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THE STATE OF

MODERN ECONOMICS

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REGIONAL ANALYSTS
Matthew Martin
Sonya Ravindranath Waddell

CONTRIBUTORS
Khalid Abdalla
William Perkins

DESIGN
Beatley Gravitt Communications

CIRCULATION
Walter Love
Shannell McCall

Published quarterly by the Federal Reserve Bank of Richmond
P.O. Box 27622
Richmond, VA 23261
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Financial Stability and the Fed



This issue of *Region Focus* features a special section that explores the economics profession today, its role in society, and questions about its future. Such a discussion is timely, appropriate, and healthy for a dynamic discipline that's been much in the news lately. Still, the basic lessons of economics endure: Markets tend to organize economic activity efficiently, and government inter-

vention can sometimes have unexpected and undesirable consequences.

Given the recent events in the economy, and especially in financial markets, it's also useful to draw on research and experience of the last 30 years. While that body of knowledge provides a solid foundation for policy, the wide-ranging root causes of disruptions can be difficult to determine. And when events require swift and direct policy responses in real time, the job gets even tougher. The Fed's role as lender of last resort often faces the institution with difficult choices when financial disruptions unfold.

In an episode of financial disruption, central bank lending may prevent a bank run and put off costly closure or liquidation. (Bank runs occur when depositors fear that a bank's assets can't cover its liabilities, and depositors cash out en masse.) But if the financial sector is just coping with deteriorating fundamentals, central bank lending distorts economic allocations by artificially supporting the prices of some assets and liabilities of some market participants. Government support in this latter case can intensify the "moral hazard" problem inherent in any financial safety net.

Applying this framework to recent policy actions can help provide some perspective. As the slowdown in housing markets and the associated decline in home prices began, it became clear that the securities backed by mortgages originated in 2006 and early 2007 would perform significantly worse than anticipated. This realization affected the future prospects of any institution or financial instrument with mortgage-related exposure. The recent instances of run-like behavior, such as those that afflicted Bear Stearns in the week leading up to its acquisition, seemed to reflect increased concern about the quality of these sorts of financial products. In short, it appeared to be what we would classify as a deterioration in market fundamentals, not a liquidity crisis.

Perhaps most important to the current debate is the fact that market expectations of central bank response in times of stress can affect the robustness of the system. In the

short-term, governments and central banks may relieve financial market strains, but the intervention itself may affect future choices of financial institutions. These new expectations could make future crises more likely.

If banks and other financial institutions assume central bank support in the future, then they are less likely to put in place the necessary and appropriate safeguards. That assistance interferes with market discipline and distorts market prices.

If intervention is assumed, then there's scant incentive for banks to take costly alternative action to prevent adverse consequences. But there is an alternative. New research by economists at the Richmond and New York Fed banks considers a scenario in which there is absolute certainty that no government or central bank assistance will be forthcoming. In such a world, banking contracts would likely include provisions that allow for suspensions of payment. These contracts will prevent the type of run that may occur because of the perceived quality of its assets. This sort of contract actually has its roots in the 19th century U.S. banking panics.

The Fed's lending policy can play a role in the stability of financial markets. As we learn more about the causes and nature of financial instability, I believe we should strive for policy that is informed by lessons about price stability learned in the 1980s. That's when the Fed committed itself to a long-term goal of maintaining a low and stable inflation rate. We will achieve better outcomes if we can establish credibility for a pattern of behavior consistent with that objective.

A handwritten signature in black ink, appearing to read "Jeffrey M. Lacker". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

JEFFREY M. LACKER
PRESIDENT
FEDERAL RESERVE BANK OF RICHMOND

The Pragmatic Evolution of the Monetary Standard

The following is an excerpt from *The Monetary Policy of the Federal Reserve: A History* by Robert L. Hetzel, Copyright © Robert L. Hetzel, 2008. Reprinted with the permission of Cambridge University Press.

The views expressed in this excerpt are those of the author and not necessarily those of the Federal Reserve Bank of Richmond or the Federal Reserve System. Robert Hetzel is a senior economist and policy adviser in the research department of the Federal Reserve Bank of Richmond.



Vast, horrific disasters marked the 20th century, but also widespread, beneficent progress. In the first half, two world wars almost ended Western civilization. In the second half, democracy spread and living standards rose. Throughout, monetary instability interacted with social upheaval and political disorder. Inflation and deflation created feelings of powerlessness in the face of impersonal forces that promoted a search for scapegoats. Hyperinflation and depression contributed to the rise of Nazism in Germany. The stability of the deutschemark then accompanied the German postwar growth miracle.

In the United States, deflation and depression in the 1930s produced a decade of untold human misery. The Great Inflation of the 1970s spawned wage and price controls, which trampled on due process. The feeling of government's loss of control, symbolized by gas lines, helped propel Ronald Reagan into power. After Paul Volcker led the Fed to accept responsibility for inflation in 1979, an increase in monetary stability accompanied an increase in economic stability.

The success of the 21st century will depend upon how well societies learn the lessons of the 20th century. The grand monetary experiment of the last century was replacement of a gold standard with a fiat money standard. The failure of central banks to understand their new responsibility to provide a

nominal anchor for prices lay at the heart of the spectacular monetary failures of that century. What nominal anchor and what monetary standard are in place at the start of the current century?

The Volcker-Greenspan Monetary Standard

The U.S. monetary standard has evolved pragmatically rather than by conscious design. The current standard arose out of the consistent effort by the Federal Open Market Committee (FOMC) under Paul Volcker and Alan Greenspan to re-anchor inflationary expectations unmoored by the experience with stop-go policy. Consistency under duress achieved credibility. Credibility laid the foundation for the current nominal anchor: an expectation of low, stable trend inflation unaffected by macroeconomic shocks.

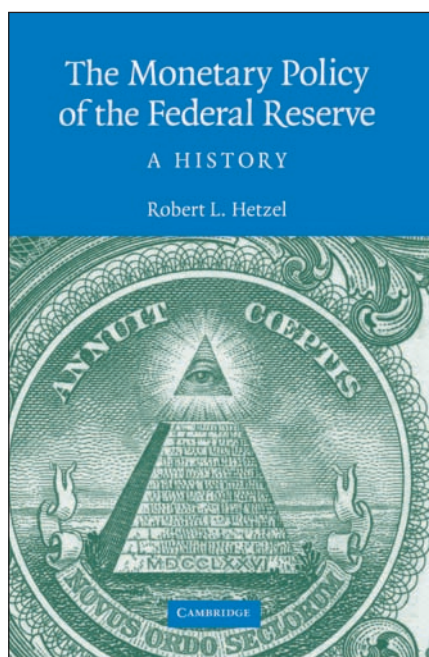
Something must "anchor" the public's expectation of the future value of money. For the gold standard, it was the commitment to maintain the par value of gold. Under the gold standard as it existed in the late 19th-century, money received its value from the Bank of England's commitment to maintain in the future a fixed pound price of an ounce of gold. For the contemporaneous money price of gold to be viable, the public had to believe that the Bank would maintain that value in the future.

To achieve the stability in the expected future price level requisite for contemporaneous stability of the price level,

the public must believe that the central bank will behave consistently. Over the quarter century of the Volcker-Greenspan era, the Fed did not follow a rule in the sense that it never departed from consistent procedures for setting the funds rate. Nevertheless, the achievement of near price stability derived from an overall consistency of behavior that emerged out of an effort to restore the expectational stability of the earlier commodity standard.

Stop-Go Monetary Policy and the Loss of a Nominal Anchor

Experience with a commodity standard created an expectation of price stability that persisted into the second half of the 20th century. The primacy attached to price stability by the early William McChesney Martin FOMC sustained



that expectation into the 1960s. Subsequently, stop-go policy opportunistically exploited it and, in time, destroyed the nominal anchor provided by the expectation of price stability.

Keynesians emphasized discretionary manipulation of aggregate demand. Because they assumed the existence of an inertia in inflation independent of monetary policy, they believed that subject to the inflation-unemployment trade-offs of the Phillips curve, the central bank could manipulate aggregate nominal demand to smooth fluctuations in real output. The exercise of discretion destroyed the prior nominal expectational stability.

Sherman Maisel, a member of the Board of Governors from 1965 until 1972, expressed the Keynesian view in 1973:

There is a trade-off between idle men and a more stable value for the dollar. A conscious decision must be made as to how much unemployment and loss of output is acceptable in order to get smaller price rises. Some price increases originate on the cost side or in particular industries. These cannot be halted by monetary policy, which acts principally on the overall aggregate demand for goods and services. ... [E]xperience ... shows that without some type of government intervention in the price-wage bargains struck by labor and industry, the trade-off between inflation and unemployment is unsatisfactory.

Starting with the Kennedy and Johnson appointments to the Board of Governors, Keynesian views became increasingly prevalent within the FOMC. According to these views, monetary policy should aim for full employment, almost universally assumed to occur at a 4 percent unemployment rate or less. This figure benchmarked potential output. By 1970, elimination of the resulting presumed negative output gap (actual minus potential output) became a national and an FOMC objective. Furthermore, a nonmonetary view of inflation led the FOMC to believe that monetary policy could be stimulative without increasing inflation as long as the output gap was negative. The inflation that did occur with unemployment in excess of 4 percent had to arise from cost-push inflation. Failure to accommodate such inflation would require high unemployment.

The loss of expectational stability began in 1966 when the FOMC, unlike 1957, did not move in a sustained way to eliminate nascent inflation. Bond yields began a long, irregular climb to the low double-digit figures reached in the early 1980s. They fell briefly during the 1970 recession but resumed rising in spring 1971. The Nixon administration wanted rapid money supply growth to stimulate output sufficiently to reduce the unemployment rate to 4.5 percent by summer 1972. Arthur Burns, FOMC chairman, campaigned

for wage and price controls as the price of stimulative monetary policy. In their absence, inflationary expectations, Burns contended, would counter the stimulative effects of expansionary policy. On Aug. 15, 1971, Nixon delivered the controls Burns wanted and Burns obliged with expansionary monetary policy.

