

# Southwest Economy

## Globalization and Monetary Policy

Globalization is one of the most debated and analyzed phenomena of our time. Declining trade barriers and advances in technology have made it possible for consumers in the United States and around the world to purchase a variety of goods and services that would have been impossible a generation ago.

Cheaper imports have contributed to higher standards of living, but the growth of trade has also been associated with job losses as production shifts toward lowest cost producers. Freer flows of capital have made it easier for investors to seek out high returns and diversify their portfolios. International capital flows have also made it easier for businesses to raise funds for investment projects by making them less dependent on domestic institutions. Inflows of foreign capital have helped raise living standards in emerging market economies and have also increased the pressure on these countries' governments to pursue sound fiscal and monetary policies.

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## European Economic Integration: A Conflict of Visions

Economic integration is a key theme of the global era in which we live today. Perhaps the single most important example of such integration in recent decades is the European Union.

From the ashes of the wartime years, six core European nations forged a confederation that gradually grew to encompass 15 members and then 25. As the EU evolved into an economically freer and more integrated group of nations, the overall European economy has grown to the point where it rivals that of the United States (*Chart 1*).

*(Continued on page 12)*

*A simple definition  
of globalization: the  
increased interdependence  
of national economies as  
manifested in greater  
flows of goods, services  
and capital across  
national borders.*

These and many other aspects of globalization have been written about at great length. However, relatively little attention has been paid to the question of how a more integrated world economy might impact the conduct of monetary policy in the United States and around the world. In this article I explore some ideas about what globalization might mean for monetary policy.

I start by explaining what economists understand by globalization, offering a definition of the phenomenon and showing some measures of its extent. These measures also give us some historical perspective and show that in many ways globalization is not new.<sup>1</sup> I then highlight a key difference between the last era of globalization and the current one, namely, the monetary standard, and discuss some of the implications of this for monetary policy.

### Defining Globalization

Globalization means different things to different people. Indeed, the term *globalization* is much overused. It is taken to refer to many things, from the spread of culture and ideas to the ease of communication and travel in the era of the Internet and jet aircraft. Supporters of globalization hail the greater ease and quality of life in a globalized world; critics claim that free trade simultaneously impoverishes workers in poor countries while desecrating the environment and promoting mass homogenization.

There are also many popular measures of globalization. For example, a recent issue of *Foreign Policy* magazine ranked countries in terms of a variety of criteria to come up with a list of the most globalized countries.<sup>2</sup> Singapore was ranked No. 1; the United States ranked fourth, behind Ireland and Switzerland. Among the factors that went into the ratings were international travel and tourism, membership in international organizations, contributions to United Nations peace-keeping missions, international telephone traffic, Internet hosts and so on.

I propose a simple *economic* definition of globalization as the increased interdependence of national economies as manifested in greater flows of goods, services and capital across national borders. In a fully globalized world, goods, labor and capital would move between

countries with the same ease with which they move within countries. Consumers in Texas could buy goods and services from producers in Taiwan as readily as they buy from producers in Tennessee. Workers in Germany would be free to move to Ireland or the United States in pursuit of employment opportunities. Investors in China could freely choose between putting their savings in domestic bank accounts or using them to purchase shares in U.S. and European firms.

Once we have defined what we mean by globalization, we can set about constructing some measures of its extent. If markets were completely integrated and there were no trade barriers, identical goods and services would be priced very similarly around the world. The only differences would be due to transportation costs. Likewise, wage differentials would be eliminated, and equally risky assets would yield the same return. However, it is difficult to obtain the data needed to make such comparisons, so I rely instead on less perfect measures based on flows of goods, services, labor and capital across national borders. One advantage of these indicators of globalization is that they allow comparison of trends over long periods. This is an important consideration if we are to bring some historical perspective to the issue and make inferences about globalization's impact on monetary policy.

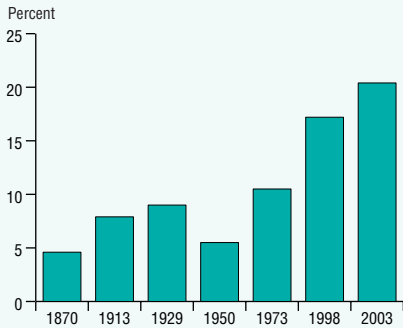
### Measures of Globalization

**Flows of Goods and Services.** Perhaps the most basic measure of the extent of globalization as I have defined it is the volume of trade between countries. Chart 1 shows global exports as a share of global gross domestic product (GDP) for selected years back to the late 19th century.<sup>3</sup> The years shown are major milestones in global economic history: the classical gold standard began in 1870 and effectively ended with the outbreak of war in 1914; the Great Depression began in 1929; the post–World War II era of rapid growth began in 1950 and ended in 1973.

The chart gives some idea of just how globalized the world was at the turn of the 20th century. Global trade peaked at 9 percent of global GDP in 1929, before collapsing as a result of the Depression and World War II. By 1950,

Chart 1

**Growth of World Trade**  
(Merchandise exports as percent of GDP)



SOURCE: Angus Maddison, *The World Economy: A Millennial Perspective*, OECD, 2001, Table F-5, "Merchandise Exports as Per Cent of GDP in 1990 Prices."

exports were only 5.5 percent of global output. They recovered steadily, however, as the world economy expanded and trade restrictions imposed during the interwar years were lowered. By 2003, the last year for which we have data, global exports amounted to just over 20 percent of global GDP.

**Flows of Capital.** Another important dimension of globalization is flows of capital. Other things being equal, basic economic reasoning predicts that capital should tend to flow from countries where capital is abundant to countries where capital is scarce. And indeed this is what happened prior to World War I. Chart 2 shows foreign capital stock as a share of the GDP of developing countries (defined as Africa, non-Japan Asia and Latin America). On the eve of World War I, foreign investment amounted to almost one-third of developing countries' GDP. In the post-World War II period, the share of foreign investment has never approached this level, so along this dimension, the world is a lot less globalized than it used to be.

A more comprehensive view of global capital flows is obtained by taking into account the large flows of capital that now occur between developed countries in addition to the flows from rich to poor countries. One simple measure of this broader concept of capital mobility is the stock of foreign liabilities as a percentage of global GDP. As Chart 3 shows,

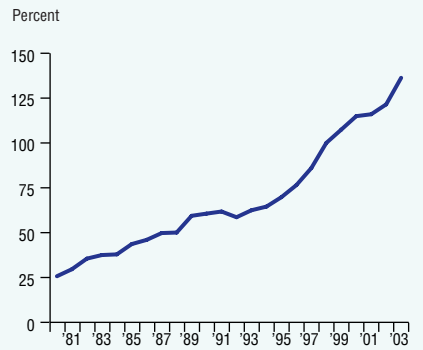
this ratio has increased steadily over time, from around 25 percent in 1980 to nearly 140 percent today. Much of this takes the form of rich countries borrowing from and lending to other rich countries. For example, the European Union remains the single most important destination of U.S. direct investment abroad and also the single most important source of direct investment in the United States.

**Flows of Labor.** It is more difficult to get comprehensive data on the movement of workers between countries over long periods. We all know there were mass movements of people from the Old World to the New World in the 19th century. Less well documented are the migrations that took place in other parts of the world and at other times. Here I focus just on migration to the United States.

Chart 4 shows the importance of immigration as measured by the share of the foreign-born in the total U.S. population. While the number of immigrants to the United States in recent years exceeds what we experienced in the 19th century, they make up a smaller share of the population. In the 2000 census, foreign-born residents made up 12.5 percent of the U.S. population—still somewhat below the near 15 percent that immigrants accounted for in the 19th century. Because of immigration restrictions and the rise of the welfare state, we are

Chart 3

**Growth of Global Capital Markets**  
(Foreign liabilities as a percent of world output)



SOURCE: *International Financial Statistics*, International Monetary Fund.

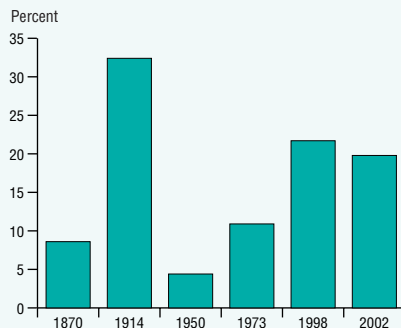
unlikely to ever again see movement of workers across national boundaries on a scale comparable with what we saw in the late 19th century. But it is also worth bearing in mind the rise of what some have referred to as virtual immigration (or offshore outsourcing), where new technologies make it easier to take jobs to workers rather than have the workers come to the jobs in the United States.

By the way, the United States is not unique in receiving large inflows of immigrants in recent years. Foreign-born nationals are a higher percentage of the populations of several other developed countries, including Australia (23 percent), Switzerland (22.4 percent) and Canada (19.3 percent). And immigrants account for about the same share of the populations of Germany and Austria as they do in the United States.<sup>4</sup> According to the United Nations, in 2002 some 175 million people, or about 3 percent of the world's population, lived outside their country of birth.<sup>5</sup>

The extent of globalization on the eve of World War I was famously summarized by the great British economist John Maynard Keynes in his book critiquing the Treaty of Versailles, *The Economic Consequences of the Peace* (see box). This quote from Keynes is probably overused in the literature on globalization, but it is nevertheless an important warning not to take for granted the gains of recent decades. The liberal international economic order is under constant

Chart 2

**Global Capital Flows**  
(Foreign capital stock as percent of developing countries' output\*)



\* Developing countries include Africa, Asia excluding Japan, and Latin America.  
SOURCE: Angus Maddison, *The World Economy: A Millennial Perspective*, OECD, 2001, Table 3-3, "Gross Value of Foreign Capital Stock in Developing Countries, 1870-1998."

threat, and one can imagine scenarios in which much if not all of the progress we have made in the postwar period would be quickly reversed.

## Commodity Money and Fiat Money

Given that the world has experienced globalization on a scale comparable with what we are witnessing today, it seems reasonable to look at how central bankers conducted monetary policy during the earlier era to see what lessons it may hold for contemporary monetary policy. Unfortunately, history offers relatively little guidance on this issue. Here's why.

