. The major agricultural products of Pennsylvania (in dollar value of sales in 1997)—dairy products, poultry, and greenhouse and nursery products—account for a large portion of the state's agricultural output (Figure 2a). Pennsylvania's dairy output is 7 percent of the national total, placing the state fourth among all states in dairy production. (The top three states are California, Wisconsin, and New York.) Pennsylvania ranks high in total poultry sales (11th in dollar value) and supplies more laying hens for egg production than any other state. Pennsylvania ranks fourth in greenhouse and nursery crops, primarily because of the state's large output of mushrooms. Pennsylvania leads the nation in mushroom production, providing 36 percent of the total national output. Pennsylvania is also an important source of Christmas trees, ranking third in dollar value of cut Christmas trees.

Pennsylvania's largest farm sector, the dairy industry, has been undergoing a seemingly unending process of restructuring for 50 years, and this restructuring has affected all phases of the industry, from farm to product manufacturer to retail outlet. Large-scale production and processing operations and extended markets have replaced small local producers and distributors for all types of dairy products from milk to cheese and ice cream as well as less visible products, such as milk solids used in baked goods and other nondairy foods. Nationally, large dairy farms, some with 5,000 cows, have increased in number since the 1950s, when a farm with 100

cows was considered large. Reduced transportation costs have allowed dairy farms in the West to take advantage of abundant land, good climate, and ample supplies of forage to increase their share of the national market for milk and other dairy products.

Agricultural analysts expect these trends to continue. Producing a bulk commodity and facing expanding competition, dairy farmers are expected to emphasize volume and quality at low cost. Recent changes to federal dairy policy reflect these developments and open up the dairy industry to more market forces (see *U.S. Agricultural Policy*, page 22). As the effects of these changes in legislation unfold, responses in the dairy industry may include consolidation among the cooperatives that market milk for their farm members, setting of quotas among members of a cooperative, and active production and inventory management by the cooperative, as well as a continuation of the trend toward fewer and larger dairy farms. These changes may prove more critical to Pennsylvania dairy farms than to those in some other states, since

FIGURE 2a
Agricultural Products of
Pennsylvania



*Sum of all livestock other than those listed individually

**Sum of all crops other than those listed individually

TABLE 2
State and County Rankings for Agricultural Production

	State Rank	Percent of U.S. Total	Counties in Top 100	County Rank**
Pennsylvania Production*				
Dairy Products	4	7.0	Lancaster Franklin Bradford Berks Lebanon Chester Cumberland	8 23 49 60 76 84 98
Nursery and Greenhouse Crops, Christmas Trees, Mushrooms, Sod	4	5.9	Chester Berks Bucks Lancaster Armstrong	3 20 48 65 84
Poultry and Products	11	3.2	Lancaster Lebanon	6 82
Hogs and Pigs	12	1.7	Lancaster	15
Fruits, Nuts, Berries	12	0.7	Adams Erie	55 91
Vegetables, Sweet Corn, Melons	17	0.8		
Sheep, Lambs, Wool	19	0.8		
New Jersey Production*				
Nursery and Greenhouse Crops, Christmas Trees, Mushrooms, Sod	11	2.5	Monmouth Cumberland Burlington Morris Gloucester	40 61 74 83 91
Fruits, Nuts, Berries	13	0.7	Atlantic Burlington	64 68
Vegetables, Sweet Corn, Melons	17	0.8	Cumberland Gloucester Atlantic	33 50 60
Delaware Production*				
Poultry and Products	16	2.2	Sussex Kent	1 78
Vegetables, Sweet Corn, Melons***			Sussex Kent	52 70

*Product categories defined by the U.S. Department of Agriculture

**Rank out of 3,043 counties in the U.S.

***State not in top 20 but counties in top 100

Pennsylvania's dairy farms are smaller than the national average.

New Jersey. New Jersey's major agricultural products are greenhouse and nursery products, vegetables, melons, and other fruits (Figure 2b). New Jersey produces 2.5 percent of the national output of greenhouse and nursery crops (in dollar value), several times the state's share of total agricultural production, and much more per farm or acre than the national average. The state ranks in the top 10 in production of bedding and garden plants, cut flowers, foliage plants, potted plants, and bulbs. Thus, despite being in the center of the East Coast megalopolis, New Jersey can justify its nickname, The Garden State. New Jersey also supplies one-fifth of the nation's blueberry crop and one-tenth of the cranberry crop, placing it second and third, respectively, in production of these fruits among all states.