Charles Walker, treasury undersecretary, later summarized the forces leading the Nixon administration to adopt wage and price controls:

[I]nflationary expectations ... began to come back on us last winter after we had them under some control. Interest rates were going down, and then [they] shot back up again. ... [L]abor tended to leapfrog into the future and get three-year contracts to guard against additional inflation. Inflationary expectations are what really got us.

Keynesian aggregate demand management relied on inertia in actual and expected inflation as the lever with which increases in aggregate nominal demand lowered unemployment. By the end of the 1970s, that apparent inertia disappeared. The public's response to price controls offered an early example. Initially, their imposition did assuage inflationary fears and permit stimulative monetary policy. However, as George Shultz, treasury secretary in the Nixon administration, wrote in 1978:

Once the suspicion of permanence sets in, gamesmanship develops between the private and public sectors. It becomes apparent that the controls process is not a one-way street in which the government does something to the

private sector; rather, it is a two-way street, with the government taking an action, the private sector reacting to it, the government reacting in turn, and so forth. It is a continual process of interplay and interrelations through which those "controlled" develop ways of doing whatever they really want to do.

Apart from wartime, before 1965, the United States had never experienced sustained high inflation. Experience with a commodity standard had conditioned the public to expect stationarity in prices. However, the sustained rise in inflation produced by stop-go monetary policy changed expectations. As the public learned that policy did not provide for stationarity in either the price level or the inflation rate, an increase in expected inflation increasingly offset the stimulative effect of the expansionary policy followed in the go phases of stop-go policy. By 1979, the Fed found itself operating in the world described by Robert Barro and David Gordon (in 1983) and Finn Kydland and Edward C. Prescott

To achieve the stability in the expected future price level requisite for contemporaneous stability of the price level, the public must believe that the central bank will behave consistently.

(in 1977) where the public believes that the central bank possesses an incentive to raise inflation to lower unemployment below its sustainable value. Forward-looking expectations on the part of the public offset the stimulative effect of monetary policy on the unemployment rate.

Herbert Stein, Council of Economic Advisers chairman in the Nixon administration, foresaw in 1974 the environment that Volcker inherited upon becoming FOMC chairman in 1979:

If policy or external events slow down the growth of demand, price and wage increases abate little if at all, as everyone is looking across the valley to the next surge of inflation. Because price and wage increases persist at a high rate employment suffers, and governments are driven or tempted to prop up demand, validating the expectation of continued or ever-accelerating inflation.

In 1980, Paul Volcker observed:

[T]he idea of a sustainable “trade-off” between inflation and prosperity... broke down as businessmen and individuals learned to anticipate inflation, and to act in this anticipation. ... The result is that orthodox monetary or fiscal measures designed to stimulate could potentially be thwarted by the self-protective instincts of financial and other markets. Quite specifically, when financial markets jump to anticipate inflationary consequences, and workers and businesses act on the same assumption, there is room for grave doubt that the traditional measures of purely demand stimulus can succeed in their avowed purpose of enhancing real growth.

Alan Greenspan made the same point in congressional testimony in 1993:

The effects of policy on the economy depend critically on how market participants react to actions taken by the Federal Reserve, as well as on expectations of our future actions. ... [T]he huge losses suffered by bondholders during the 1970s and early 1980s sensitized them to the slightest sign ... of rising inflation. ... An overly expansionary monetary policy, or even its anticipation, is embedded fairly soon in higher inflationary expectations and nominal bond yields. Producers incorporate expected cost increases quickly into their own prices, and eventually any increase in output disappears as inflation rises.

A New Nominal Anchor

By summer 1979, the United States had lost the nominal anchor provided by a residual expectation of inflation stationarity. The bond rate fluctuated widely at a level that exceeded 10 percent until December 1985. The persistent effort to change the inflationary expectations of the public, unmoored in the prior period of stop-go monetary policy, formed the crucible in which Volcker and Greenspan forged a new monetary standard. At the time, the change to a

preemptive policy of raising the funds rate in the absence of rising inflation engendered fierce criticism. The abandonment of aggregate-demand management in favor of stabilizing inflationary expectations was a departure for unknown shores.

Volcker and Greenspan had to reduce the expectation of high inflation manifested in the high level of bond rates. Furthermore, financial markets had come to associate inflation shocks (relative price shocks that pass through to the price level) and positive growth gaps (above-trend real output growth) with increases in trend inflation. After the initial disinflation that brought inflation down to 4 percent in 1983, the FOMC still had to convince markets that a go phase would not follow a stop phase. It had to forego expansionary policy early during economic recovery when inflation had fallen but unemployment had not yet returned to full employment. The Volcker-Greenspan expected-inflation/growth gap policy emerged in 1983 when the FOMC raised the funds rate in response to rising bond rates despite the existence of high unemployment and falling inflation. Greenspan reconfirmed the policy during the “jobless recovery” from the 1990 recession when the FOMC lowered the funds rate only gradually to work down the inflationary expectations embodied in long-term bond rates.

As a consequence of responding to the increases in bond rates produced by positive growth gaps, the FOMC replaced an output-gap target with a growth-gap indicator. It raised the funds rate in response to sustained above-trend growth rather than waiting until a perceived negative growth gap approached zero and inflation rose. The more expeditious movement in the funds rate eventually convinced markets that the FOMC would keep real growth in line with potential growth promptly enough to prevent increases in inflation. As a result, in response to shocks, market participants began to move the forward real interest rates embodied in the yield curve continuously in a way effectively estimated to return real output to potential. The alternation of intervals of stimulative and restrictive monetary policy disappeared. Ironically, allowing the price system to work rather than attempting to improve upon it produced more rather than less economic stability. **RF**



JARGON ALERT

Productivity

BY KHALID ABDALLA

For an economist, the word “productivity” can have several meanings. But if you’re reading about productivity in your daily newspaper, you’re probably reading about “labor productivity.” It is defined as the average value of output produced for every hour worked by the nation’s employees. It is the most widely used measure of the overall productivity of the economy. However, as a measure, labor productivity is a blunt tool: It can show us the trends in productivity, but it can’t tell us much about how those trends came about.

To understand what labor productivity measures, consider the example of an aluminum factory that produces \$1,000 worth of aluminum a day, and employs 10 workers who each work 10-hour days. Note that the number of labor hours that go into producing that aluminum each day is 100. Dividing the value of the aluminum produced by the number of labor hours required to produce it yields the labor productivity — in this case, \$10 an hour.

In the United States, economy-wide labor productivity is measured by the Bureau of Labor Statistics (BLS) and figures released every quarter. These data are closely followed by stock markets and policymakers. Since labor productivity growth is an indicator of economic growth, the growth of labor productivity over the previous quarter is particularly important.

One way a firm can improve labor productivity is through increasing the amount of capital they invest per worker. This is called “capital deepening.” Capital is comprised of plant and equipment, so capital deepening can be achieved through expanding plant size or buying more equipment. With more capital to work with, workers can produce more and this could lead to higher firm revenues. (Of course, there are limits to the labor productivity growth that this can achieve as there is a limit to the amount of capital each worker can efficiently utilize.)

A second measure of productivity, called “total factor productivity” — or TFP, for short — is a broader measure. TFP takes into account the amount of capital employed in production in a more explicit way by measuring the productivity of the combination of labor and capital. When TFP rises, labor productivity rises as well. The reverse, however, is not necessarily true.

TFP can be viewed as a measure of the level of overall technology in an economy. We often think of technology as it pertains to items such as computers and cars, for instance. One might be tempted to think of TFP in the same narrow

terms. However, economists discuss TFP in broader terms, and define it as being comprised of all factors other than labor and capital affecting production. TFP can be influenced by elements such as the regulatory environment, managerial talent, as well as those more traditionally associated with technology such as the level of sophistication in equipment designs.

From 1996 to 2006, economists recorded a significant rise in the growth of labor productivity in the United States. According to a 2007 study by the Congressional Budget Office, between 1996 and 2006 the average rate of annual labor productivity growth was 2.9 percent, compared to an average rate of 1.4 percent from 1974 to 1995.



In recent years, labor productivity growth has been largely driven by robust TFP growth. But the sources of this high TFP growth are hard to pinpoint. One theory attributes the acceleration in TFP growth between 2001 and 2006 to the boom in information technology (IT) investment in the 1990s. These investments provided

firms with an immediate labor productivity boost due to the effects of capital deepening. After that initial period, firms may have developed better business practices tied around the new IT capital. These new practices could have led to an increase in the growth rate of TFP, which in turn, translated into higher labor productivity growth in the post-2001 period.

While labor productivity growth was strong for much of the preceding decade, the future trajectory of labor productivity growth remains to be seen. Future trends in labor productivity are particularly important because of the direct relationship between labor productivity and labor compensation. In the long run, economic theory predicts that wage growth will follow labor productivity growth. The intuition behind this is simple: If workers are producing more, then firms will have to increase wages to compensate workers for their increased productivity.

However, there is debate about whether this relationship between wages and productivity actually holds in practice. Some point to studies which show that U.S. wage growth has been lagging productivity growth since the mid-1970s. Others counter by pointing out that, among other things, many of these studies examine only growth in take-home pay, and fail to take into account growth in the levels of non-cash benefits (such as employer-provided health care) which often constitute a major part of worker compensation. **RF**

ILLUSTRATION: TIMOTHY COOK

Does Unemployment Insurance Discourage Work?

BY KHALID ABDALLA

Established under the Social Security Act of 1935, unemployment insurance (UI) is one of the largest government labor programs in the United States. In most states, UI programs replace 50 percent of a claimant's preunemployment wage up to a maximum benefit level for up to six months. In a new paper, economist Raj Chetty of the University of California at Berkeley presents an evaluation of the efficiency of the UI system.

Chetty begins his paper by noting, "One of the classic empirical results in public finance is that social insurance programs such as unemployment insurance reduce labor supply." Various studies have found that a 10 percent increase in UI benefits is associated with increases in the average duration of unemployment of between 4 percent and 8 percent. The long-established explanation for this finding is that UI benefits create an incentive for workers to remain unemployed. This incentive stems from the fact that receipt of UI benefits is conditional on a worker remaining unemployed. In the language of economics, UI benefits are said to induce "moral hazard" among workers. Such behavior is welfare-reducing — making it undesirable from a policy perspective.