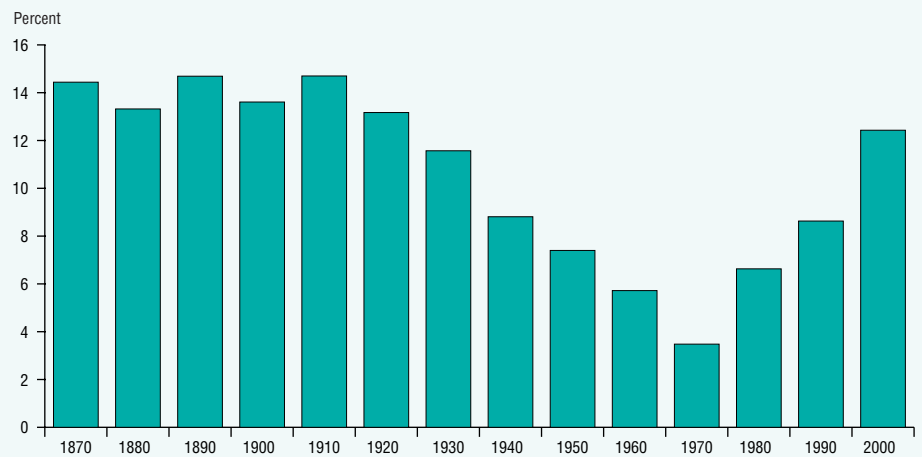
A major difference between the current era of globalization and the last era has to do with the monetary institutions. At the turn of the 20th century, most of the world was on a commodity standard; currencies were backed by precious metals, in almost all cases gold. The need to maintain convertibility into precious metals limited the ability of central banks to change interest rates at will; that is, central banks had very limited discretion when it came to monetary policy.

One of the great benefits of the commodity standards that prevailed in the previous era of globalization was that price levels were relatively stable. Periodic inflations were followed by deflations, with the result that over long periods the price level remained nearly constant. There is some debate about whether this greater price stability was accompanied by greater instability of the real economy. The idea of using monetary policy to smooth out the business cycle is very much a by-product of the Keynesian revolution during the interwar period.

To get a sense of just how much nominal stability the gold standard conferred, take a look at Chart 5, which shows the price level in the United States for the past two centuries. It is clear that the level was a lot more stable under the gold standard than it was after its abandonment. Between 1820, when the United States went on the gold standard, and 1932, when the gold standard was abandoned, the average annual inflation rate in the United States was essentially zero. Since 1932, the average annual inflation rate has been about 3.8 percent, although in recent years the rate has been lower than that. However, the greater

Chart 4

## Stock of Immigrants in the United States (Foreign-born as percent of U.S. population)



SOURCES: *Historical Statistics of the United States, Colonial Times to 1970*, Census Bureau.

long-run stability of prices that prevailed when the United States was on the gold standard came at the cost of greater short- and medium-run volatility of inflation rates.<sup>6</sup>

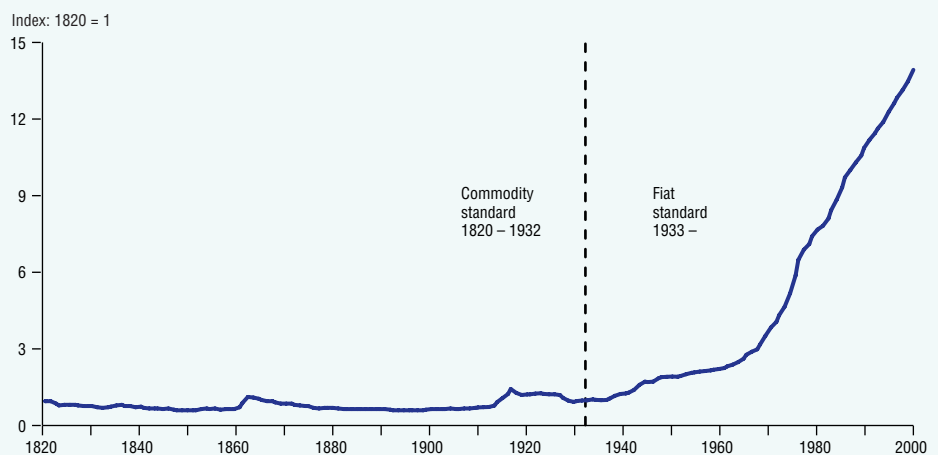
While the classical gold standard era ended essentially in the interwar period, the last vestiges did not really disappear until the early 1970s, when the so-called Bretton Woods system of fixed exchange rates collapsed. Since then, the world has been on what economists call a fiat monetary standard, in which national currencies

are no longer backed by precious metals or other commodities. They are no longer convertible into something other than themselves.

This in itself raises interesting problems for monetary theorists: Why are people willing to exchange valuable goods and services for objects that have no inherent value? This might seem like a rather esoteric question, but coming up with a satisfactory answer has proven quite difficult. While it might seem that spending time on such a question is an

Chart 5

## Price Level in the United States



SOURCE: *Handbook of U.S. Labor Statistics*, Bureau of Labor Statistics, <http://woodrow.mpls.frb.fed.us/research/data/us/calc/hist1800.cfm>.

## 'The Economic Consequences of the Peace'

What an extraordinary episode in the economic progress of man that age was which came to an end in August, 1914! The greater part of the population, it is true, worked hard and lived at a low standard of comfort, yet were, to all appearances, reasonably contented with this lot. But escape was possible, for any man of capacity or character at all exceeding the average, into the middle and upper classes, for whom life offered, at a low cost and with the least trouble, conveniences, comforts, and amenities beyond the compass of the richest and most powerful monarchs of other ages. The inhabitant of London could order by telephone, sipping his morning tea in bed, the various products of the whole earth, in such quantity as he might see fit, and reasonably expect their early delivery upon his door-step; he could at the same moment and by the same means adventure his wealth in the natural resources and new enterprises of any quarter of the world, and share, without exertion or even trouble, in their prospective fruits and advantages; or he could decide to couple the security of his fortunes with the good faith of the townspeople of any substantial municipality in any continent that fancy or information might recommend. He could secure forthwith, if he wished it, cheap and comfort-

able means of transit to any country or climate without passport or other formality, could despatch his servant to the neighboring office of a bank for such supply of the precious metals as might seem convenient, and could then proceed abroad to foreign quarters, without knowledge of their religion, language, or customs, bearing coined wealth upon his person, and would consider himself greatly aggrieved and much surprised at the least interference. But, most important of all, he regarded this state of affairs as normal, certain, and permanent, except in the direction of further improvement, and any deviation from it as aberrant, scandalous, and avoidable. The projects and politics of militarism and imperialism, of racial and cultural rivalries, of monopolies, restrictions, and exclusion, which were to play the serpent to this paradise, were little more than the amusements of his daily newspaper, and appeared to exercise almost no influence at all on the ordinary course of social and economic life, the internationalization of which was nearly complete in practice.

—John Maynard Keynes, *The Economic Consequences of the Peace*,  
New York: Harcourt, Brace and Howe,  
1920, pp. 10–12.

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academic luxury, the answer matters because it has implications for many of the other more practical problems that monetary policymakers have to deal with on a regular basis.

Let's consider three important implications of fiat money standards for monetary policy.

**The Size of the Money Stock.** One of the key characteristics of fiat money is that it is for all intents and purposes costless to create.<sup>7</sup> Yet fiat currency has a positive value to society as a whole because it facilitates economic activity. In a famous article, Milton Friedman first posed the question of how a central bank should determine the size of the money supply under such circumstances.<sup>8</sup> Basic economic reasoning indicates that the optimal amount of any commodity is the amount that equates the marginal cost of producing it to the marginal cost of using it. The opportu-

nity cost of holding money is essentially the short-term interest rate, so Friedman concluded that the optimal quantity of money for society as a whole is the quantity that drives short-term interest rates to zero. With real interest rates determined by savings and investment opportunities and presumably positive, this would call for central banks to engineer steady deflations to maximize welfare.

The logic of Friedman's argument is compelling, yet it has never convinced central bankers. As recent U.S. and Japanese experience shows, central bankers are very adverse to deflation, arguably more so than they are to inflation. Part of the reason for this is that we do not fully understand how deflations work and whether there is a meaningful distinction between "good" and "bad" deflations.

**Rules Versus Discretion.** A second key feature of fiat monetary standards is

*There is general agreement among economists and central bankers alike that monetary policy should be rule based, although there is less agreement as to what form desirable rules should take.*

that because the central bank is not required to maintain convertibility of the currency into some intrinsically valuable commodity, it has considerable discretion as to how rapidly it lets the money stock grow and prices increase. In 2004, Finn Kydland and Edward Prescott received the Nobel Prize in economics for (among other things) work they did pointing out how central banks may be tempted to create too much inflation in such circumstances, even if they are acting in the best interests of society as a whole.<sup>9</sup>

Largely as a result of the work of Kydland and Prescott, economists have spent the past decade thinking about optimal rules for monetary policy. There is general agreement among economists and central bankers alike that monetary policy should be rule based, although there is less agreement as to what form desirable rules should take. One of the most popular rules for central bank behavior is one devised by John Taylor of Stanford University, relating the setting of interest rates to measures of the deviation of output from potential (the output gap) and the deviation of inflation from target.<sup>10</sup> As economies become more open and exposed to global trade, it is worth asking whether the optimal specification of such rules needs to change to take account of broader measures of slack and inflation pressures.

**Exchange Rates.** A third feature of fiat money is that in the absence of any restrictions on what currencies households and businesses may use, the exchange rate between them is indeterminate.<sup>11</sup> That is, in a fully integrated world where governments did not intervene in foreign exchange markets, the exchange rate between any two currencies will be whatever holders of the currencies expect it to be. Thus, under a floating exchange rate regime, exchange rates will be unpredictable and will impose unnecessary costs on households and businesses seeking to do business with foreign countries. Arguably a better state of affairs would be a system of fixed exchange rates, with central banks agreeing to convert each others' liabilities on demand and in any amount and sharing the seigniorage revenue from money creation according to a preset formula. This is something like what the Europeans have agreed to do with economic and monetary union (EMU).