Greenhouse and nursery crops, New Jersey's most important agricultural products, have been the fastest growing sector of agriculture in the United States for several years. The sector is made up of two major subsectors: floriculture (cut flowers, cut cultivated greens, and potted flowering and foliage plants) and environmental horticulture (trees, shrubs, bedding and garden plants, and turfgrass). Environmental horticulture accounts for 80 percent of the dollar value of output for greenhouse and nursery crops, and much of the greenhouse and nursery crop sector's growth in sales has come from environmental horticulture. Sales of trees, outdoor plants, and other landscaping vegetation have been boosted by overall economic growth, residential development, and increased spending on home improvements in recent years. U.S. producers supply 97 percent of the domestic market, since imports are restricted by transportation difficulties associated with live plants and by regulations intended to prevent the spread of plant diseases. On the other hand, floriculture products, especially cut flowers, face strong import competition, and U.S. producers have lost market share and reduced acreage, although they have

achieved increases in dollar sales.

Delaware. Poultry, grains, and vegetables dominate Delaware's agricultural output (Figure 2c). Poultry alone accounts for 69 percent of the state's agricultural sales. Delaware's poultry farms supply nearly 4 percent of total U.S. sales of broiler and other meat-type chickens. Poultry, the major agricultural product in Delaware and the second most important in Penn-

FIGURE 2b
Agricultural Products
of New Jersey

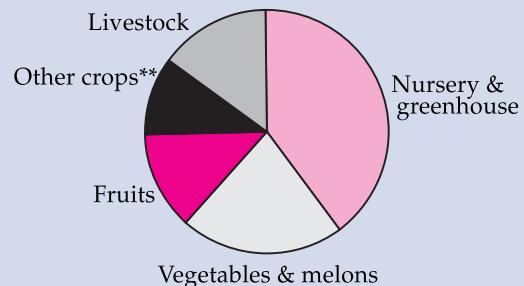
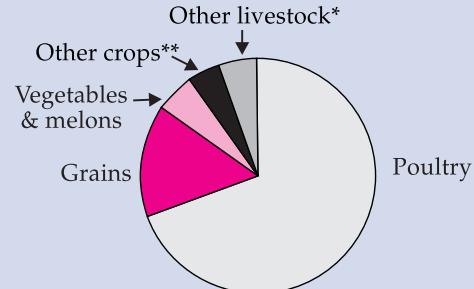


FIGURE 2c
Agricultural Products
of Delaware



*Sum of all livestock other than those listed individually
**Sum of all crops other than those listed individually

U.S. Agricultural Policy

National agricultural policy in the first century and a half of the United States was focused on encouraging farming by making land available for free or at low prices, promoting transportation between agricultural areas and urban markets, and providing financial and technical assistance to farmers. During the Great Depression, farm commodity prices fell, and the income of farmers dropped both absolutely and relative to incomes in other sectors of the economy. The Agricultural Adjustment Act of 1933 was passed to address the problem of low and unstable farm prices and incomes, and basic farm policy since then has had income support for farmers as its major goal.

The 1933 act introduced production and marketing controls and price and income supports for many commodities, chiefly grains, cotton, tobacco, and milk. Under these programs farm output was restrained and land was often taken out of production. Government payments to farmers were countercyclical, increasing when prices of agricultural commodities fell and decreasing when they rose. Under these programs, U.S. farmers found themselves insulated from foreign competition during adverse times but also frequently unable to expand their output (because of government limits on production) when worldwide demand rose.

The U.S. economy has expanded and grown in complexity since these programs were initiated. In the 1930s one-fourth of the population lived on farms; currently less than 2 percent does. Before World War II farms tended to be diversified family operations on which rural residents depended for their livelihood. Now many farms are specialized commercial ventures, and rural families have off-farm sources of employment and income.