However, Chetty argues that the standard view of the UI program overstates the effect of moral hazard. He argues that UI does not increase unemployment durations solely due to moral hazard. Rather, there is a second channel through which UI causes longer unemployment durations: the "liquidity effect." The liquidity effect is directly tied to the observation that many workers have limited liquid net worth at the time of job loss. These workers are unable to "smooth consumption" over the course of their unemployment. Instead, they have to make cuts in their expenditures, some of which might prove quite difficult. As a result, liquidity constrained workers face greater pressure to quickly find employment than unconstrained workers.

Receipt of UI benefits, however, improves constrained workers' liquidity, allowing them to more easily smooth consumption. Consequently, they may spend more time looking for jobs that match their particular skills. In contrast to the moral hazard effect, the liquidity effect is socially beneficial.

If private credit and insurance markets were free of distortions, then liquidity constrained workers could tap them for liquidity. However, when private market imperfections exist, the UI program can fill the gap by providing liquidity to constrained workers. In such a case, UI-induced

increases in unemployment durations are due to both the liquidity and moral hazard effects. Determining the ratio of the two effects in raising unemployment durations under UI determines the extent to which UI is optimal.

"To the extent that it is the liquidity effect, UI reduces the need for agents to rush back to work because they have insufficient ability to smooth consumption; if it is primarily the moral hazard effect, UI is subsidizing unproductive leisure," Chetty writes.

Chetty takes advantage of changes in benefit levels across U.S. states to compare the effect of changes in benefit levels

"Moral Hazard versus Liquidity and Optimal Unemployment Insurance"

by Raj Chetty. *Journal of Political Economy*, April 2008, vol. 116, no. 2, pp. 173-234.

on the unemployment durations of constrained and unconstrained households. He finds that a 10 percent increase in UI benefits is associated with a 7 percent to 10 percent increase in unemployment durations within the constrained group. On the other hand, the unconstrained group is far less affected by increases in

benefit levels. The fact that there is a differential between the constrained and unconstrained groups indicates that the liquidity effect is in play.

However, Chetty notes that while this result is indicative of the existence of a liquidity effect, it doesn't reveal its magnitude. To determine the magnitude of the liquidity effect, Chetty turns to another type of unemployment compensation: lump-sum severance payments. The effect of lump-sum payments on unemployment durations is entirely due to the liquidity effect. This is because receipt of the payment is not conditional on the worker remaining unemployed. Therefore, lump-sum payments do not induce moral hazard. He finds that workers who received lump-sum payments had longer unemployment durations than those who didn't receive the payments. Because moral hazard is unlikely to be driving this difference, Chetty concludes that the liquidity effect is the cause.

He writes, "Using data from the United States, I estimate that the liquidity effect accounts for 60 percent of the marginal effect of UI benefits on durations at current benefit rates. This estimate implies that a benefit equal to 50 percent of the preunemployment wage is near optimal in a UI system that pays constant benefits for six months."

Chetty's findings are at odds with much of the previous literature on unemployment insurance. His provocative paper will likely stimulate further research on this important topic, research that will be of interest to academics and policymakers alike.

RF

New Farm Bill Extends Menu

BY BETTY JOYCE NASH

It's hard to come up with an example of something in your life that the new farm bill won't affect in one way or another. Everybody eats at this table.

The Food, Conservation and Energy Act of 2008, passed despite a presidential veto in May, will require about \$307 billion to pay for its "programs, plans, institutes, partnerships, initiatives, assistance, authorities, grants, and opportunities." The biggest chunk, \$209 billion, will go toward nutrition programs. It tweaks the food stamp program and changes its name, provides fresh fruits and vegetables for poor children who receive government-funded school lunches, and doubles money for the federal purchase of commodities such as cheese.

There is \$35 billion for various supports to commodity farmers, keeping the 1930s-era subsidy structure mostly intact. And the bill authorizes \$25 billion for conservation, according to the Congressional Budget Office.

Farmers in the Fifth District raise livestock and grow cotton, soybeans, and corn, as well as a wide range of specialty crops like sweet potatoes. In North Carolina, livestock (broilers and hogs mostly) makes up two-thirds of all agricultural production. Horticulture and greenhouse production round out the state's agricultural picture.

For the first time, fruit and vegetable growers will get federal help with marketing efforts and the safe handling of products. The United States Department of Agriculture also will spend new money on fresh food from local farms for school lunches. There's also money in this bill to market local and organically grown food. In an example of how far the bill ranges beyond the farm, money will also go to install broadband in remote areas and to lend money to rural businesses.

The bill's continued subsidy system disappoints agricultural economists who track farm policy, like David Orden, of the Global Issues Initiative of Virginia Tech's Institute for Society, Culture and Environment. After all, the idea behind the 1996 "Agricultural Market Transition Act" was to reduce subsidies. Tobacco farmers' quotas were eventually bought out, ending that industry's federal support. (See *Region Focus*, summer 2005.)

"[It keeps] the direct payments, some \$5 billion in payments," Orden says. The payments are controversial because crop farmers are currently reaping high commodity prices. But livestock farmers, of course, face rising feed costs.

Current farm income is about 50 percent higher than its 10-year average, says agricultural economist Barry Goodwin of North Carolina State University. The value of agricultural assets has risen over the past decade, contributing to agricultural landowners' wealth. Average farm household net

worth was almost \$900,000 in 2006, yet there was no limit placed on adjusted gross income for payment eligibility, Goodwin notes. The Environmental Quality Incentives Program (EQIP) will get \$3.4 billion more, a 27 percent increase. The money goes to farmers who use environmentally safe practices. Chesapeake Bay farmers will receive \$88 million a year, double the current funding, for a wide range of conservation efforts to staunch runoff and its ensuing damage.

Other pieces of the bill include grants and loans for rural water and sewer systems, farmers markets, and agricultural research. And, for asparagus farmers, \$15 million to compensate for losses due to competition from imports.

The energy industry will burn through \$320 million in loan guarantees for biorefineries that use products such as switchgrass, corn husks, and cobs. While the bill reduced the tax credit for ethanol blenders by six cents, it extended the tariff on biofuel imports, like sugar-based ethanol from Brazil. There's even money to buy and store sugar from U.S. growers for biofuel — never mind that sugar could be bought for half the price if not for import barriers and domestic production controls.

Such provisions worry Orden because the bill contains little to position the United States favorably for a future Doha round of World Trade Organization talks, which broke down in July over tariff disputes. For instance, the WTO has challenged the direct payments program because it forbids farmers from planting fruits and vegetables on land removed from production. A recent ruling in a case brought by Brazil against the U.S. cotton program determined that such a prohibition was not consistent with WTO subsidy rules.

A new plan that covers commodity crops would cushion participating farmers against low yields and falling prices. But the plan, the Average Crop Revenue Election (ACRE), could prove expensive. It would pay out when revenues for a particular crop in a state fall below a trigger amount. That amount will be calculated based on a moving average of prior years using national-average prices and state-level yields. In 2006 and 2007, commodity prices reached record levels, so future payouts could be huge.

On the research side, the bill creates the National Institute of Food and Agriculture, and authorizes \$78 million to study organic food production. There's also \$22 million to help farmers switch to organic farming and money to train farmers and ranchers who are disadvantaged or just starting out.

It's a lavish soup-to-nuts buffet that expands the reach of traditional farm bills. Agricultural policy will never be just meat and potatoes again. **RF**

PUBLIC TRANSPORTATION

Gas Prices Boost Light Rail

Charlotte's new light rail line, a rarity in sprawling southeastern cities, is rolling like a juggernaut. In a case of perfect timing, Charlotte's 9.6 mile Lynx Blue Line opened as gas prices climbed, in November 2007. It has exceeded passenger forecasts by 40 percent so far.

Pump prices have prompted a 2.8 percent national decline in vehicle miles traveled so far this year. In fact, an analysis by Cambridge Energy Research Associates suggests that, if petroleum prices stay at or near current levels, gasoline demand in the United States may have peaked. Consumers are driving less and are also choosing more fuel-efficient cars based on gasoline prices that began rising two years ago. Car sales in the United States have declined since mid-2005, and hybrid vehicle sales have increased by more than a third from 2006 to 2007.

Another byproduct of higher fuel prices is that more riders are seeking out public transportation. The Greater Richmond Transit Corporation (GRTC) reports that more suburban dwellers are riding the bus. Vanpools have also become more popular. Last April, nearly 3,000 more people, 15 percent more, rode vanpools than in April 2007, according to the GRTC. And in Norfolk, Va., 32 percent more people rode the bus in the first quarter of 2008 than in the same period in 2007. The city broke ground on its light rail project last fall.

Charlotte's rail line has become a model. "Since we have opened, from December [2007] through the end of April, we are averaging daily about 13,000, just during the week," says Jean Leier, spokesman for the Charlotte Area Transit System (CATS). The light rail system in Baltimore had almost 17 percent more riders in the first quarter of 2008 than it did in that quarter of 2007.

While this spark of public interest may help the benefit side of the public transportation ledger, light rail remains a heavily subsidized way to travel. Light rail is tough for economists to accept because these systems cost big money to build, money that typically comes from all taxpayers through federal grants as well as state and local taxes.

Public transportation doesn't pay for itself. "Even if every person in a city rode light rail, the subsidy rate per rider would still greatly exceed that of the automobile because the fares for light rail cover only about 25 percent of the operating cost of an additional passenger — the remaining 75 percent is subsidized," says Thomas Garrett, an economist at the St. Louis Fed who has studied light rail transportation.

Part of the problem is that driving has seemed cheap by comparison. But drivers don't pay the full cost of that either. They do pay federal and state gas taxes if they drive, and that



The Charlotte Area Transit System's Lynx light rail line has exceeded its ridership projections by 40 percent since it opened in November 2007.

helps fund highway construction and maintenance. Yet driving involves hidden costs. Drivers pay in fuel, time, and car depreciation, but not costs imposed on others such as pollution and congestion. That leads to a higher-than-optimal number of cars on the road much of the time.