## Globalization and Disinflation

A more practical question might be to ask how globalization has impacted inflation. For about a quarter century following the end of World War II, the Bretton Woods system of fixed exchange rates anchored inflation rates around the world. As Chart 6 shows, for about 10 years following the end of World War II not a single country experienced high inflation, which I define as an annual rate in excess of 25 percent. From the late 1950s until the early 1970s, episodes of high inflation were still rather rare. With the collapse of the Bretton Woods system in 1971 and the oil shocks that followed, episodes of high inflation became a lot more common, with no fewer than 49 countries experiencing high inflation in 1994. But note that since then, the number of countries experiencing high inflation has declined to nearly zero. The average inflation rate has also declined, from a peak of more than 35 percent in the early 1990s to less than 5 percent today.

This decline has taken place at the same time that world trade has continued to grow, prompting some analysts to claim that there is a causal link between the two. Cruder versions of this story routinely confuse relative price changes and price level changes. More sophisticated versions look at the political economy of monetary policy and examine how globalization has altered the incentives of central banks to engineer inflation.

One basic story that builds on the insights of Kydland and Prescott goes as follows.<sup>12</sup> In the presence of taxes, tariffs and other regulations that cause economic activity to be lower than it would be otherwise, central banks that are not bound by rules will have an incentive to try to engineer surprise inflations to boost economic activity. Households and businesses understand the incentive of central banks to behave this way and come to expect the higher inflation. The net result is higher inflation with no gain in real economic activity. However, as the taxes, tariffs and regulations that depress economic activity are removed, the incentive of central banks to engineer higher inflation will fall and so, too, will the actual inflation rate. Thus, we might expect to see declining inflation as the world becomes more integrated as a result of deregulation and freer trade.

Chart 6

**The Rise and Fall of Inflation**  
(Countries experiencing high inflation)



SOURCE: *International Financial Statistics*, International Monetary Fund.

Appealing as this story might be, it is not the only one we can tell to interpret what we have seen over the past couple of years. An alternative and equally plausible explanation is that central banks have simply learned the limits of their ability to fine-tune the economy after the experiences of the 1970s in the industrialized countries and of the 1980s and 1990s in the emerging market economies. Many central banks now have formal inflation targets and have been granted independence to pursue price stability as a primary goal. Under this reading of the data, the simultaneous decline of inflation and growth of globalization are simply coincidence. An important research question is the relative importance of the two explanations in accounting for what has been going on.

A cursory examination of the data shows that it is far from clear what the answer will be. As you can see in Chart 7, there was indeed a significant decline in the prevalence of inflation around the world during the past decade, during which the share of exports in global GDP increased from around one-fifth to around one-quarter. However, note that an even larger increase in the importance of trade occurred during the 1970s and 1980s as inflation was accelerating. If growth in world trade acted as a restraint on inflation in recent years, why wasn't it equally successful at restraining inflation in the earlier period?

**Conclusions**

This article has shown that in many ways, there is nothing new about globalization. In the years prior to World War I, goods, capital and labor flowed across national borders with the same ease as they do today and, in some cases, with greater ease. However, the monetary standard under which globalization took place in the late 19th and early 20th centuries was very different from the monetary standard under which globalization is occurring today. And therein lies the challenge for monetary policymakers.

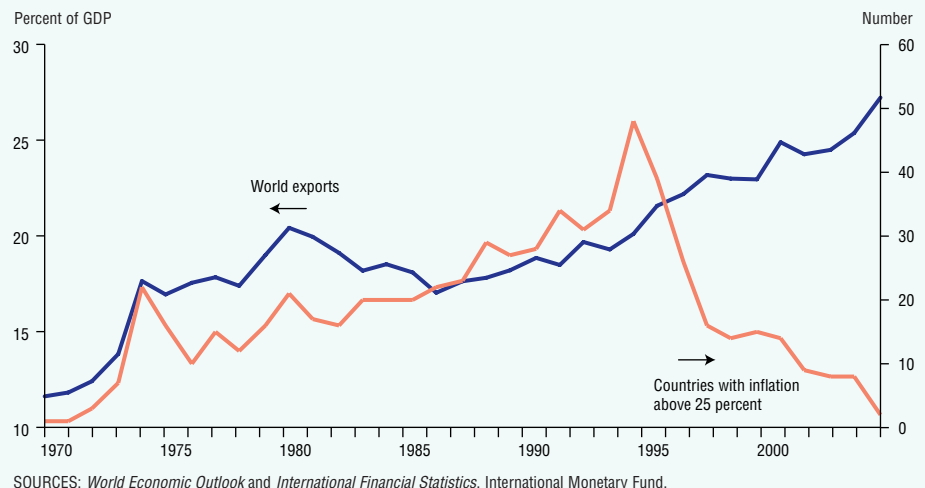
This article has scratched the surface of what the greater integration of the world economy might mean for monetary policy in the United States and around the world. I reviewed a small subset of the issues that globalization raises for monetary policymakers. There are many more that need to be addressed.

For example, how exactly should we define and measure the phenomenon of globalization? I presented some simple measures of globalization based on export data, capital flows and migration. A more economically meaningful measure of globalization would probably look at consumption volatility as well and the co-movement of consumption in different countries.

How does globalization affect strategy and tactics of monetary policy? Does globalization make the case for an explicit numerical price objective for monetary policy (an inflation target) more or less compelling? How does globalization affect the so-called Phillips curve, that is, the relationship between inflation and unemployment (or something similar) that forms such an important part of many central bankers' analytical apparatus? There are grounds for thinking that in economies that are more open to trade and capital flows, a decline in the unemployment rate, other things being equal, is associated with a smaller increase in inflation.<sup>13</sup> Of course, there is also a body of thought that argues that even in

Chart 7

**Globalization and Disinflation?**  
(World trade and prevalence of high inflation)



SOURCES: *World Economic Outlook* and *International Financial Statistics*, International Monetary Fund.

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closed economies the Phillips curve is essentially useless as a guide for setting interest rates, and it is arguably just as useless in an open economy.

I discussed how under a fiat money standard, fixed exchange rates may be preferable to floating exchange rates. Would the United States really be better off if we were to participate in a new system of fixed exchange rates with the dollar, the euro and the yen pegged at 1–1–100, as some have suggested? Should there be more coordination of monetary and fiscal policies between the major economies, or is conversation preferable to formal coordination, as Federal Reserve Board Vice Chairman Roger Ferguson recently suggested?<sup>14</sup>

Has globalization had a strong effect on global inflation, or is the improved inflation performance of the past decade or so due to better policy on the part of central banks around the world? Is China having a restraining influence on U.S. inflation, as some have suggested? Or is it still too small to account for more than a few tenths of a percent of the lower inflation in the United States in recent years, as Federal Reserve Board research seems to suggest?<sup>15</sup>

These and many other questions will be addressed in subsequent articles in this and other Federal Reserve Bank of Dallas publications in coming years.

—Mark A. Wynne

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## Notes

<sup>1</sup> For an excellent review of the first era of globalization, see *Globalization and History: The Evolution of a Nineteenth-Century Atlantic Economy*, by Kevin H. O'Rourke and Jeffrey G. Williamson, Cambridge, Mass.: MIT Press, 1999.

<sup>2</sup> "Measuring Globalization: The Global Top 20," *Foreign Policy*, May/June 2005, pp. 52–60.

<sup>3</sup> Note that the chart refers to merchandise exports only. Exports of services are now a significant share of total exports, but we do not have reliable estimates of global exports of services prior to World War II.

<sup>4</sup> "Counting Immigrants and Expatriates in OECD Countries: A New Perspective," by Jean-Christophe Dumont and Georges Lemaître, Paris: OECD, Directorate for Employment Labor and Social Affairs, 2005.

<sup>5</sup> *International Migration Report 2002*, New York: United Nations, 2002.

<sup>6</sup> There is also some debate about whether the greater nominal stability the United States experienced under the gold standard came at the cost of greater instability of real economic activity—that is, more frequent and severe recessions.

<sup>7</sup> According to the Bureau of Engraving and Printing, it costs about 6 cents per note to print U.S. currency.

<sup>8</sup> "The Optimum Quantity of Money," in Milton Friedman, *The Optimum Quantity of Money and Other Essays*, Chicago: Aldine, 1969.

<sup>9</sup> "Rules Rather Than Discretion: The Inconsistency of Optimal Plans," by Finn E. Kydland and Edward C. Prescott, *Journal of Political Economy*, vol. 85, June 1977, pp. 473–91.

<sup>10</sup> "Discretion Versus Policy Rules in Practice," by John B. Taylor, *Carnegie-Rochester Conference Series on Public Policy*, vol. 39, December 1993, pp. 195–214.

<sup>11</sup> This argument was first developed by Neil Wallace in his paper "Why Markets in Foreign Exchange Are Different from Other Markets," Federal Reserve Bank of Minneapolis *Quarterly Review*, Fall 1979, pp. 1–7. A very good exposition of Wallace's argument is in *Modeling Monetary Economies*, by Bruce Champ and Scott Freeman, New York: John Wiley and Sons, 1994 (second ed., Cambridge: Cambridge University Press, 2001). See also "A Case for Fixing Exchange Rates," by Arthur J. Rolnick and Warren E. Weber, Federal Reserve Bank of Minneapolis Annual Report, 1989, pp. 3–14.

<sup>12</sup> This argument was first expressed by Kenneth Rogoff in "Globalization and Global Disinflation," Federal Reserve Bank of Kansas City *Economic Review*, Fourth Quarter 2003, pp. 45–78.

<sup>13</sup> See, for example, "The 'New Keynesian' Phillips Curve: Closed Economy Versus Open Economy," by Assaf Razin and Chi-Wa Yuen, *Economics Letters*, vol. 75, March 2002, pp. 1–9; "Globalization and Disinflation: A Note," by Assaf Razin, NBER Working Paper No. 10954, December 2004; and "Capital Mobility and the Output–Inflation Trade-off," by Prakash Loungani, Assaf Razin and Chi-Wa Yuen, *Journal of Development Economics*, vol. 64, February 2001, pp. 255–74.