Beginning in 1985 with the Food Security Act, agricultural policy has been evolving toward greater market orientation, separating farm income support from farm production planning. The most recent major legislation, the Federal Agriculture Improvement and Reform Act of 1996 (FAIR Act), sets agricultural policy out to 2002. It is another step in the process of lifting production restraints and moving the farm sector toward greater reliance on market signals while cushioning farm income during the transition. (In 2001 a commission established by the act will propose an outline of federal policy to be implemented for 2002 and subsequent years.) The FAIR Act makes farmers more subject to income variability as they become more responsible for managing their exposure to market risk.

Prior to the 1996 act, producers of wheat, feed grains, cotton, and rice received deficiency payments when market prices fell below target prices. Payments also depended on farmers' reducing the acreage on which these crops were planted. Under the new law, deficiency payments are replaced by

sylvania, has benefited from increasing popularity in domestic and foreign markets. Per capita consumption has grown steadily since the late 1970s as poultry prices have remained competitive with beef and consumers' tastes have shifted from beef to lighter meats. Poultry producers have also catered to growing demand for convenience foods by adding processing steps to reduce the time required to prepare poultry meals at home. Meanwhile, the growth of away-from-home eating has increased outlets for poultry products.

From 1992 to 1997, the dollar value of poultry products sold in the United States increased 44 percent, twice the rate of increase in total agricultural sales. Sales by Delaware and Pennsylvania farms have not increased at this rate; dollar sales grew 28 percent in Delaware and 20 percent in Pennsylvania. Much of the national increase was accounted for by increased production in southern states. The Department of Agriculture estimates that sales of broiler chickens, the major poultry category, have increased

annual payments that are not based on commodity prices, and these payments will decline each year through 2002. In addition, the production limits required under the former law are substantially eliminated. Commodity loans are retained in the 1996 act. Under this program, farmers are eligible for loans from the federal government when they pledge certain crops as collateral. If market prices fall below the price set on the commodity as collateral, farmers may keep the loan amounts and deliver the commodity to the government in payment of the loan.

Another major change in the new law is the reduction in support for dairy prices. The law phased out price supports and replaced them with a loan program intended to assist in the management of dairy product inventories; however, the program does not permit dairy farmers to forfeit commodities to the government in lieu of paying off a loan. The 1996 law also addressed federal milk marketing orders, regulations that set minimum milk prices. Prior to the FAIR Act, these orders were issued separately for milk produced or purchased in 33 specified regions that cover the entire country. The 1996 law directed that these regions be consolidated into a smaller number, and new orders for 11 areas were issued in 1999. This change expands the number of dairy farms and dairy product purchasers subject to each marketing order. The intent of the broadening of milk marketing regions is to encourage more competition within each region.

An environmental issue addressed by the new law is water pollution. The FAIR Act consolidated and expanded federal measures, establishing the Environmental Quality Incentives Program. Under this program, the government signs one-year contracts with farmers, providing technical and financial assistance in exchange for the farmers' implementing measures to reduce water pollution caused by the use of fertilizers and the disposal of animal waste. Under the FAIR Act, multi-year contracts will replace one-year contracts, but the law sets limits on amounts that can be paid and makes large-scale operations ineligible for financial assistance for construction of animal waste facilities.

In Third District states, the reduction in price supports for grains is not expected to have a major impact. Grain production is not a large part of the region's farm output, and grain producers find ready markets among the region's poultry farms. Changes to the dairy program may have a significant impact by bringing the region's dairy farms into more direct competition with larger dairy farms from other regions of the country. And the potential reduction of financial assistance for controlling water pollution could hamper farm profitability in the region as federal and state regulations become more stringent.

in 1998 and will rise again in 1999. The strength of domestic demand has prompted this growth; exports to major foreign markets in Asia and the nations of the former Soviet Union have declined as those regions have suffered economic setbacks. Recovery in exports to those areas is not expected to be strong in the near term. The Department of Agriculture's 10-year baseline projection for poultry envisions advances in productivity that will reduce costs, but increased foreign competition will limit growth in exports.

FARM FINANCES

Farming in Third District states has remained economically viable despite the fact that farms in the region are smaller than the national average and surrounded by dense populations and a large number of nonagricultural industries. Farms in the region have greater sales per acre than farms elsewhere, and the value of their assets per acre is higher (Table 3).