Many mid-sized cities were developed on the assumption that car use would remain prevalent, and it's been hard to design and implement successful rail projects. Charlotte planned commercial projects around its proposed rail line. "There is a lot of density being built around the line," Leier says, mixed-use developments as well as entertainment venues. The Time Warner Cable Arena, home of the Charlotte National Basketball Association franchise the Bobcats, sits adjacent to the Blue Line. The Courtside, a 17-story building less than two blocks from two light rail stations, has sold out its 107 residential units. Other projects are under way.

Norfolk's light rail route will serve the Eastern Virginia Medical Center through the downtown, with stops at Harbor Park, the minor league baseball stadium, among others. Private developers are responding with transit-oriented project proposals, says James Toscano, spokesman for Hampton Roads Transit.

For the people in Charlotte and Norfolk, these light rail projects offer a convenient alternative to driving and parking. In general, the benefits of light rail projects like these are concentrated, with the costs dispersed among many, many taxpayers, according to Garrett and co-author Molly Castelazo: "The many who stand to lose will lose only a little, whereas the few who stand to gain will gain a lot."

— BETTY JOYCE NASH

DRILL THOSE HILLS

Fuel Price Spike Lures New Investment

Energy firms have pumped up natural gas and oil exploration in fossil-fuel rich West Virginia because of rising fuel prices and improved drilling technology.

“There’s lots of excitement among major players,” says Charlie Burd, executive director of the Independent Oil and Gas Association of West Virginia.

Potential for natural gas within a layer of rock called the Marcellus shale has further fueled that excitement. Dominion has rights to drill on about 1.9 million acres, and has leased about 205,000 of those acres in West Virginia and western Pennsylvania to Antero Resources Corp. for \$552 million and a 7.5 percent royalty. Chesapeake Energy Corp. in 2005 bought Columbia Natural Resources, a natural gas exploration firm with assets in Appalachia, for \$2.9 billion.

This Marcellus shale formation begins in New York and extends through Pennsylvania down the eastern spine of the Appalachian Mountains. It holds natural gas that, until recently, was considered too expensive to extract. But yields from a similar formation in Texas has focused attention on this West Virginia shale.

A geologist with the West Virginia Geological and Economic Survey, Lee Avary, is fielding double the usual information inquiries from energy firms and many landowners, curious about drilling rights contracts they’re being offered.

This untapped natural gas is good news because the state lies so close to the large Northeast markets, Avary notes. Appalachian natural gas is typically shipped to northeastern utility companies, while its oil is shipped south for refining. Another way to gauge increased activity is to count oil and gas rigs. They’re expensive, and volatile prices make the drilling rigs hard to plan and place. West Virginia had 32 rigs by the end of 2007, compared to 14 at the end of 2000, according to Baker Hughes, a petroleum industry services firm.

In the Mountain State’s early history, oil and natural gas was a complete mystery — a nuisance, in fact — for salt miners. A candle flame could cause gas “vents” to flare, and these “burning springs” were described by Thomas Jefferson as early as 1781. Deeper drilling yielded oil, and by 1859, 200 barrels a day came out of the ground. Oil production peaked at 16 million barrels in 1900.

In 2006, West Virginia produced about 200 billion cubic feet of natural gas and 1.6 million barrels of oil.

— BETTY JOYCE NASH

FRESH FOOD

More Shoppers Seek Local Flavors

Have you ever gotten to the grocery store only to realize that the fresh fruits and vegetables weren’t so fresh? That’s just one of many reasons people have become “locavores,” adopting a lifestyle of buying and eating locally grown produce.

Though the definition of “local” varies, it typically describes food grown within a radius of 50 to 150 miles.

These foods are becoming easier to find. In 1994, there



The spinach growing in the foreground won’t have far to go once it’s ready to harvest — Trail’s End Farm in Montpelier, Va., ships only within a 30-mile radius.

were 1,755 farmers markets in the United States; by 2006, that number had reached 4,385. Ellwood Thompson’s Local Market in Richmond, Va., sells produce within 24 to 48 hours of harvest. Customers know its origin, and farmers aren’t forced to use as many preservatives since they ship locally.

Trail’s End Farm, owned and operated by Sherri Cantrell and her family, is located in Montpelier, Va. One of its biggest challenges is keeping up with demand. “If you grow it, you can sell it,” she says.

It’s hard to talk about eating locally without addressing the perception that it is better for the environment. While that’s a popular way of thinking, it’s not always true. A recent article by Carnegie Mellon University economists Christopher Weber and H. Scott Matthews found that 83 percent of carbon emissions associated with food are from the production phase, while transportation represents only 11 percent.

However, travel distance affects not only the environment but also food quality. Food may travel 1,500 miles before it lands on your dinner table, says Nancy Creamer of North Carolina State University. Buying locally may create jobs within the farming and food sectors, and keep potential revenue within a community.

At a 2007 Virginia Food Security Summit in Charlottesville, Kenneth Meter, president of the Crossroads Resource Center, reported that Virginians spend \$8.9 billion on food imported from outside the state. If the state was able to increase purchases from local farms by just 15 percent, Virginia farms could earn \$2.2 billion of new income.

Matt Benson, an economist with the Virginia Cooperative Extension, says the trend of buying and eating locally will continue, but its success hinges on creating systems that benefit both farmers and consumers. “If we could get area restaurants to buy from local farmers, that would be a start,” Benson says.

Though it’s difficult to name one specific reason eating and buying locally has become more popular, one thing is for sure: It’s hard to beat the freshness factor. With the rise of farmers markets, it’s becoming easier than ever to enjoy the “local flavor.”

— JULIA RALSTON FORNERIS

PHOTOGRAPHY: TRAIL’S END FARM

The Costs and Benefits of Disclosure

BY BETTY JOYCE NASH AND KHALID ABDALLA

“Should Bank Supervisors Disclose Information About Their Banks?” Edward Simpson Prescott, Federal Reserve Bank of Richmond *Economic Quarterly*, Winter 2008, vol. 94, no. 1, pp. 1-16.

Bank supervisors monitor banks for “safety and soundness.” If investigations detect problems, supervisors can act to reduce a bank’s risk, which protects taxpayer liability. The supervisors collect, on- and off- site, a wide body of information, such as details on problem loans. They use this information to rate banks, and results remain private and confidential as required by regulatory policy.

Why not let banks voluntarily disclose or require supervisors to share useful information that, incidentally, costs about \$3 billion (in 2005) to collect? So if banks could disclose their risk ratings, would better information lead to more efficient market prices of bank securities and avoid costly, duplicate collection efforts?

Richmond Fed economist Ned Prescott built a model to investigate whether there was a good reason to require disclosure. He found that public disclosure of bank ratings by supervisors can create an incentive for banks to withhold information so they can get better ratings and gain market favor. So, mandatory disclosure may hurt the ability of the supervisor to collect that information in the first place. (In the model, allowing banks to make exam results public is the same as requiring a supervisor to share the information.) Prescott also shows that allowing a bank to voluntarily disclose its exam report is no better. If a bank did not disclose its report voluntarily, the markets would assume it withheld the information because it had a bad rating since, if it had a good rating, it would have disclosed the information. As a result, voluntary disclosure can impair supervisors’ ability to gather information in the same way that mandatory disclosure can — by creating incentives for banks to withhold it. His findings demonstrate that there are good reasons for supervisors not to share some of this information.

“What Is the Optimal Inflation Rate?” Roberto M. Billi and George A. Kahn. Federal Reserve Bank of Kansas City *Economic Review*, Second Quarter 2008, pp. 5-27.

The Federal Reserve Act calls on Fed policymakers to maintain price stability and maximum employment. The optimal long-run inflation rate is the rate that best fulfills this dual mandate. Kansas City Fed economists Roberto Billi and George Kahn argue in a new paper that for the Fed to carry out its mandate, its long-run

inflation target cannot be zero percent per year.

According to the authors, if the inflation rate is at zero percent, an adverse shock could easily push the inflation rate below zero. A negative inflation rate — known as deflation — can be particularly harmful to an economy. A positive — but low — inflation rate could serve as a buffer against any adverse shocks that could push the inflation rate into deflationary territory.

The authors cite studies that show an upward bias of as much as 1 percent in the Consumer Price Index annual inflation rate and as much as 0.6 percent in that of the Personal Consumption Expenditures (PCE) price index. As a result, an annual inflation rate of zero percent as measured by these indices would mean that the economy is undergoing a deflation. Billi and Kahn note that when the inflation rate is very close to zero, the federal funds rate is likely to be near zero as well. Thus, the ability of the Fed to lower the federal funds rate would be restricted. This could constrain the Fed’s ability to stimulate a slumping economy.

With these issues in mind, Billi and Kahn use a macroeconomic model of the U.S. economy to calculate the optimal annual inflation rate. They find that the optimal annual inflation rate is between 0.7 percent and 1.4 percent when measured using the PCE price index. This estimate is lower than previously published estimates that had specified the optimal annual inflation rate to be about 2 percent.

“How Do EITC Recipients Spend Their Refunds?” Andrew Goodman-Bacon and Leslie McGranahan. Federal Reserve Bank of Chicago *Economic Perspectives*, Second Quarter 2008, pp. 17-32.

First introduced in 1975, the Earned Income Tax Credit (EITC) is one of the largest federal government assistance programs targeted to lower-income households. Designed to encourage work force participation, the program distributed \$40 billion to 22 million families in 2004.

In a new study, Chicago Fed economist Leslie McGranahan and former associate economist, Andrew Goodman-Bacon, investigate the spending patterns of EITC-eligible households during February and March, the period in which EITC benefits are disbursed. The authors found that these households increase relative average monthly spending on vehicles in February by 35 percent relative to non-EITC families. The EITC families also spent more on other transportation costs. “Given the crucial role of access to transportation in promoting work, this leads to the conclusion that recipient spending patterns support the program’s prowork goals,” the authors conclude. **RF**

Unsteady State

The ongoing evolution of mainstream economics

BY DOUG CAMPBELL

In the spring of 2003, a dozen economists quietly gathered in a hotel conference room in downtown St. Louis to talk about the state of their profession. They shared a general malaise. In their view, academic economics had become too narrow and too rigid, and scholarly articles too abstract, technical, and disconnected from the real world.