<sup>14</sup> "Globalization: Evidence and Policy Implications," by Roger Ferguson, remarks to the Association for Financial Professionals Global Corporate Treasurers Forum, San Francisco, May 12, 2005, [www.federalreserve.gov/boarddocs/speeches/2005/20050512/default.htm](http://www.federalreserve.gov/boarddocs/speeches/2005/20050512/default.htm).

<sup>15</sup> "Is China 'Exporting Deflation?'" by Steven B. Kamin, Mario Marazzi and John W. Schindler, Federal Reserve Board International Finance Discussion Papers No. 791, January 2004. The authors find that the impact of Chinese exports on inflation in the United States is of the order of magnitude of a quarter of a percentage point or so.



# Natural Gas Pricing: Do Oil Prices Still Matter?

For a number of years, natural gas and refined petroleum products have been used as close substitutes in U.S. industry and electric power generation. Industry and electric power generators have switched back and forth between natural gas and residual fuel oil, preferring to use whichever energy source was less expensive. Consequently, movements of natural gas prices in the United States have generally tracked those of crude oil. Most often, crude oil prices are shaped by world oil market conditions, and natural gas prices adjust to oil prices.

Over the past 10 years, however, the number of facilities able to switch between natural gas and residual fuel oil has declined. And in the most recent five years, natural gas prices seemed to move somewhat independently of oil prices. Natural gas prices rose above what was seen as their historical relationship with crude oil prices in 2000, 2002 and 2003. In the first half of 2005, natural gas prices seemed to fall below this historical relationship.

Consequently, many may wonder whether oil price movements still shape those of natural gas and whether the old rules of thumb for relating natural gas prices to those of crude are still useful. The analysis presented here shows oil prices do still matter for natural gas prices, but the old rules of thumb relating natural gas prices to those for oil are of limited usefulness.

## Two Simple Rules of Thumb

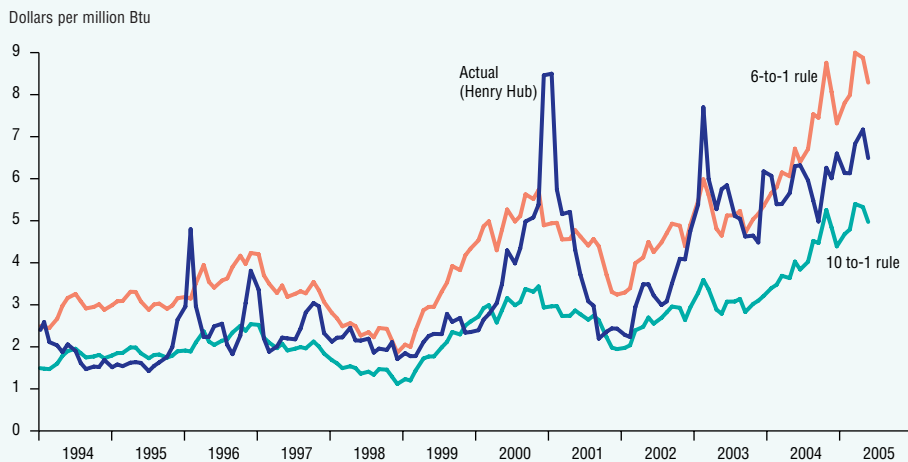
One commonly used rule of thumb relating natural gas prices to crude oil is the 10-to-1 rule, in which the price of natural gas is one-tenth the crude oil price:

$$P_{NG} = .1 \times P_{WTI},$$

where  $P_{NG}$  is the Henry Hub price of natural gas in dollars per million Btu and  $P_{WTI}$  is the price of West Texas Intermediate (WTI) crude oil in dollars per barrel. Under this rule of thumb, a WTI price of \$20 per barrel would mean a

Chart 1

## Actual and Implied Natural Gas Prices Using 10-to-1 and 6-to-1 Rules of Thumb



SOURCES: New York Mercantile Exchange; author's calculations.

natural gas price of \$2 per million Btu at Henry Hub, and \$50 oil would mean \$5 natural gas.

Some energy analysts have argued that natural gas really ought to trade at the same price per million Btu as crude oil. Because a barrel of WTI contains 5.825 million Btu, those analysts have used a 6-to-1 rule, in which the natural gas price ought to be roughly one-sixth the crude oil price:

$$P_{NG} = .1667 \times P_{WTI}.$$

Under this rule of thumb, a WTI price of \$20 per barrel would mean a natural gas price of \$3.33 per million Btu at Henry Hub, and \$50 oil would mean \$8.33 natural gas.

When used to assess the relationship between U.S. natural gas prices and WTI, neither the 10-to-1 nor the 6-to-1 rule of thumb seems to perform well (*Chart 1*). The 10-to-1 rule consistently underforecasts natural gas prices, and the 6-to-1 rule generally overforecasts them. Moreover, as oil and natural gas prices have risen, they seem to be making a transi-

tion from the 10-to-1 rule to the 6-to-1 rule.

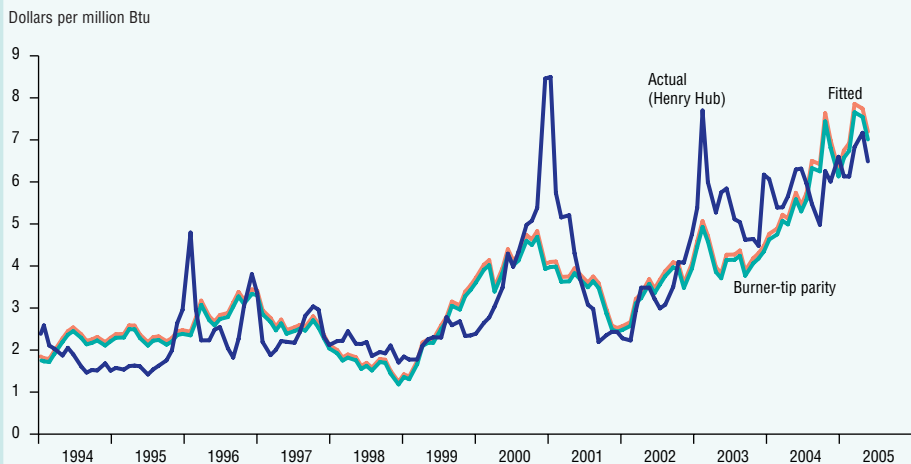
## Burner-Tip Parity

A few analysts have interpreted the apparent transition from the 10-to-1 rule to the 6-to-1 rule as indicative of improving market conditions for natural gas. In fact, the seeming transition in pricing may reflect a more complex relationship between natural gas and oil prices. The competition between residual fuel oil and natural gas occurs where they are used—at the burner tip. Therefore, natural gas pricing should yield parity at the burner tip, and prices at the trading hubs should adjust to whatever is necessary to achieve burner-tip parity. In fact, residual fuel oil sells for less than WTI, and natural gas costs more to move to end users than residual fuel oil.

If we explicitly consider the historical relationship between prices for residual fuel oil and WTI, convert to million Btu and subtract the higher costs of transporting natural gas to market, we obtain a rule of thumb based on burner-tip parity:

Chart 2

### Actual and Implied Natural Gas Prices Using Burner-Tip Parity and Fitted Values



SOURCES: New York Mercantile Exchange; author's calculations.

Hub, and \$50 WTI would mean \$7.24 natural gas. For these prices, a 150 percent increase in the oil price would mean a 177 percent increase in the natural gas price.

Fitted values from the regression analysis and those obtained through the burner-tip parity rule show that U.S. natural gas prices generally track those of WTI (Chart 2). Nonetheless, there appear to be a number of occasions when natural gas prices have decoupled from those of crude oil. In particular, natural gas prices seem to have pulled away from oil prices in 2000, 2002 and 2003 and then fallen behind in 2005.

### Seasonality and Storage

Seasonality and the natural gas in storage also play a prominent role in natural gas prices. Because natural gas consumption is seasonal but production is not, natural gas inventories are built during the summer for use in the winter (Chart 3). This seasonality leads to higher winter prices and lower summer prices. In addition, inventories above the seasonal average depress prices, and inventories below the seasonal average boost prices. Taking these additional factors into account in a regression analysis using weekly data yields

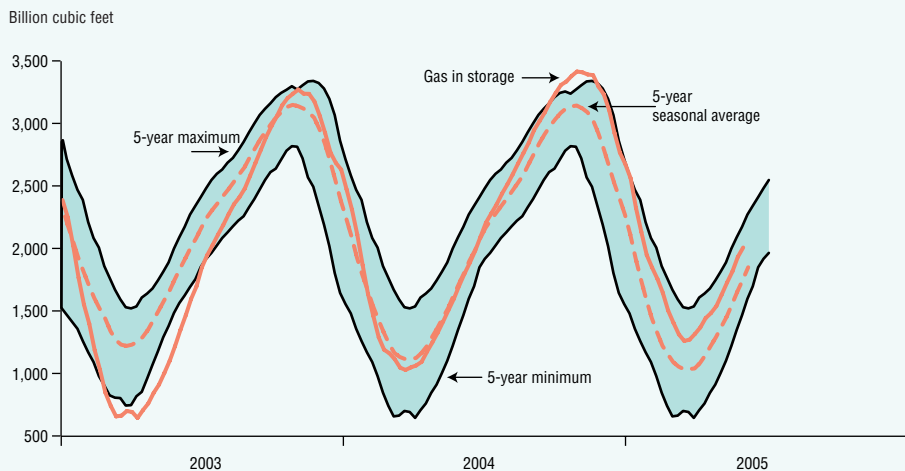
$$P_{NG} = -.3345 + WSF - .0265 \times ST + .1503 \times P_{WTI},$$

where *WSF* is a weekly seasonal addition to or subtraction from the price of natural gas and *ST* is the percent deviation of natural gas in storage from the weekly seasonal average for the previous five years. Seasonal factors affect the price of natural gas considerably—adding 94 cents per million Btu in the last week of the year and subtracting 55 cents per million Btu in the 38th week of the year (Table 1). Storage 10 percent below the weekly seasonal average adds 26 cents per million Btu.