Revenue. Agricultural sales per acre are higher in all three states of the Third District

than in the nation. To some extent, this advantage is due to the fact that many farms in the three states are in the categories with the highest value of output per acre nationally. But even among these types of farms, Third District farms generally produce more per acre. For example, both nationally and in the Third District, farms engaged in poultry and egg production have the greatest market value of sales per acre, and in Delaware, where poultry is the largest agricultural product, poultry farm sales per acre exceed the national average by 4 percent. Sales per acre of nursery and greenhouse products, the major agricultural product of New Jersey, are the next highest in market value (again, both nationally and in the region) and sales per acre of these products by New Jersey farms are 7 percent greater than the national average. In Pennsylvania, however, the major type of agriculture, dairy farming, ranks only in the middle of major farm categories in terms of sales per acre, and Pennsylvania's dairy sales per acre are 13 percent less than the national average. Because farms are smaller than average in Pennsylvania and New Jersey, sales per farm in these states are less than the national average, but sales per farm in Delaware are higher than average.

Nationally, farmers' net cash return from sales of agricultural products made up 83 percent of total farm income (excluding government loans) in 1997.⁷ Farms in Pennsylvania, New Jersey, and Delaware obtained slightly more than this portion of their income from agricultural sales. In addition to sales of agricultural products, important sources of farm income are the provision of agricultural services by farmers and government payments to farmers (see *Sources of Farm Income*).

⁷This figure is computed by the National Agricultural Statistics Service by subtracting production expenses from farm income. Expenses include purchase costs of livestock, feeds, seeds, and fuels, and the cost of labor, maintenance, utilities, taxes, rent, and interest.

Since 1997, prices for many agricultural commodities have fallen as a result of increased production in this country and abroad and a decline in world demand due to weak economic performance in many foreign countries. Prices for major grains fell to or near decade lows in 1998. In contrast, relatively healthy market conditions for the major agricultural products of the three-state region have sustained Third District farm income amid the national decline. The Department of Agriculture estimates that from 1997 to 1998, cash receipts from farm marketings increased approximately 1 percent in Pennsylvania and Delaware and declined about 1 percent in New Jersey. Cash receipts are estimated to have declined 6 percent nationally.

Assets and Liabilities. The resilience of the region's farm sector is reflected in the high value of farm assets. The average value of assets per farm in Pennsylvania was lower than in the nation, but in Delaware and New Jersey it was higher. On a per acre basis, the value of farmland and buildings is higher in each of the Third District states than in the nation for nearly all types of farms (Table 3).

Much of this premium may be attributed to generally higher land prices in Third District states. Agricultural land values are primarily determined by the income-earning potential of the land as measured by farm output. But in places where alternative, nonfarm uses of the land might be more profitable, farmland values can rise above what would be predicted based solely on agricultural use. According to the Department of Agriculture's Economic Research Service, this rise in value tends to happen in rapidly urbanizing areas and in areas where recreational use of the land is popular. The service estimates that farmland values are still based on agricultural use in all areas of the country except the Northeast farm production region (which includes all three Third District states), where residential and commercial uses are more important determinants of land prices.⁸

Evidence of this may be found in farmland

Sources of Farm Income

In addition to income from sales of agricultural products, farmers receive income from other sources, such as providing farming services to others. These services include planting, spraying, harvesting, providing mechanical services, and renting farmland and equipment. For all farms in the nation, gross farm-related income other than sales of agricultural products averaged \$5,999 per farm in 1997, equal to 6 percent of total net farm income (the sum of net cash return from sales of agricultural products, other farm related-income, and government payments). In Pennsylvania, other farm income averaged \$4,848 per farm and matched the national average (6 percent) as a share of total net farm income. In New Jersey and Delaware, this type of income per farm was \$3,092 (3 percent of total net farm income) and \$4,801 (5 percent of total net farm income), respectively. These amounts were less than the national average both absolutely and as shares of total net farm income.

Government payments under a variety of programs have been a major source of farm income. In 1997, 36 percent of the nation's farms received government payments (excluding crop loans). The average payment was \$7,378 per farm. In Third District states, relatively fewer farms received government payments, and the average payment was less than in the nation as a whole. In Pennsylvania, 22 percent of farms received government payments, and the average payment was \$3,009. In New Jersey, 7 percent of farms received government payments, and the average payment was \$4,677. In Delaware, 28 percent of farms received government payments, and the average payment was \$5,432. Because fewer farms receive payments and the payments are smaller, government payments made up a smaller share of farm income in Third District states than in the nation. The portion of total net farm income accounted for by government payments was about 3 percent in Pennsylvania, 1 percent in New Jersey, and 5 percent in Delaware. The national average was close to 9 percent.