“We had a sense that economists were failing in an important sense to bring economic insight to bear on public understanding and public policy,” recalls Dan Klein, a professor at George Mason University in Fairfax, Va., who organized the gathering.

Out of this meeting was born a new economics journal — *Econ Journal Watch*, with its premiere issue in 2004. Published three times a year and edited by Klein, the journal consists mainly of refereed “Comments” essays that critique articles in other economics journals, sometimes questioning their data, other times their premises or their logic. The stated mission is to watch “the journals for inappropriate assumptions, weak chains of argument, phony claims of relevance, and omissions of pertinent truths.”

To be clear, Klein and his fellow journal organizers belong to a specific ideological strain. (And there are plenty in the profession who do not share their malaise. After all, the mainstream is still, well, “the mainstream.”) Klein calls them the “Smith-Hayek-Friedmans,” after Adam Smith, author of *The Wealth of Nations* and generally regarded as the founding father of economics; Friedrich Hayek, a Nobel Prize winner known for his defense of free markets and contributions to what became known as the “Austrian School” of economics; and Milton Friedman, another Nobel Prize winner whose work became synonymous with the neoclassical “Chicago School” and whose essays galvanized public interest in economic principles.

Those who follow in this tradition are pretty close to being mainstream economists, though perhaps even more free-market tilting and not as technically oriented as those who preside over the field’s top journals. It is not surprising that their journal is at heart a critique of the economic orthodoxy. But it is only one of many critiques, some from the far end of the ideological spectrum and others rather close to the middle.

Klein and his cohorts want to know why more economists aren’t addressing the Big Questions. Where are the plain-spoken economists of yore who helped guide public opinion? As Klein puts it: “There’s this lingering question of people of my ilk — why isn’t there a Milton Friedman today?”

Questions from other camps also abound. As is natural during turbulent times such as these, many questions focus on macroeconomics — the study of economy-wide phenomena. Income inequality is widening and more domestic jobs are being lost to free trade. The recent credit market turmoil provides numerous examples of borrowers and lenders making poor choices. Is economics too set in its ways to consider alternative explanations for how individuals and firms make decisions?

It’s a fair question. But it would be unfair to suggest that it is going unanswered. As it is, many view the supposed failings of high-level economics as greatly exaggerated. Is macroeconomics too theoretical? Perhaps in some cases, but it’s unlikely you can devise workable policy proposals without first establishing a solid theory about how people will react to those new policies. Too much math? Well, the fact is that economics is a quantitative field. Especially for the purposes of conducting macroeconomic policy, quantitative judgments are essential. Helen Tauchen, associate chair of the economics department at the University of North Carolina, Chapel Hill, says: “The inherently dynamic nature of economic decisions, the statistical difficulties in using nonlaboratory data, and the complication of handling interactions among strategic agents all require nontrivial mathematical approaches.”

In this issue of *Region Focus*, we describe how economics is trying to get at the Big Questions — the way the field is embarking on a reorganization, how its members are communicating with each other and nonspecialists, and how their research focuses are shifting.

By no means is this an exhaustive exploration of the state of economics, and the following historical summary is just that — a heavily abridged and simplified review to help place these articles in historical context. We aim instead to capture the uniqueness and — most of all — the enthusiasm

that permeate the economics discipline today. In fact, debate among economists is in some ways livelier than ever, with universities experiencing a heyday in applications and enrollment; blogs providing informal venues for discourse; and exciting new research frontiers beginning to produce real results.

A Brief History of Economic Thought

In the beginning, there was Adam Smith. The “classical model” of the economy that is attributed to Smith — as well as David Ricardo and John Stuart Mill — assumed that markets exhibited perfect competition; that people make decisions based on real, not nominal, values; and that these people are basically the same in their preferences and economic behavior. Obviously, this was an oversimplification that limited the model’s reach. For instance, in the classical model there are no business cycles — the historical boom-bust sequence of economic fluctuations. Output is determined by changes in aggregate supply, which in turn is often adversely influenced by government interference. Hence, classical economists were advocates of a “laissez-faire,” or hands-off, approach.

While the next 200 years were eventful, the classical model maintained its dominance. But with the Great Depression came great change in the prevailing economic paradigm. In 1936, John Maynard Keynes published *The General Theory of Employment, Interest, and Money*. Few works have so shaken up their disciplines. Among the differences between Keynes and his predecessors was that he provided a model which encompassed both the macroeconomy — an aggregate description of how the economy works — and the microeconomy. He also put short-term conditions at the forefront, famously remarking, “In the long run we are all dead.”

The key to what became known as the Keynesian model was aggregate demand. (Over the years, you see some clear differences in beliefs between Keynes and the practitioners who call themselves Keynesians.) Keynesians relied on the so-called IS-LM model, which showed how demand was impacted by changes in investment and savings (IS) and changes in liquidity and money (LM). In this model, shifts in consumption levels as well as investment can have an effect on demand.

Keynes himself thought people formed their expectations based on “animal spirits” and not economic fundamentals. As a result, aggregate demand tended to move erratically along with the mood of the marketplace.

Keynesians also believed policymakers had several key tools with which to bring about changes in consumption and, by extension, aggregate demand. Fiscal policy — raising or cutting taxes — is one way that Keynesians believed the economy could be fine-tuned.

Keynes also provided an answer to why the Great Depression occurred: High expectations about the future occurred in the midst of a stock market bubble and the economy’s general overproduction of goods. This in turn

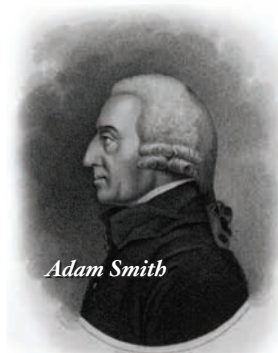
reduced investment and popped the stock market bubble. Wall Street’s crash lowered wealth and spurred low expectations about the future of the economy, both of which had the effect of further reducing investment and consumption. In sum, aggregate demand collapsed. To reverse the situation, Keynesians advocated stimulating demand via government spending.

Keynesians ruled the policy world for at least two decades after World War II. But then the monetarists, led by Milton Friedman, entered the picture. The monetarists from the University of Chicago held that changes in the money supply were the real driver of business cycles because of their ability to change aggregate demand.

Where Keynesians believed that prices and wages were somewhat “sticky” because markets were not perfectly competitive, monetarists believed that expectations about the future were stickier. These “sticky expectations” were the main culprit in upsetting the process of getting supply and demand back into equilibrium. It was this backward-looking nature of expectations that allowed a loosening of monetary policy to have (temporary) stimulative effects on real production and consumption in the economy. But that effect would wear off as expectations eventually caught up with increases in realized inflation. Thus, the central bank’s main job should be to avoid causing inflation by tightly controlling the money supply. From monetarists came the maxim: “Inflation is always and everywhere a monetary phenomenon.”

In the mid-1970s Robert Lucas articulated his “rational expectations” hypothesis, which has endured as arguably the most influential contribution to macroeconomic theory ever since then. Lucas tended to agree with monetarists, but he added the notion that people form their expectations of the future by using all available information — they are forward-looking more often than they are backward-looking. He also suggested that they are unlikely to make predictable, systematic errors. While a monetarist would have assumed people would react to inflation only upon experiencing it, a disciple of rational expectations believes people will see that expansionary monetary policy could lead to higher inflation, and thus immediately incorporate that information into their financial behavior.

The famous example is a football game — data show that throwing passes leads to more touchdowns than simply running the



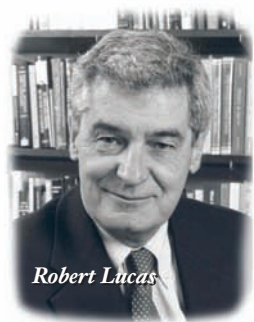
Adam Smith



John Maynard Keynes



Milton Friedman



Robert Lucas

ball. So should a team simply throw the ball all the time? Of course not, because the defense would respond with new formations to quash a pass-only offense. The Lucas critique at heart pointed out what should have been obvious: People's behavior will change as policy changes.

From the perspective that markets contain much imperfect information or firms and people face constraints on their borrowing, for example, the rational expectations theory provides a useful framework for understanding the economy. More to the point, it remedies the main problem with previous economic theories.

Closely associated with the rational expectations approach is "real business cycle" theory, developed by eventual Nobel Prize winners Finn Kydland and Edward C. Prescott, and which held much sway during the 1980s. So-called RBC models emphasized the importance of the supply side of the economy in determining output. They also drew heavily from microeconomic principles — the rational individual responding to incentives who tries to maximize the "utility" of his marginal decisions over time as well as the tendency of markets to move toward equilibrium. In RBC models, prices and wages change rapidly.

The New Keynesians arrived in force by the late 1980s to build upon the neoclassical/rational expectations/RBC approaches. New Keynesians come in several forms, but in general they believe that sticky (or slow-changing) prices and wages are the key to understanding the effects of monetary policy, which in turn is central to economic output. New Keynesian models also take into account the possibility of both demand- and supply-driven recessions.

Where Are We Now?

For macroeconomists, a leading notion is that they have achieved a "new neoclassical synthesis," a term coined in a 1997 paper by former Richmond Fed economist Marvin Goodfriend and Robert King, a Richmond Fed visiting scholar. In the 1960s, Goodfriend and King argued, the original synthesis included the acceptance of the common optimization tools of microeconomics, a belief in the power of sticky prices, and the need to provide useful macroeconomic policy advice.

The new synthesis marries Keynesian short-run demand policies with classical let-the-market-decide microeconomic policies. It combines the most compelling parts of Keynesian and classical models with rational expectations, monetarist, RBC, and New Keynesian theories. "There are new dynamic microeconomic foundations for macroeconomics," Goodfriend and King wrote. "These common methodological ideas are implemented in models that range from the flexible, small models of academic research to the new rational-expectations policy model of the Federal Reserve Board."