These weekly seasonal factors and storage conditions allow for considerable variation in the price of natural gas for any given oil price. With natural gas 10 percent above the normal seasonal average, a \$20 per barrel price for WTI would imply a natural gas price of \$1.86 per million Btu at Henry Hub in the 38th week of the year. With natural gas 10

Chart 3

### Natural Gas in Storage Above Seasonal Average



SOURCE: U.S. Information Administration, Department of Energy.

$$P_{NG} = -.5 + .1511 \times P_{WTI}.$$

Under this rule, a \$20 per barrel price for WTI would mean a natural gas price of \$2.52 per million Btu at Henry Hub, and \$50 WTI would mean \$7.06 natural gas. For these prices, a 150 percent increase in the oil price would mean a 180 percent increase in the natural gas price.

Regression analysis using monthly data yields

$$P_{NG} = -.4744 + .1543 \times P_{WTI}.$$

With the relationship obtained through regression analysis, a \$20 per barrel price for WTI would imply a natural gas price of \$2.61 per million Btu at Henry

Table 1

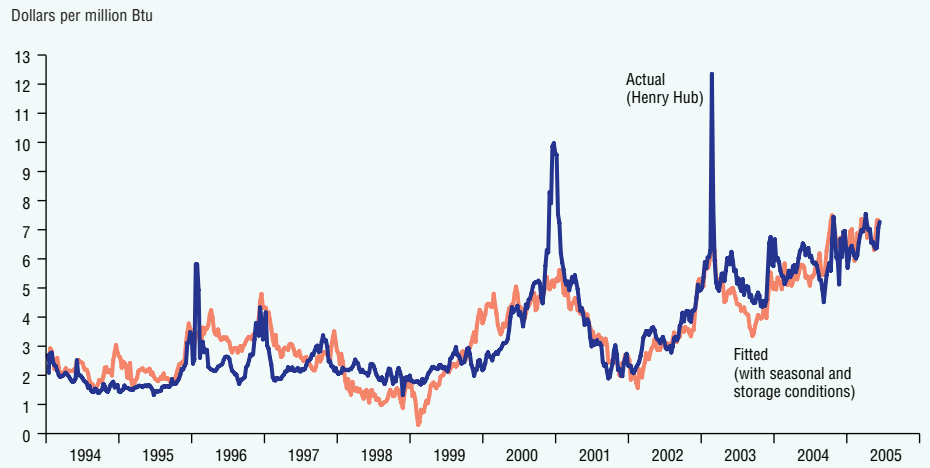
### Estimated Weekly Seasonal Factors

Week	Factor	Week	Factor
1	.7755	27	-.0192
2	.6901	28	-.1600
3	.6833	29	-.1948
4	.3790	30	-.2917
5	.6603	31	-.3226
6	.6289	32	-.2775
7	.4511	33	-.3579
8	.0766	34	-.4062
9	.0660	35	-.4215
10	.4768	36	-.5056
11	.0605	37	-.5435
12	-.1538	38	-.5510
13	-.0649	39	-.5060
14	-.0977	40	-.4112
15	-.0431	41	-.3920
16	.0545	42	-.3888
17	.0118	43	-.2843
18	-.0269	44	-.1322
19	-.0579	45	-.0257
20	-.1216	46	-.0460
21	-.0935	47	-.0475
22	-.0356	48	-.0252
23	-.0233	49	-.0833
24	.0060	50	.4254
25	-.0223	51	.7122
26	.0335	52	.9427

NOTE: By construction, the weekly seasonal factors have a zero mean.

Chart 4

### Actual and Implied Natural Gas Prices Incorporating Seasonal Factors and Storage Conditions



SOURCES: New York Mercantile Exchange; author's calculations.

### A Relatively Stable and Complex Relationship

A number of common rules of thumb imply that the relationship between U.S. natural gas and crude oil prices has changed or that oil prices no longer affect natural gas prices. This view has been bolstered by the observation that industrial and electric power-generation facilities are less able to switch between natural gas and residual fuel oil than they were in the past. When we take into account the normal seasonal variation in natural gas prices and the amount of natural gas in storage, however, we find compelling evidence that U.S. natural gas prices continue to be related to those for crude oil. The relationship is relatively stable and complex.

—Stephen P. A. Brown

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### Note

The author thanks Mike Cox for helpful conversations and Raghav Virmani for able assistance.

percent below the normal seasonal average, a \$20 per barrel price for WTI would imply a natural gas price of \$3.88 per million Btu at Henry Hub in the last week of the year. Comparable figures for \$50 WTI are \$6.36 and \$8.39 per million Btu, respectively.

With variations in natural gas storage of  $\pm 10$  percent, a 150 percent gain in the crude oil price could result in the natural gas price rising by less than 65 percent or more than 350 percent. It's no wonder that analysis using rules of thumb to price natural gas suggests that the relationship between natural gas and crude oil prices has changed. In contrast, fitted values from the regression analysis with weekly seasonal factors and storage conditions taken into account show that U.S. natural gas prices track those of WTI quite well (*Chart 4*).

# European Economic Integration

(Continued from front page)

A further step toward economic integration was at stake on May 29, when French voters cast their ballots on a proposed European constitution. The debate had been framed in cataclysmic terms, with proponents arguing that a French rejection could be a “fatal blow” to further European integration. Proponents went on to say that there was no Plan B—implying the French either must approve the proposed constitution or bear responsibility for what former EU Presi-

dent Romano Prodi called “the end of Europe.”

French voters rejected the constitution by a 10-point margin, and the Dutch followed suit three days later with an even more resounding rejection of the document. Yet the EU did not end. Indeed, it could not end because its existing treaties and regulations remain in place indefinitely unless superseded by a new governing structure. So in a very real sense, the EU to which French and Dutch

voters awoke in June was the same Europe to which they had awoken the month before.

In and of itself, the proposed constitution would have little effect on the overall European economy. Indeed, primary author Valéry Giscard d’Estaing describes its economic provisions as a “tidying-up” of existing guidelines, rather than a renewed effort at economic reform. But the debate that has broken out in the wake of the French and Dutch referendums does have important implications for Europe’s economic future and, by extension, the economic future of the United States. The question is simple: To what extent and in what manner should European integration continue?

## The Evolving European Union

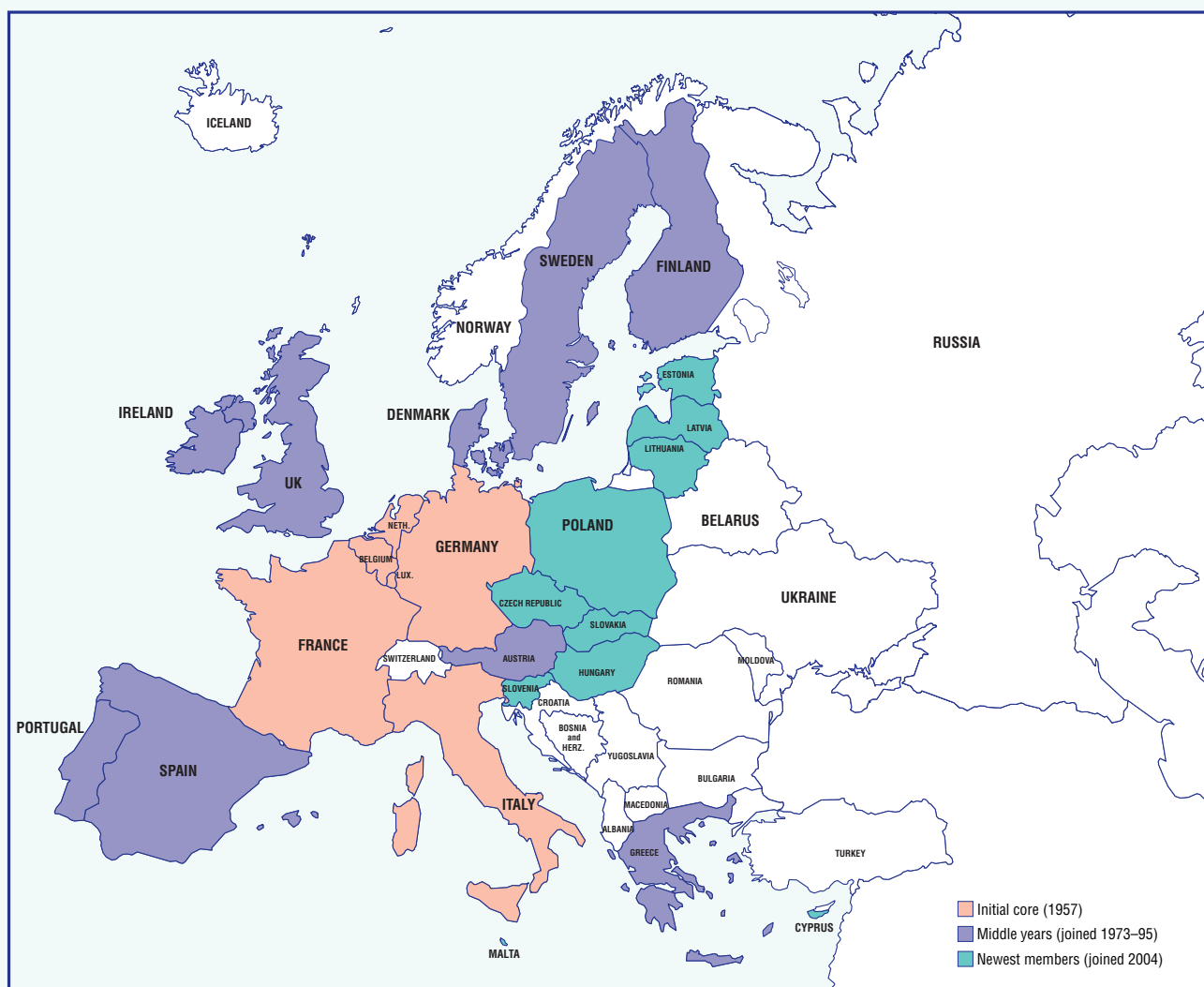
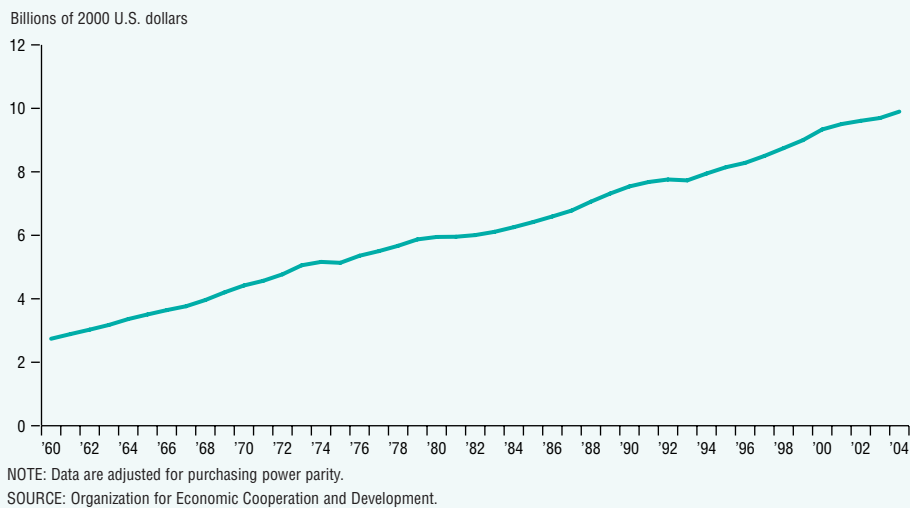