The ratio of government payments to farm income varies with the agricultural business cycle. By historical standards, the ratio of government payments to farm income in 1997 was relatively low. These payments were made in accordance with the provisions of the 1996 farm law, and they were lower than what they would have been under previous programs. In response, Congress passed legislation in late 1998 to allow farmers to receive all of their fiscal year 1999 payments in 1998 rather than taking half in December 1998 and half in September 1999. Congress also passed legislation in 1998 providing additional funds for farmers in that year.

prices of Third District states. While prices are higher for nearly all types of farms, premiums vary. For example, nationally, sheep farms have the lowest average value per acre, but the value of sheep farms per acre (land and buildings) in Pennsylvania, New Jersey, and Delaware exceeds the national average by a greater percent-

age than any other type of farm. Conversely, greenhouse and nursery land has the highest value nationally per acre, but the three-state premium for this type of land is relatively low. In general, the three states' farmland values exceed the national average proportionately less for farm types that have higher national average values and proportionately more for farm types that have lower national average values. This difference suggests that the possibility of using the land for nonagricultural purposes is setting a floor on the value of farmland in the region.

⁸*Agricultural Income and Finance: Situation and Outlook Report, AIS-71*, U.S. Department of Agriculture, Economic Research Service, February 1999, p. 29.

TABLE 3
Farm Finances

Sales of Agricultural Products		
	Per Farm	Per Acre
United States	\$102,970	\$211
Pennsylvania	87,942	566
New Jersey	76,627	842
Delaware	280,811	1,190

Value of Farmland and Buildings		
	Per Farm	Per Acre
United States	\$449,748	\$933
Pennsylvania	371,740	2,390
New Jersey	594,206	6,642
Delaware	609,074	2,660

The farm sector's financial position has improved since its problems of the 1980s. At that time, commodity prices and land values fell after surging in the previous decade, and interest rates rose on the high debt that farms had acquired during the expansion. In the 1990s, commodity prices and land values rose. Although the absolute amount of farm debt rose in the 1990s, asset values increased more, resulting in an improved balance sheet for the farm sector. The average debt to asset ratio, a key indicator of financial health, was 16 percent in 1998 (the latest year for which data are available), continuing the recovery from the 1980s when the ratio exceeded 20 percent. In 1998, the debt to asset ratio was 12 percent in Pennsylvania, 7 percent in New Jersey, and 17 percent in Delaware. Delaware's poultry farms, which tend to be

larger operations than other types of farms in the region, require higher capitalization. They also tend to sell their output under contract, which provides them with greater security for higher debt levels than farms without pre-arranged sales.

Low prices for many commodities and uncertainties about recovery in foreign demand for U.S. agricultural products have prompted concern about financial conditions in the farm sector. The Department of Agriculture forecast a decline of 2 percent in the sector's net cash income in 1999 compared to 1998.⁹ With clear signs of recovery lacking, farmers were not expected to increase their borrowing in 1999. Providers of financing to the agriculture sector have implemented more cautious credit evaluation procedures since the 1980s, placing greater emphasis on a farm's basic profitability and long-term earning capacity and less reliance on short-term cash flow and collateral value to support loan repayment. As a result of greater restraint on the part of both borrowers and lenders, and a forecasted increase in the value of farm real estate, the farm sector's debt to asset ratio was projected to fall slightly in 1999.

AGRICULTURAL ISSUES FACING THE REGION

Continuing trends and important developing issues will affect the future of farming in the Third District. Some of these developments are national, even international, in scope; others relate to factors of particular importance in the region. As mentioned above, low prices for many farm commodities have caused concern recently. Although farm income in the three states of the region has not been negatively impacted by low prices for grain, the most troubled commodity,

⁹Forecasts for 1999 are from *Agricultural Outlook*, September 1999, U.S. Department of Agriculture, Economic Research Service, and represent the latest data and estimates available at the time this article was written.

the region's poultry farms have experienced lower demand as a result of economic slowdowns in Asia and the countries of the former Soviet Union. Looking further ahead, there is a possibility that other nations, particularly in South America, may be preparing to enter world markets for poultry, intensifying competition even when world demand rebounds. Dairy prices have also weakened lately, mainly because of expanded supply, and this weakening is affecting Pennsylvania, an important dairy state. Meanwhile, the growth of the dairy industry in western states and changes in federal milk marketing regulations are altering the competitive landscape facing dairy farmers in Pennsylvania and throughout the East.