One thing that should be clear at this point is that the dominant economic paradigm has shifted significantly over the years, sometimes abruptly, and that at any given time many economists disagree with the prevailing economic paradigm.

The economy is, at this writing, experiencing a downturn of, as yet, an undetermined length and magnitude. Macroeconomic models may do very well at theoretically evaluating the effects of various policies, but how confident is anyone, including the people who build the most widely used models, that they can really help forecast or understand the economy?

At a more fundamental level, today's questions have centered on the perceived rigidity of the economic orthodoxy. Last year, the *New York Times* looked at how some economists felt like outcasts after raising doubts about the uniform virtues of free markets. Alan Blinder, a former Federal Reserve Board governor, was quoted as saying that "there is too much ideology" and that economics was too often "a triumph of theory over fact." Economics blogs spent weeks debating an article in *The Nation* that spotlighted the "heterodox" wing of economics and described the mainstream as smug and inflexible to new, possibly better ideas. In an April op-ed piece in the *Boston Globe*, economist Richard Thaler and legal scholar Cass Sunstein used the mortgage crisis as an example of the failure of economic orthodoxy. After the fact, it's clear that credit was extended to all sorts of people who shouldn't have received any. In response, Thaler and Sunstein favor the emerging field of "behavioral economics," in which "the robot-like creatures who populate standard economic theories are replaced with real human beings."

Some of the criticism is to be expected, both in terms of its timing (accompanying the downturn) and from its sources. For example, John Willoughby, chairman of the economics department at American University in Washington, D.C., wonders why so many economists seem to ignore growing bodies of research. "The rational expectations, dynamic programming models seem to me to bear very little connection to what economists actually do when trying to stabilize the economy," Willoughby says. "There are a lot of interesting things being done in behavioral and experimental and game theory that challenge the notion that there's one sort of steady state to which the economy is heading — not that most economists strictly believed that but even as a theoretical framework I think that's breaking down."

On the other hand, someone like Alan Blinder is hardly out of the mainstream. Nor is Thomas Nechyba, chairman of Duke University's economics department, who worries that macroeconomics in particular has become too theoretical. "There is a new paradigm in the more micro-based way we are doing macro. But if it can't succeed in explaining actual data, the stylized facts that are out there, and do it in more than a calibrated model with replicated facts — I think it's going to be in trouble."

Tom Humphrey, who retired from the Richmond Fed in 2004, is a historian of economics who remains engaged in the profession. Humphrey says he takes a relatively optimistic view. By no means is economics in crisis, he says, and one should not be overly restrictive in defining what a "main-

stream” economist thinks. Even a diehard neoclassical economist might agree that in the short run people can behave irrationally and make mistakes.

Watchdogs

One of the traditional mechanisms that defines the intellectual currents in economics are the journals. As in other academic disciplines, article submissions are vetted by other economists before acceptance. The big journals — *American*

Economic Review, *Journal of Political Economy*, *Quarterly Journal of Economics*, and *Econometrica* to name a few — naturally tend to accept papers that agree with the worldview of the referees. That’s not an easy thing to change so it may take awhile for generally accepted paradigms to shift as well.

But what can accelerate the shift is an open, intellectual exchange of the ideas, theories, and methods that appear in the leading economics journals. At least that is what Klein and his cohorts at *Econ Journal Watch* hope. Klein does not

Q&A: General Equilibrium Models

General equilibrium models are the preferred tool of many macroeconomists today. To get a better understanding of these models, we asked Richmond Fed economist Kartik Athreya to explain.

What’s a standard general equilibrium model?

General equilibrium refers to situations in which the desires of consumers and producers for all commodities under study are simultaneously reconciled. A standard general equilibrium model is the “competitive” one, where consumers and producers meet in markets in which both parties assume that the prices of goods are beyond their control. A competitive general equilibrium occurs when we’ve found a set of prices that leads households to demand precisely the amount that firms wish to produce at those prices.

At its heart, a general equilibrium model is a collection of two objects: One is a set of assumptions about the behaviors of households and firms, and the other is an “equilibrating” institution, which is how the actions of individual actors restrict each other. The behavior assumed for households is that they are utility maximizing — they make themselves as well-off as possible given their constraints. For firms, it’s profit maximization. All general equilibrium models are going to have these two ingredients. The big achievement of competitive equilibrium theory was to show that “usually” — if households and firms took prices as given when optimizing and paid no attention to anything but these prices — supply would equal demand in all markets.

What’s a dynamic stochastic general equilibrium (DSGE) model?

It’s any general equilibrium model in which the actors must make decisions over time in an uncertain environment. Firms look forward to the future and households think about retirement — that’s the dynamic part of the model. “Stochastic” refers to the fact that economic actors in the model face uncertainty. And equilibrium in this case refers to the presumption that supply equals demand in markets for goods traded both in the present as well as in the future. In models where prices equilibrate competing interests, people’s expectations of the future values of prices must be specified. In standard DSGE models, these expectations are

assumed to be correct — not always, but on average.

In the context of monetary policy, people have started employing these models because they think expectations of future inflation are something important to guide the behavior of actors. These models take a big step toward escaping the Lucas critique (which states that relying on historical data is misleading because people will change their behavior based on changes in policy) because the actors are modeled as always reacting optimally to policy changes.

What do you feed into these models?

In the model, the attitudes of households and the capabilities of firms will be given mathematical representations that are summarized in a set of numbers that we call “parameters.” For example, the way that people value future consumption relative to current consumption, or how averse to risk households are. In assigning numerical values to parameters, we let agents operate under current policies and then ask, “What numbers must be chosen for the parameters such that the equilibrium behavior of the model matches what we see in the real world?” This strategy is called calibration.

What do you get out of these models?

You predict outcomes for all the objects that the actors in the model care about. For households, the goal of the model is to deliver predictions of how much people will consume and work at different dates and under different circumstances, and what prices they will face. For firms, it’s often how much they will produce and invest.

How big is a typical DSGE model?

They’re small in the sense that I can describe a model to you in five or six equations. For most models, a single page would summarize them, and their solutions can be obtained in minutes, if not seconds, on many computers. They’re big in the sense that they presume that individual actors are acting as if they perform fantastically complicated computations. The old “non-equilibrium” models were actually much bigger. The internal consistency required of the current models makes their computation grow rapidly more demanding as they get “larger” and has so far prevented most of them from getting too big.

think his publication has spurred the leading journal editors to reexamine their product. What he thinks is that his journal's very existence and continued financial and intellectual support is testament to the willingness of the economics discipline to embrace new and improved ideas. And while the field of economics in 2008 may not have its own Milton Friedman, Klein thinks it's a good sign that more people are at least talking about the absence of such a figure.

He says: "Clearly today there is more empirical work going on, and I think model building has come down a notch; so-called theory is continuing to come down in prestige and that's a good thing ... so I think that I'm ready to believe that things are getting better. I sure hope so."

If economics is itself a market, then the best models should rise to the top. Today, there are more ways to percolate new ideas than ever — from a widening array of journals, to blogs, to curricula in college classrooms, and to a surprising run of *New York Times* best-selling economics books. Then again, the process of rising can take some time. In 1970, it would have been difficult to find an economist

who believed the Keynesian paradigm would be dead 10 years later. As for today's paradigm? Perhaps we'll know in 10 more years. **RF**

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$$\begin{aligned} \frac{1}{h} \int_{-\infty}^{\infty} \hat{f}(x) dx &= \frac{1}{nh} \sum_{i=1}^n \int_{-\infty}^{\infty} \mathbf{I}(|\frac{x-x_i}{h}| < \frac{1}{2}) dx \\ &= \frac{1}{n} \sum_{i=1}^n \int_{-\infty}^{\infty} \mathbf{I}(|\frac{x-x_i}{h}| < \frac{1}{2}) d\psi \\ &= 1. \end{aligned}$$

$$\begin{aligned} &\theta(1-r(\theta)) - a(\theta) \\ &\geq (1-\pi) [\theta(1-r(\theta')) - a(\theta')] \\ &\quad + \pi [\theta(1-r(\theta)) - a(\theta) - \hat{P}], \quad \forall \theta, \theta'. \end{aligned}$$

$$\begin{aligned} \hat{f}(x) &= \frac{1}{n} \sum_{i=1}^n \mathbf{I}(x - \frac{h}{2} < x_i < x + \frac{h}{2}) \\ &= \frac{1}{n} \sum_{i=1}^n \mathbf{I}(|\frac{x-x_i}{h}| < \frac{1}{2}) \\ &= \frac{1}{n} \sum_{i=1}^n \mathbf{I}(|\psi(x_i)| < \frac{1}{2}) \end{aligned}$$

Economist, Study Thyself

The way economists are trained has come a long way in the past 20 years. Has it come far enough?

BY DOUG CAMPBELL

A major in economics, once as popular as an 8 a.m. lecture, lately finds itself in high demand. Universities across the nation report a growing number of undergraduates entering their programs in economics. At the graduate level, competition for admission to the top schools is just plain brutal.

Let's turn to the empirical evidence: According to the Digest of Education Statistics, the number of economics majors at U.S. universities jumped 22.5 percent between 2001 and 2006; the number of master's students was up 37.5, while the number of doctorates grew by a much tamer but still strong 9.3 percent. To be sure, an economics degree is by no means dominant on most campuses — it still represents only about 1.6 percent of all bachelor degrees conferred in the United States. On the other hand, growth in an economics degree is almost 4 percentage points higher than total degrees. And the popularity of economics appears to have come at the expense of some other traditionally popular

degrees — the number of sociology bachelors, for example, actually dropped 5.7 percent between 2001 and 2006.

And now, in the parlance of the discipline, some stylized facts from the Fifth Federal Reserve District, which reaches from South Carolina to Maryland: At Duke University, one in four undergraduates majors in economics. At George Mason University, applications skyrocketed after faculty member Vernon Smith won the Nobel Prize in economics. Clemson's pool of economics majors has increased 65 percent in the past four years alone; Wake Forest University's doubled in just the past year.