Chart 1

## European Union GDP Grows Steadily



### The Benefits of Economic Integration

Economists generally support economic integration because it eliminates certain inefficiencies. When states in a common market choose different tax and labor policies, for example, workers and businesses have an incentive to move from states where taxes are high to states where they are low. Similarly, those who receive government subsidies have an incentive to move from states where subsidies are low to states where they are high. This migration punishes socially progressive states by simultaneously raising the amount they must spend and reducing the tax revenue available to meet their obligations.

Some believe this competition goes too far. The Organization for Economic Cooperation and Development recently concluded that the developed world should eliminate “harmful tax competition” between states. German Chancellor Gerhard Schröder echoed these concerns in a European Union context, arguing that low tax rates in its newly admitted Eastern members constitute “unfair tax competition.” French President Jacques Chirac even coined a new term—“social dumping”—to describe the process by which laissez-faire states import workers and businesses from more highly regulated EU members.

Economics textbooks reveal the solution to this apparent dilemma. If compe-

tion between states for individuals and businesses is undesirable, such competition can be reduced or even eliminated through common economic policies. Simply compel all members of a federation to offer the same business climate and social safety net, and neither individuals nor businesses will migrate in search of something that better suits their needs. This would relieve the fiscal pressure on high-benefit states and thereby strengthen what is often called “social Europe.” Further economic integration, in other words, is the answer.

But there is more than one kind of economic integration. The North American Free Trade Agreement provides a useful example in this regard. When NAFTA was debated in the early 1990s, many unions felt the treaty should impose U.S. labor and environmental laws on Mexico. Business groups vigorously disagreed, arguing that such a requirement would weaken the competitive forces NAFTA was intended to unleash. The argument was not so much over whether to integrate the U.S. and Mexican economies but how to integrate them.

Much the same rhetoric has been heard in the debate over the European constitution. As Chirac said in mid-April, the EU faces a conflict of visions on how to further integrate members’ economies. “The first,” he said, is “to go with the Anglo-Saxon and Atlantic liberal current” of low tax rates and flexible labor mar-

*The debate that has broken out in the wake of the French and Dutch referendums on the proposed constitution has important implications for Europe’s economic future and, by extension, the economic future of the United States.*

kets. “That is not what we want. The second solution is that of a humanist and therefore organized Europe,” he concluded, that can “stop the drift toward economic ultra-liberalism.”

So it is not economic integration per se that is being debated, because a uniformly low-tax Europe with flexible labor markets would be just as integrated as a Europe that embraces uniformly high tax rates and inflexible labor markets. Rather, the question is what sort of further economic integration Europe will pursue.

If the European economy would be equally productive under either approach, economics would have little to say about these two visions. But this is not the case. It may be true that individuals and businesses could not escape a uniformly high-tax, high-benefit Europe through migration. But individuals could reduce their workweek or leave the workforce entirely, and businesses that would barely survive under a low tax burden would fail if confronted by a higher one. Such individuals and businesses would simply cease to exist as far as production is concerned, becoming either welfare recipients or bankrupt enterprises.

Those are the unspoken economic stakes behind the conflict of visions. In essence, integration along British norms would propel EU members toward a future of high growth and low unemployment, while integration along German norms would drag EU members toward low growth and high unemployment.

## Liberalization Versus Economic Integration

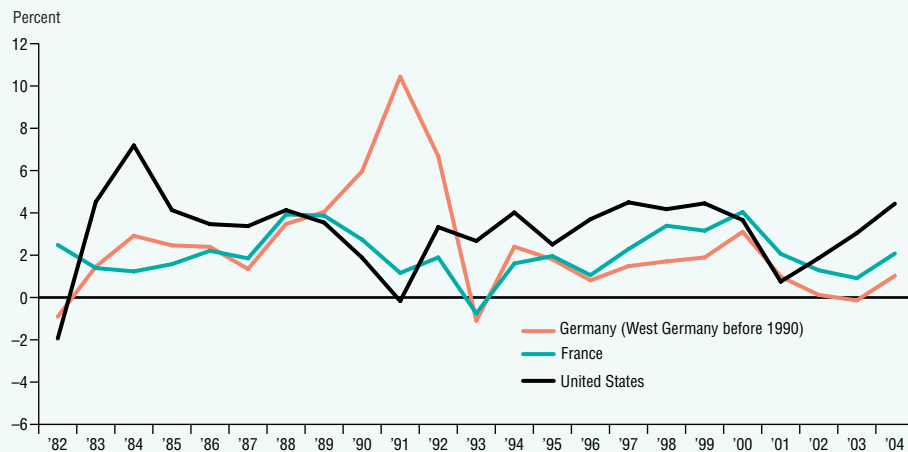
Does the evidence support the notion that high-tax, high-benefit economies fare worse than freer economies? A comparison of Europe and the United States sheds light on this question.

Over the past two decades, the U.S. economy has grown at an annual rate of 3.2 percent, while the French economy has grown by barely 2 percent per year (*Chart 2*). Except for a brief spike following reunification in the early 1990s, the German economy has fared even worse.

Unemployment is a good indicator of labor market flexibility, and here, too, the evidence is clear. U.S. unemployment has fallen from 8 percent to 5 percent over the past two decades, while the French and German rates have averaged about 10 per-

Chart 2

### France, Germany Usually Trail United States in GDP Growth



SOURCES: Bureau of Economic Analysis; Organization for Economic Cooperation and Development.

cent (*Chart 3*). Although observers commonly point to the current economic performances of France and Germany as proof of the “Eurosclerosis” that besets Old Europe, it is this sustained difference that suggests something more fundamental is at work here. That fundamental “something” boils down to competitiveness.

The various organizations that evaluate the extent to which countries are economically free uniformly conclude that the United States is freer than all or most European nations. Perhaps the most well known of these evaluations is published jointly by the Fraser Institute and the National Center for Policy Analysis. It ranks the United States as the world’s third freest economy, with Germany 22nd and France 44th. Rankings published by the Heritage Foundation and IMD International reach similar conclusions.

Why does the U.S. fare so well in these surveys? Simply put, America offers a lower tax burden and a more flexible labor market than France and Germany. The United States has fewer regulations governing the hiring and firing of workers and fewer governing the number of hours an employee can work. This increases the value of workers in the eyes of firms and thereby helps keep unemployment low—and production high. Low tax rates have a similarly laudable effect on the U.S. economy by facilitating business creation and fostering business growth.

If it is well understood that inflexible

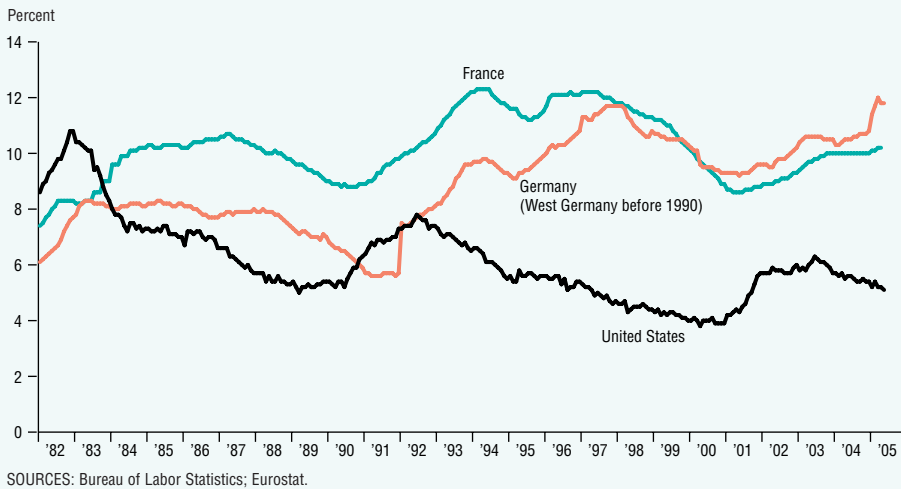
labor markets and high taxes cost jobs and retard growth, why do some EU member states seek to impose them at the European level? The answer may lie in the distributional consequences of this choice. If it’s assumed that France and Germany will not abandon the policies that encourage businesses and workers to flee those countries, the consequences of those policies can be mitigated by compelling nearby states that would otherwise attract those disgruntled workers and businesses to adopt the same policies. Businesses and workers for whom the economic climate is particularly oppressive might leave the EU entirely, but that is a much more costly decision than simply slipping from one European state to another. On net, the more highly regulated European economies may gain, even though the EU as a whole loses.