Declining farmland is a concern both nationally and in the region. Farmland is shrinking as residential and commercial development spreads into formerly rural areas. Residential expansion has also created conflict between farm operations and residential amenities in some communities. Environmental regulation is becoming stricter, raising the cost of farming and prohibiting some or all types of farming in some environmentally sensitive areas. Restrictions on the use of fertilizer and on the disposal of animal waste are of particular concern to farmers in the region. While increasingly stringent environmental regulations drive up the cost of farming, development pressures are raising the price of land. These two factors tend to reduce the economic return to farming and increase the gains that can be made by switching land to nonfarm uses, especially in densely populated states such as Pennsylvania, New Jersey, and Delaware.

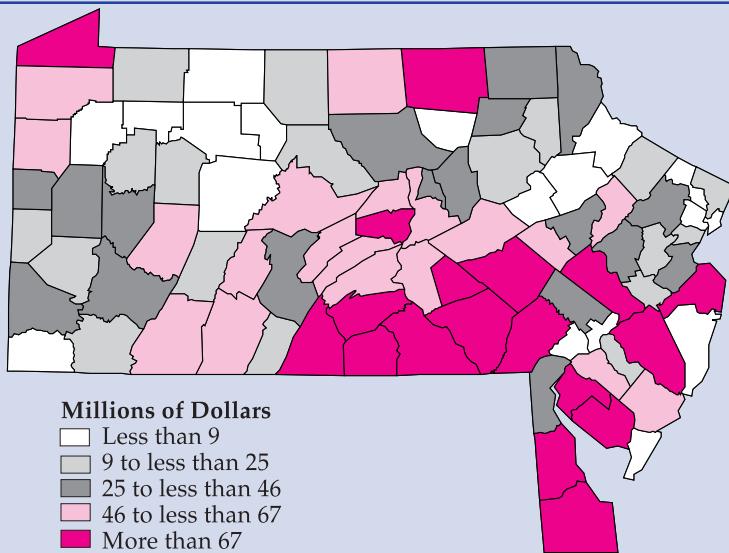
Whether land remains in use for farming or is converted to other uses is a concern for many people who see the preservation of farms as a means of preventing rapid development and its attendant congestion. A common response that

addresses the desire for farmland preservation is development easements, whereby farmland owners are compensated with public funds for forgoing the right to switch their land to other uses or sell it for development. Third District states have such programs in place, but farmers and others are concerned that the amount of money available is inadequate and the commitment to continuing these programs is uncertain. Advocacy of increased funding and dedicated revenue sources for easements has been growing. Another approach to preservation is lower taxation of farms than other properties. Those interested in arresting the decline in farming believe this approach can be extended further than it has been so far.

CONCLUSION

The total impact of changes in the way foods and fibers are produced and marketed has been summed up in the word industrialization, which is used to describe changes in the structure of agriculture that have taken place over the past two decades. As advanced technology and modern business techniques are applied to all aspects of the process that leads from the field to the dinner table, agriculture is becoming more similar to other goods-producing sectors. Industrialization requires high levels of investment and makes high levels of output possible, and both of these factors tend to result in fewer and larger farms. Some of the distinguishing features of poultry farming in Delaware are the result of industrialization, and similar developments may be in store for Pennsylvania's dairy farms. Whatever changes may lie ahead for agriculture, it is clear that farmers in the region, as in the nation generally, will have to initiate or accept innovations in how they do business in the future. The history of agriculture in the region shows that the area's farmers have displayed adaptability in the past.