But don't get carried away. For while it's true that economics is enjoying a period of perhaps unsurpassed popularity on college campuses, there is no shortage of questions about its direction. Chiefly, some faculty members worry that the core curriculum — particularly at the graduate level — is becoming too technical, too theoretical, and fails to address relevant policy questions. A Ph.D. program

can teach students how to build an impressively complicated mathematical model — so is it really just training people how to be good at math and theory, and ignoring practical applications that might help end poverty, grow employment, and improve the general welfare? After all, if an economist can't address those questions, what's the point of being an economist?

"This is a concern I've had as long as I've been in the profession: As we get more math, we get less interesting," says Doug Pearce, economics chair at North Carolina State University.

But for every academic economist who feels that way, there almost certainly is a counterpart who is less discouraged. Peter Murrell, economics chair at the University of Maryland, agrees that first- and second-year graduate courses tend to lay the math on thick, but "beyond that, and especially at the dissertation stage, we are producing students who are studying some unbelievable topics." Indeed, graduates from the most technical economics programs in the United States who can also devise answers to practical questions are in high demand at research institutions.

In their influential 1987 paper, "The Making of an Economist," David Colander and Arjo Klamer rebuked graduate education in economics at the top schools for a perceived overemphasis on technique and an avoidance of practical applications. Recently, Colander revisited this topic with the idea of evaluating whether any change had happened. As his surveys show — and our interviews with department chairs across the Mid-Atlantic confirm — much has changed in academic economics over the past 20 years. There is still plenty of math and theory, of course, but there are more practical applications than ever.

Big Major On Campus

When people talk about the on-campus popularity of economics, they are usually referring to the undergraduate level. Among academic observers, the consensus is that students who formerly saw value in a variety of other social science degrees now view economics as more worthwhile.

Some attribute the growing cachet of an economics major to the "Freakonomics" phenomena. Stephen Dubner and Steven Levitt's popular 2005 book turned on a new generation to the fun and virtues of economic analysis. But department chairs interviewed for this article discounted the Freakonomics effect, arguing that growth in the discipline began at least a decade earlier, and that it's still a rare 18-year-old who has read the book.

Granted, economics is sometimes looked at as the poor man's business degree. To the question: "What can I do with an economics major?" an economics blogger joked: "Anything you could do with a business degree only for less money." But the money isn't bad for recent graduates. According to the National Association of Colleges and Employers, economics graduates got average starting salary offers in 2007 of \$47,782, compared with \$35,092 for history graduates.

The benefits of an education in economics are fairly clear. At the introductory level, the math is basic and the lessons practical. It's a useful background when it comes to landing a job. "Businesses increasingly realized that people studying economics have two valuable skills," says Raymond Sauer, economics chair at Clemson University. "They develop their analytical skills and skills for working with data. If you can think about data, analyze it, and communicate your findings to management, that's a valuable set of skills that are relatively scarce among other degrees."

The popularity varies by school, of course. At Duke, economics chair Thomas Nechyba attributes the growth and appeal of economics in part to the school's lack of a business degree. Meanwhile, West Virginia University has only 100 economics majors; director William Trumbull believes that the existence of a strong business program lures away many would-be economics majors.

Doctoral Doubts

Graduate economics is likewise experiencing a heyday in terms of enrollment. Bolstered in large part by a surge of international students — for whom the value of a U.S. economics degree is huge — department chairs say that admission standards are extremely high right now. But whereas there is little debate about the real-world value of an undergraduate economics degree, the same thing can't be said at the graduate level.

The overarching concerns are twofold and related: First, there is worry that the high-level math that graduate students endure during their first two years is unnecessarily grueling and, sometimes, unconnected to the curriculum that follows. Second, there is unease that economics risks losing its connection to real-world problems because of its focus on theory and complex models. This second concern is most acute in the subfield of macroeconomics, which studies forces that affect the entire economy, such as inflation and growth. (By contrast, microeconomics is chiefly interested in individual decisions and markets within the wider economy.)

These are long-standing perceptions, well articulated 20 years ago by economics journalist Robert Kuttner who complained that economics departments were "graduating a generation of idiot savants, brilliant at esoteric mathematics yet innocent of actual economic life."

The math that graduate economics students take in their first two years is not to be trifled with. Andrew Foerster, who begins his third year at Duke University's graduate program this fall (and who worked two years as a research associate with the Richmond Fed), sees good and bad in the system. It may have the effect of unnecessarily warding off some otherwise perfectly capable would-be economists, he says, and the disconnect between undergraduate and graduate curriculum is conspicuous. "It's certainly grueling, but perhaps not always unnecessary," Foerster says. "It's a lot more mathematical and less graphical ... it's certainly a transition, and one that I think a lot of people who are good students

have a difficult time making.” But with math, Foerster says, students are better prepared to engage in economic discourse at the highest levels.

At the University of South Carolina, economics chairman Randolph Martin says he is impressed with the depth of knowledge displayed by today’s young economists. But he wonders whether some programs go overboard in their preparations. “Sometimes I wonder if a question is worth all this firepower they’re throwing at it?” Martin says. “I don’t want to underplay the tools that they’re taught ... but even with the young turks in the applied kinds of areas, I wonder whether their work has some relevance to the world and not just pure theory or at such a high-level of analytics that you don’t know what you get out of it.”

Robert Whaples is economics chair at Wake Forest University, which doesn’t have a graduate program. But Whaples is an economic historian who pays attention to the economic zeitgeist and he is concerned about the direction of graduate education, particularly as it applies to macroeconomics. In a review of *The Making of an Economist, Redux*, Colander’s follow-up to his 1987 work, Whaples laments that the very principles of economic thought tend to be forgotten at the graduate level. “You thought that economics was all about Milton Friedman vs. John Maynard Keynes? Think

again. Mundane issues like monetary and fiscal policy aren’t abstract enough,” Whaples writes. “The payoff in economics is for novelty and cleverness. ... The incentives are to show that you are ‘smart,’ not necessarily that you are wise or learned.” (Though, to be fair, there is still a large amount of work being done at top graduate programs on monetary and fiscal policy that is helping economists to illuminate and reconcile the views of Keynes, Friedman, and others.)

The Ivory Tower Problem

Beyond technique and methodology, there is the second related problem: ensuring that what gets taught at the graduate level has at least some application to the real world. For example: At Georgetown University, former economics chair Matt Canzoneri notices a general trend in academia away from cultivating economists who want to make policy. What they want is to publish, which — no coincidence — is the way to tenure and general peer recognition. “Here and in other institutions over the last 10 years, there’s been more emphasis on theory and math and econometric modeling, and we’re losing all the applied policy type people,” Canzoneri says. “The ‘Brookings’ style person is disappearing from academia and the rewards are going to those who publish in refereed journals ... that’s a trend that

Ph.D.-Granting Economics Programs in the Fifth District

American University Washington, D.C.

Chairman: John Willoughby
Graduate Students: About 100 Ph.D. in residence
Full-time Faculty: 21 professors
Departmental Paradigm: A split between heterodox and mainstream

George Washington University Washington, D.C.

Chairman: Robert Phillips
Graduate Students: 18 M.A., 97 Ph.D.
Full-time Faculty: 29 professors

Georgetown University Washington, D.C.

Chairman: James Albrecht
Graduate Students: About 65 Ph.D. in residence
Full-time Faculty: 28 professors

Johns Hopkins University Baltimore, Md.

Chairman: Joseph Harrington
Graduate Students: 54 in residence
Full-time Faculty: 14 professors

University of Maryland College Park, Md.

Chairman: Peter Murrell
Graduate Students: 130 in residence
Full-time Faculty: 37 professors

North Carolina State University Raleigh, N.C.

Chairman: Doug Pearce
Graduate Students: About 140
Full-time Faculty: 21 professors

Duke University Durham, N.C.

Chairman: Thomas Nechyba
Graduate Students: 81 Ph.D. in residence
Full-time Faculty: 38 professors
Departmental Paradigm: An emphasis on crossing interdisciplinary boundaries in the social sciences

University of North Carolina, Chapel Hill

Chairman: John Akin
Graduate Students: 95 in residence
Full-time Faculty: 23 professors

University of North Carolina, Greensboro

Chairman: Stuart Allen
Graduate Students: 13 in residence
Full-time Faculty: 14 professors

I'm not too happy with."

The issue is not so pressing with microeconomics, which has blossomed in recent decades. But in macroeconomics, there is a large disconnect between what undergraduates and graduate students learn about economics. The problem, however, may not be because macro has become less rooted in reality while micro has not. The problem could be that economists have yet to find a better way to present the insights of necessarily dynamic macro models to undergrads.

At the undergraduate level, students learn basic Keynesian economics — about aggregate supply and aggregate demand, and the famed IS-LM model, which shows how changes in investment-savings and liquidity-money supply affect national income. These are useful lessons that teach students about models and how to use them in studying policy questions. But they are somewhat outdated.

In graduate school, Keynes is quite literally dead, and suddenly students are transported to the world of Robert Lucas and rational expectations, paving the way to the main tool of macroeconomists: dynamic stochastic general equilibrium models (see page 15). The result is a double whammy — the jarring intellectual transition that students endure as they move to the graduate level, and then the ensuing observation that dynamic stochastic general equilibrium models

have their own problems. For while these models strive to more accurately portray how the economy really works, they sometimes tend to fall short and the complexity can frustrate students.

Here is how one student who Colander surveyed put it: "The macro courses are pretty worthless, and we don't see why we have to do it, because we don't see what is taught as a plausible description of the economy."

Meanwhile, an interesting side effect of the waning interest in graduate macroeconomics is the relative dearth of Ph.D. macroeconomists in the job market. At West Virginia University, chairman Trumbull says that he has constant difficulty finding suitable candidates for macro slots. "You've got to be doing numerical analysis, computable general equilibrium stuff, and we don't have that [among faculty members]," Trumbull says.

Forward Thinking

All of this seems to point to a discipline in trouble. But if you take a step back, it's easy to see that the debates going on inside economics are no more heated than in other fields. And they are useful debates. A survey of economics departments in the Mid-Atlantic shows that, on these campuses at least, academic economists are constantly reevaluating their

Clemson University Clemson, S.C.