Recent evidence points to the same conclusion. Last year the European Union considered a proposal to introduce free trade in services across its member states.<sup>1</sup> With free trade having been a core idea behind the EU’s formation, and with the service sector having grown to the point where it now accounts for 70 percent of European output, free trade in services would seem like an almost automatic extension of the ever-closer union that EU policymakers say they seek. Yet the proposal was rejected.

In arguing against it, one European head of state decreed that the continent

Chart 3

### French and German Unemployment Climb, While U.S. Rate Falls



“must not become a free trade zone,” a statement consistent with the vision that Europe must achieve economic integration without further economic liberalization. But it is not consistent with the agenda to which a unanimous EU agreed in Lisbon, where Europe committed to having the world’s most dynamic and fastest-growing economy by 2010.<sup>2</sup>

French Prime Minister Dominique de Villepin opined in late June that European leaders must either lead the charge to protect social Europe or else “we resign ourselves to making our continent a vast free-trade area governed by the rules of competition.” Whether to accept or resist the “rules of competition,” and the prosperity those rules bring, is indeed the choice Europe now confronts.

### The Conflict of Visions

These facts by no means imply that European integration to date has been a mistake. As mentioned elsewhere in this article, European integration has facilitated a remarkable rise in Europe’s standard of living. Nor do they shed light on whether Europe should or should not voluntarily sacrifice economic growth to achieve social goals it deems important. If Europeans wish to be less prosperous in the future so they can be more equal today, economics cannot call the wisdom of that decision into question. But economics can reveal its consequences.

Consider Singapore and the Soviet

Union, and the conflict of visions becomes clear. Singapore is generally considered the freest economy on the planet (even more so than the United States), and its economic growth has been consistently strong. Yet the country has no formal structure anchoring it to the world economy beyond a strong business climate and membership in organizations like the World Trade Organization that promote business activity.

On the other hand, the Soviet Union is generally considered to have been one of the least free economies, and it exhibited weak economic growth for most of its history. Yet its member states were linked with a high degree of economic integration.

The point is that economic integration does not promote economic growth in and of itself. Only economic liberalization can do that. If the 25 members of the EU were to agree to integrate along French or German norms, the fact that the federation had achieved further economic integration would not save its economy from sliding into the night.

From an economic perspective, then, the ultimate fate of the European constitution is less important than the competing visions of the European future the ratification debate has exposed. On one side are countries, led by France and Germany, that believe the European economy should become more highly regulated. On the other are countries, led by

Britain and the Netherlands, that believe the European economy should become less highly regulated. How can further economic integration simultaneously satisfy these two competing visions? The simple answer is that it can’t.

As British Prime Minister Tony Blair put it, “Should Europe embrace globalization and try and make it work for us, or should we try and ward it off?” That is the question on which the economic future of the EU now rests.

—Jason L. Saving

*Saving is a senior economist in the Research Department of the Federal Reserve Bank of Dallas.*

### Notes

<sup>1</sup> Information about the proposal can be found at [http://europa.eu.int/comm/internal\\_market/services/docs/services-dir/com-2000-888/com-2000-888\\_en.pdf](http://europa.eu.int/comm/internal_market/services/docs/services-dir/com-2000-888/com-2000-888_en.pdf).

<sup>2</sup> For more information on the so-called Lisbon strategy, see [http://europa.eu.int/growthandjobs/index\\_en.htm](http://europa.eu.int/growthandjobs/index_en.htm).

## Foreign Exchange Policy and Banking Reform in China

Until very recently, the two salient features of China's foreign exchange regime had been capital controls and the de facto peg to the U.S. dollar. On July 21, China's central bank—the People's Bank of China—changed the dollar peg to a basket peg based on a number of undisclosed foreign currencies. It also allowed a simultaneous 2 percent appreciation of the Chinese currency against the U.S. dollar, from 8.28 yuan to 8.11 yuan per dollar.

Meanwhile, despite gradual loosening, capital controls are still largely in effect. These features of the Chinese foreign exchange regime carry important implications for government efforts to resolve China's ongoing banking problems and to maintain the nation's financial stability.

### Banks Play the Central Role in Financial Intermediation in China

At the end of 2004, total bank deposits stood at 185.5 percent of GDP—with total bank loans at 138.1 percent. In comparison, the combined market capitalization of the Shanghai and Shenzhen stock exchanges was only

27.1 percent of GDP. China's banking sector is dominated by just four state-owned commercial banks (SCBs) that account for 54 percent of China's total bank assets and liabilities (*Chart 1*).

In terms of total assets, all four SCBs rank among the world's 40 largest. Quantity, however, does not mean quality. These banks have proved inefficient in allocating funds to China's economy. All four have low profitability. Moreover, the size of their bad-loan portfolios has been among the world's largest.

### Capital Controls Are Crucial to Banking Stability

Although appearances and reality can differ sometimes in Chinese banking, even the appearances look problematic. The latest official data show the average ratio of nonperforming loans to total loans for China's big four banks as 15 percent in first quarter 2005, down from 20 percent at the end of 2003 (*Table 1*).<sup>1</sup> While these ratios are well above those in most countries, private estimates have placed total Chinese impaired loans (including those already taken over by the government in trade for bonds) in the range of 50 percent of bank assets.

There are questions about the adequacy of the capitalization of the four big banks. The China Banking Regulatory Commission requires all banks to meet the minimum capital adequacy ratio of 8 percent, consistent with the Basel I international standard, by January 2007. At the end of 2003, the average capital adequacy ratio was only 4.6 percent for the four SCBs. This ratio was calculated with the knowledge that existing nonperforming loans were not provisioned for sufficiently.

Although they are technically bankrupt, none of China's state-owned banks has ever faced a bank run or closure. An often cited reason is that even though China has no official deposit insurance system, there is an implicit government

Table 1

### Recent Changes in Nonperforming Loan Condition in the Four SCBs

	Nonperforming loan ratio (percent)	Nonperforming loans (billion yuan)
2003:Q4	20.0	—
2004:Q1	19.2	1,889.8
2004:Q2	15.6	1,523.1
2004:Q3	15.7	1,559.6
2004:Q4	15.6	1,575.1
2005:Q1	15.0	1,567.1

SOURCE: China Banking Regulatory Commission.

guarantee on deposits. Aside from the applicability of this guarantee to any bank, the four SCBs are perhaps even less likely to be closed, owing to a dictum common in many countries. That is, some banks are viewed as “too big to fail.”

There is, however, another less discussed reason why Chinese banks have not faced runs by depositors. The reason is capital controls. These controls largely prohibit Chinese citizens from investing overseas. With China's high domestic savings rate (as much as 40 percent by some estimates) and the relative scarcity of alternative financial vehicles such as stocks and bonds, opportunities for purchasing financial assets other than bank deposits are highly limited.

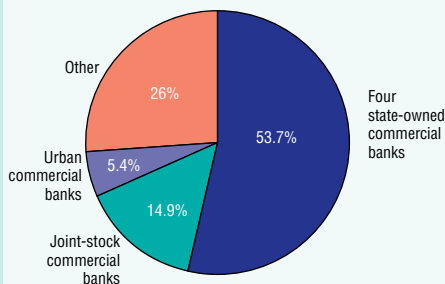
### Financial Liberalization Puts Increasing Pressure on Capital Controls

In line with its World Trade Organization (WTO) commitment, China has gradually opened its domestic banking and financial sector to foreigners.<sup>2</sup> By October 2004, 62 foreign banks were operating in China. These institutions account for only 1.8 percent of total banking assets. However, with an aver-

Chart 1

### Chinese Banking Sector in Terms of Assets

(Percent, 2004 data)



SOURCE: China Banking Regulatory Commission.



age nonperforming loan ratio of only 1.3 percent, they are substantially more solvent than China's four SCBs.

Foreign banks differ markedly from Chinese banks in other ways as well. Government rules for Chinese banks largely restrict them to the most traditional functions of commercial banking. In contrast, many of the foreign institutions are so-called universal banks. These foreign institutions not only carry on the traditional functions conducted by China's state-owned banks, but also engage in investment banking, securities and insurance operations. The foreign institutions have global opportunities for funding. China's fragmented financial regulatory system, which includes completely separate organizations for banking, securities and insurance, is poorly equipped to deal with universal banks.

Moreover, despite China's WTO-linked openings to foreign financial institutions, the Chinese government still makes efforts to control capital flows. In 2004, the Chinese government announced a new rule under which foreign banks have to apply in advance for quotas for offshore borrowing.

### What If China Removed Capital Controls Completely?

China has recently adopted measures to permit more flexible capital flows in response to increasing pressures on its currency. But there is much evidence that China continues to be concerned not only about capital inflows but also about capital outflows. Creating opportunities for Chinese citizens to invest abroad could lead to outflows of deposits from China's already troubled commercial banks.

A few days before China's central bank announced its new exchange rate regime, the government announced that Chinese multinationals would be permitted to acquire more foreign currency and lend the foreign currency to their subsidiaries. The new rules still limit the ability of Chinese to place their money abroad. However, if large outflows were to take place, Chinese banks that now rely on the government to preserve their captive deposit markets would have much more difficulty in stanching fund outflows that would erode the balance between assets and liabilities.

### China's Policy Priority Lies in Bank Recapitalization and Privatization

On Dec. 31, 2003, the Chinese government conducted the third large-scale bank bailout in six years. The two previous bailouts had involved procedures that are standard across the world—the injection of domestic-currency-denominated capital and an exchange with the government of bad assets (impaired loans) for good assets (government securities).<sup>3</sup>

As part of the third bailout, however, the government injected \$45 billion of foreign-currency-denominated reserve assets (dollar- and other currency-denominated bonds) to two SCBs—the Bank of China and China Construction Bank.<sup>4</sup> The two banks have since been restructured into joint-stock companies, and they are planning an initial public offering both domestically and overseas in an effort to diversify ownership and privatize, at least partially.