APPENDIX

Value of Agricultural Products Sold - 1997**County Shares of State Agriculture**

County	Percent of State Farmland	Percent of State Farm Workers	Percent of State Farm Product Sales	County	Percent of State Farmland	Percent of State Farm Workers	Percent of State Farm Product Sales
DELAWARE							
Kent	33.57	41.99	22.25	Gloucester	7.01	11.37	9.60
New Castle	13.34	15.44	5.35	Hudson	0.00	0.00	0.00
Sussex	53.09	42.57	72.40	Hunterdon	12.64	5.31	5.17
NEW JERSEY							
Atlantic	3.73	17.61	9.10	Mercer	3.41	1.66	1.90
Bergen	0.32	1.16	1.29	Middlesex	3.37	3.00	4.93
Burlington	12.45	10.89	12.55	Monmouth	7.13	8.33	9.75
Camden	1.08	2.42	2.51	Morris	2.68	3.37	4.30
Cape May	1.16	1.09	0.98	Ocean	1.37	1.20	1.17
Cumberland	7.96	13.67	13.50	Passaic	0.27	0.47	0.55
Essex	0.00	0.21	0.18	Salem	11.06	8.96	9.74
				Somerset	5.56	2.19	2.01
				Sussex	8.77	2.49	2.75
				Union	0.00	0.52	1.43
				Warren	9.96	4.07	6.60

APPENDIX**County Shares of State Agriculture (continued)****PENNSYLVANIA**

County	Percent of State Farmland	Percent of State Farm Workers	Percent of State Farm Product Sales	County	Percent of State Farmland	Percent of State Farm Workers	Percent of State Farm Product Sales
Adams	2.49	6.47	3.75	Lackawanna	0.41	0.61	0.28
Allegheny	0.38	0.62	0.23	Lancaster	5.47	8.96	19.18
Armstrong	1.67	1.92	1.02	Lawrence	1.22	0.75	0.64
Beaver	0.75	0.45	0.31	Lebanon	1.54	2.04	4.28
Bedford	2.77	1.69	1.45	Lehigh	1.28	1.26	1.42
Berks	3.09	7.02	6.20	Luzerne	0.80	1.33	0.46
Blair	1.17	1.10	1.28	Lycoming	1.89	1.21	1.08
Bradford	4.28	1.72	2.43	McKean	0.54	0.16	0.11
Bucks	1.17	2.72	1.74	Mercer	2.32	1.77	1.15
Butler	1.65	1.21	0.69	Mifflin	1.11	0.62	1.30
Cambria	1.22	1.35	0.55	Monroe	0.36	0.25	0.13
Cameron	0.06	0.02	0.01	Montgomery	0.58	0.98	0.74
Carbon	0.28	0.30	0.19	Montour	0.56	0.51	0.66
Centre	1.90	1.25	1.26	Northampton	1.09	0.49	0.67
Chester	2.45	10.14	8.58	Northumberland	1.60	1.36	1.49
Clarion	1.31	0.59	0.41	Perry	1.60	0.60	1.47
Clearfield	0.73	0.35	0.22	Philadelphia	0.00	0.06	0.02
Clinton	0.58	0.75	0.52	Pike	0.08	0.09	0.03
Columbia	1.54	1.67	0.96	Potter	1.16	0.67	0.49
Crawford	2.89	1.49	1.46	Schuylkill	1.26	1.76	1.67
Cumberland	2.00	1.27	2.11	Snyder	1.29	1.24	1.87
Dauphin	1.21	1.40	1.34	Somerset	2.88	1.77	1.50
Delaware	0.07	0.33	0.18	Sullivan	0.38	0.23	0.18
Elk	0.24	0.07	0.05	Susquehanna	2.35	0.92	1.08
Erie	2.34	3.75	1.72	Tioga	2.82	1.32	1.18
Fayette	1.52	0.63	0.50	Union	0.88	0.84	1.24
Forest	0.07	0.05	0.03	Venango	0.64	0.19	0.16
Franklin	3.32	4.48	4.88	Warren	0.90	0.28	0.37
Fulton	1.32	0.42	0.53	Washington	2.60	1.25	0.67
Greene	1.83	0.40	0.18	Wayne	1.53	0.53	0.63
Huntingdon	1.74	1.03	1.03	Westmoreland	2.06	1.24	0.91
Indiana	1.93	2.55	1.15	Wyoming	0.85	0.72	0.75
Jefferson	1.12	0.58	0.40	York	3.64	3.31	3.22
Juniata	1.21	0.90	1.60				