Even though Chinese banks' nonperforming loan ratios have fallen as a result of government intervention and the two newly restructured state-owned banks' financial footings have strengthened significantly, China's domestic banks have far to go before they are viable. Thus, the government's motivations to use capital controls to preserve a captive domestic deposit base remain strong.

### China's Exchange Rate Question

The majority of recent disputes over China's foreign exchange rate have involved China's trade balance. Although China's overall current account surplus is small by Asian standards, its large surplus with the United States and other industrialized countries has ignited complaints that an undervalued Chinese currency bestows an unfair advantage on Chinese exporters. China's latest move to let its currency appreciate 2 percent against the U.S. dollar and the simultaneous change from a dollar peg to a basket peg are at least partly aimed at addressing the trade problem. Decisions about China's exchange rate regime are driven by factors other than the trade balance, in particular, the health of the banking system.

China's still-fragile banking conditions are likely to continue to motivate exchange rate intervention even under

*Even though Chinese banks' nonperforming loan ratios have fallen as a result of government intervention and the two newly restructured state-owned banks' financial footings have strengthened significantly, China's domestic banks have far to go before they are viable.*

*Combined with the loosening of capital controls, this new basket peg adds an increasing urgency for China to resolve its banking problem.*

the new basket peg system. So far, three of China's big four banks have received bailouts involving the exchange of bad loans for dollar- and other foreign-currency-denominated bonds.<sup>5</sup> The Chinese currency's appreciation means a reduction in the value of these foreign-currency-denominated assets relative to the banks' Chinese-currency-denominated liabilities and an accompanying move back in the direction of insolvency. The 2 percent appreciation on July 21 may not have a severe impact immediately in this regard. However, if it leads to further appreciation, there would be a more significant impact on the current bank reform plan.

### Conclusion

The current debate on the Chinese currency involves two related but separate issues that have often been confused. One is capital controls, and the other is the exchange rate at which the Chinese currency is pegged, whether to the dollar or to a basket of foreign currencies.

The debate has largely focused on trade effects. Banking conditions and bank reform in China provide an alternative perspective in analyzing the country's foreign exchange policy. China's latest move from a de facto dollar peg to a basket peg, together with a simultaneous 2 percent appreciation of its currency against the U.S. dollar, represents a major step toward a more flexible foreign exchange policy.

Meanwhile, combined with the loosening of capital controls, this new basket peg adds an increasing urgency for China to resolve its banking problem. In fact, the quicker the banking problem is resolved, the sooner a more flexible foreign exchange policy can truly materialize in China.

—Dong Fu

*Fu is an assistant economist in the Research Department of the Federal Reserve Bank of Dallas.*

### Notes

The author would like to thank Bill Gruben for helpful discussions and suggestions.

<sup>1</sup> There are widespread disputes on the actual figure for nonperforming loans. Historically, Chinese banks used a four-tier loan classification

system, which tended to underreport nonperforming loans. In 2002, they started to migrate to a five-tier classification system, which is more in line with the international standard.

<sup>2</sup> Foreign banks can now engage in foreign currency transactions with all clients and with no geographical restriction. By July 2004, their share of foreign currency loans rose to 17.8 percent. So far, foreign banks have conducted business in Chinese currency with Chinese companies in 18 cities. At the end of 2006, foreign banks will be able to operate freely in China.

<sup>3</sup> In 1998, the four SCBs received a capital injection of 270 billion yuan. In 1999–2000, four asset-management companies were set up and purchased 1.4 trillion yuan of nonperforming loans at book value from the four SCBs and one government policy bank.

<sup>4</sup> However, for the time being, the banks are not allowed to sell the foreign reserve assets.

<sup>5</sup> In April 2005, the Industrial and Commercial Bank of China—the largest of the four SCBs—received a \$15 billion capital injection of foreign reserve assets.

# Regional Update

Halfway through the year, the Texas economy is posting slow employment growth—a 1.1 percent annualized rate for June and 1.2 percent for second quarter 2005. The state has added 60,200 jobs so far this year, which amounts to a 1.3 percent annualized growth rate.

Although stable, Texas employment is not keeping pace with the nation. In fact, after a prolonged Texas recession, the state's share of national employment, which had been rising steadily well into 2001, stagnated. The share now hovers just above 7.2 percent and has fallen by 0.2 percent through the first six months of 2005.

The disparate nature of Texas employment growth is evidenced in metropolitan employment across the state. Through June of this year, Austin leads the metros with a 2.9 percent annualized growth rate, while El Paso, buoyed by a strong manu-

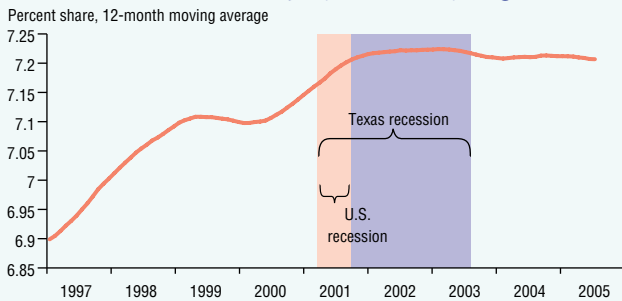
facturing sector, comes in second at 2.7 percent. Despite a sound 2004, Dallas is still at the bottom of the ladder at 1 percent, with its telecommunications and airlines industries still trying to recover.

The energy industry remains a strength. Growing at a 3.2 percent annualized rate this year, Texas energy employment continues to gain impetus from elevated energy prices. In addition, June numbers indicate that the Texas rig count crossed 600 for the first time in 20 years.

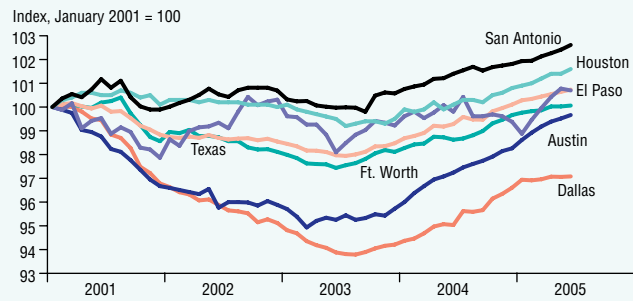
On the housing front, Texas experienced only 3.8 percent price appreciation in the first quarter, the lowest in the country. Texans can jettison fears of a housing bubble because as a percentage of personal income, house prices are flat.

—Raghav Virmani

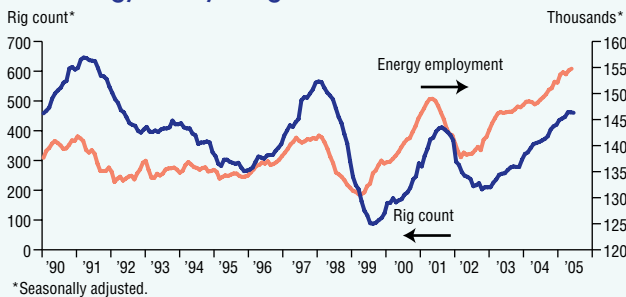
## Texas Share of National Employment Mostly Stagnant



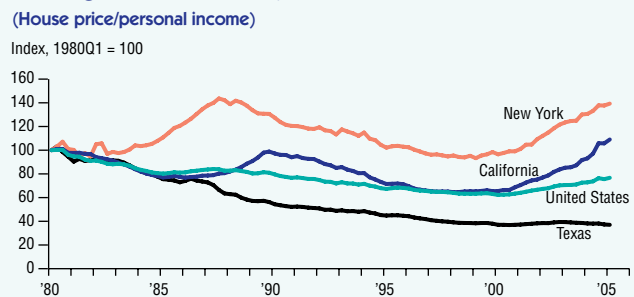
## Job Growth Uneven Across Metros



## Texas Energy Activity Rising



## Housing Bubble Less Likely in Texas



## Regional Economic Indicators

### TEXAS EMPLOYMENT\*

### TOTAL NONFARM EMPLOYMENT\*

	Texas Leading Index	TUPI † total	Mining	Construction	Manufacturing	Government	Private service-producing	Texas	Louisiana	New Mexico
6/05	121.8	n.a.	154.7	549.9	888.5	1,668.2	6,346.8	9,611.7	1,933.9	805.3
5/05	121.0	131.5	155.0	549.7	889.1	1,665.5	6,339.7	9,602.8	1,932.4	807.6
4/05	121.2	131.2	155.1	548.5	890.8	1,664.9	6,330.2	9,593.3	1,933.4	804.7
3/05	122.2	130.1	154.5	546.2	890.0	1,664.9	6,324.4	9,583.8	1,931.5	802.1
2/05	121.6	129.8	154.3	545.1	889.3	1,663.6	6,318.1	9,574.2	1,924.8	799.4
1/05	120.5	129.0	154.0	545.5	888.8	1,665.4	6,311.0	9,568.7	1,926.5	799.7
12/04	121.2	129.2	153.7	544.6	890.7	1,664.9	6,293.8	9,551.5	1,916.9	799.1
11/04	119.4	129.1	153.5	543.4	891.0	1,663.4	6,282.9	9,537.5	1,920.3	796.9
10/04	118.5	128.8	153.1	541.4	890.4	1,662.3	6,274.6	9,524.3	1,919.3	795.1
9/04	118.1	129.8	151.9	539.7	888.4	1,659.1	6,249.7	9,490.8	1,913.5	792.6
8/04	117.7	129.4	151.4	539.3	890.2	1,658.6	6,250.0	9,491.4	1,921.3	791.2
7/04	117.2	129.3	151.3	541.4	891.6	1,662.9	6,252.8	9,501.9	1,921.3	791.5

\* In thousands. † Texas Industrial Production Index.

For more information on employment data, see "Reassessing Texas Employment Growth" (*Southwest Economy*, July/August 1993). For TIPI, see "The Texas Industrial Production Index" (*Dallas Fed Economic Review*, November 1989). For the Texas Leading Index and its components, see "The Texas Index of Leading Indicators: A Revision and Further Evaluation" (*Dallas Fed Economic Review*, July 1990). Online economic data and articles are available on the Dallas Fed's web site, [www.dallasfed.org](http://www.dallasfed.org).

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