Chairman: Raymond Sauer
Graduate Students: 56 Ph.D. in residence
Full-time Faculty: 25 professors
(with new slots being added)
Departmental Paradigm: A blend of the
Chicago and Virginia school traditions

University of South Carolina Columbia, S.C.

Chairman: Randolph Martin
Graduate Students: 12 Ph.D. in residence
Full-time Faculty: 15 professors

University of Virginia Charlottesville, Va.

Chairman: William Johnson
Graduate Students: 100 in residence
Full-time Faculty: 32 professors

George Mason University Fairfax, Va.

Chairman: Don Boudreaux
Graduate Students: 160 Ph.D. in residence
Full-time Faculty: 35 professors
Departmental Paradigm: You name it — from Austrian
to Public Choice to Experimental

Virginia Tech Blacksburg, Va.

Chairman: Hans Haller
Graduate Students: 22
Full-time Faculty: 15 professors

West Virginia University Morgantown, W.Va.

Chairman: William Trumbull
Graduate Students: 50 in residence,
with up to 12 graduating each year
Full-time Faculty: 19 professors
Departmental Paradigm: Tends toward
free-market orthodoxy

NOTE: Figures are estimates or based on information accurate as of June 2008 and may depend on a department's affiliation with other departments. Except as specified, graduate student figures include both Ph.D. and master's programs.

approaches to training the next generation of economists.

American University's John Willoughby likes to describe his program as one that aims to present the vast array of economic perspectives. American's is one of a handful of departments that does not scorn "heterodox" economists — those who tend to break from mainstream thought on everything from the virtues of free trade to the rationality of individuals. At the graduate level, students can choose between the mainstream theory track or the heterodox theory track, and every doctoral student must take at least one class in the other track.

"There is a disconnect at the highest levels," he says. "So many graduate students who go into economics have received a monolithic view of what economics is, and they are less prepared for the real variety that exists."

Willoughby's definition of monolithic might differ from some other department chairs. American is unique in its employment of many radical economists. But other economics programs in the Mid-Atlantic can hardly be characterized as monolithic. Georgetown's Canzoneri is proud of the saltwater/freshwater diversity of his faculty, referring to the historical split between the coastal (more steeped in Keynesian economics) and the inland (monetarism and New Classical) schools. At Clemson, the emphasis is squarely on applied policy economics, with "almost no effort to train people as economic theorists," chairman Sauer says. George Mason is the "most methodologically diverse Ph.D.-granting institution in the English-speaking world," says chairman Don Boudreaux. "We have armchair theorists, Austrians, and even experimental economists who aren't sure the demand curve slopes downward unless they test it in a lab, and public choice people who produce multiple regressions."

As for the core curriculum, it is arguably true that the first year or two of graduate economics education is loaded with skull-cracking math. But after that, it is important to note, there is a shift to encouraging creativity. In their first years, students are equipped with the tools necessary to conduct high-level economics. Then, they can be unleashed to grapple with the ultimate goal: to generate new knowledge, as Joseph Harrington, economics chair at Johns Hopkins University, put it. To do that, students need to be able to not only answer questions, but to also ask the right questions. "It can be a considerable challenge to get students accustomed to posing a question, when almost all of their educational experience has involved being given a question and then told to answer it," Harrington says. "The intent is to reach a balance between the teaching of mathematical methods essential to economic analysis and the development of a mind for independent inquiry."

It is in fact something of a movement. At the University of North Carolina, Chapel Hill, there is no backing away from the emphasis on math in early graduate education, but there is a recognition that other talents need to be developed too. "Mathematical ability and training are very important for Ph.D. economists but other skills are as

important," says Helen Tauchen, director of graduate studies and associate chair at UNC. "In particular, the best economists are also creative, have excellent economic intuition, and can work independently." Toward that end, the Ph.D. program was recently revised so that students start writing research papers and thinking about dissertation research topics sooner.

Likewise at the University of Virginia, faculty members noticed that many students were having difficulty in transitioning to the research portion of their studies, maybe because they had spent the first part so immersed in learning methodological tools. "So we have recently changed our program to try to get students into the activity of writing, of doing research, of thinking about good research questions and how to attack them as early as the second year of the program," says William Johnson, economics chair at Virginia. "It's too early to tell whether this is working, but we are optimistic."

George Mason's Boudreaux says that some 20 years ago, his attitude about university economics was decidedly pessimistic. But today he holds the opposite view — he brims with enthusiasm that most academic economists have learned the lesson that, no matter how powerful their tools, they won't be able to predict the future. "At George Mason, we don't even try to do that, it's not even possible," Boudreaux says. Instead, his faculty tends toward empirical analysis and stays away from teaching abstract modeling.

A growing sentiment is that the "too technical/too theoretical" critique of graduate economics may be outdated. Peter Murrell, economics chair at the University of Maryland, acknowledges that as recently as 1990, he might have agreed with the detractors. But today, Murrell sees universities as unleashing highly skilled practitioners on highly practical topics. "This is a very good time to be in economics education," he says. "Not only is there powerful interest in the field, but I think economics is more interesting than ever before. The types of topics we attack, the way we can produce fundamental application lessons for public policy — it's a great time to be an economist."

Hearing of such approaches, David Colander finds himself pleased. Granted, macroeconomics remains a problem spot, he believes. By no means does he — or most academic educators in general — believe that macroeconomics has taken a wrong turn in the way it is taught. Instead, Colander recommends that the core macro curriculum be limited to courses on institutions and how they work, as well as introducing dynamic stochastic general equilibrium models — but leaving the use of such models to upper-level classes for students headed into macroeconomics.

Colander readily admits that his 1980s research on graduate economics education probably had little influence in changing how economists are made. But he believes that "The Making of an Economist" struck a chord, or expressed a near universal concern among academic economists. Today, the focus is on helping to equip economists with proper and

effective tools for attacking real problems. The math remains intense, Colander agrees, but because the admission process at top graduate schools is so rigorous, few students can't handle it.

"Economists are still economists. What they do is model, and that hasn't changed," Colander says. "But economics is reasonable and does change, and it's changed more toward what we need, with more empirical work and loosened up theory. That happened on its own, not because of a report."

At least, that's his theory. **RF**

READINGS

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Friday, July 25, 2008

Economic Blogs

Hundreds of economic blogs have sprung up on the Internet, many written by academics. What gives? How did economics become so popular?

Posted by Econblogger at 12:40 PM

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BY BETTY JOYCE NASH

Dani Rodrik launched a blog in 2007 and now he's in too deep to quit. "I still get the thought that maybe I should stop," he says. "It does take time."

But the Harvard economist finds the blog — short for Web log — useful because it serves as a reference catalog for his ideas. "I now constantly Google my own blog for ideas that I knew I had at some point," he says. "Previously, the ideas would have come and gone. The first good thing is that I have them a little more developed, and, secondly, I can actually recover them."

Some 113 million blogs range from engineering to poetry to diapers to sunsets, you name it. Economists' blogs occupy an impressive niche in this new social media universe. The authors of the best-selling *Freakonomics*, for instance, write a blog hosted by the *New York Times* that bobs around in the

top 60 of all blogs, according to the authority of Web log traffic, Technorati. And the top 10 economics blogs appear in that list's top 5,000, according to economist Aaron Schiff, who uses Technorati data to rank economics blogs on his Web site. He chalks the popularity of the econblogs up to the zeitgeist into which books such as *Freakonomics*, Tim Harford's *The Undercover Economist*, and a raft of others have tapped. "The public is increasingly realizing that economics has a lot of useful things to say about their daily personal and business lives," Schiff notes. "And economists are becoming better at communicating in relatively plain language."

Find and Link

Over the past decade, Web logs have evolved from mere collections of links into vehicles of expression that use graphics, audio, and even video. Many bloggers — authors of Web logs — invite readers to post comments, and that creates a forum for worldwide public conversations.

“Now, thanks to the Web and blogs, the public can participate easily,” Schiff says. In the two-way exchange, both sides learn. Comments, however, can be occasionally inappropriate and also take time to monitor. That’s why economist Greg Mankiw disabled the comments feature on his blog in 2007.

Rodrik’s blog attracted immediate attention, most likely because he’s a well-known academic. The blog attracted a post from Harvard colleague Mankiw, an early and widely read blogger and also a high-profile academic. The new blog went from about five hits a day to roughly 6,000.

Blogs can form bridges across disciplines and connect readers from disparate backgrounds. Rodrik records thoughts on his blog at least five days a week, and sometimes links to empirical research, often inspiring swift commentary of high quality.

“I’m also struck by how I get pushback,” he says. “I’m known for a certain kind of views. I hear from certain readers who are critics of those views, which is great — it shows me that I’m not just preaching to the converted.”

As bloggers post comments and link to academic papers, readers can shortcut to the expanding body of economic research. Blogs’ historical antecedents lie in letters, conferences, pamphlets, journals, seminars, informal lunches, and watercooler chats.

But the immediacy and range of this particular channel is unprecedented. “In the past I think it was very hard for specialists in a field to communicate with nonspecialists,” Schiff says. “This has changed dramatically in the past 10 years or so, and I think it’s a great thing.”

Explanatory Economics

Blogs may offer the best way to follow unfolding economic events, says Tyler Cowen. He co-authors the blog *Marginal Revolution* with his George Mason University colleague Alex Tabarrok. *Marginal Revolution* was one of the first of its ilk in 2003 because “we saw there was a scarcity of excellent economics blogs and thought we could make our mark,” Cowen says.

And they have: It often ranks first or second among economics blogs on Schiff’s Web site, along with *Freakonomics*. Economics blogs can penetrate complicated news stories about the economy because economists just “understand it better than most journalists,” Cowen says.

While the prose in economics papers can be obscure and hard to follow, economics bloggers explain difficult concepts and place research in context.

Economics research in particular lends itself to blogging because there’s a bottom line. “With economics, you state the main empirical result in a paragraph, link to the paper, to

some definite claim,” Cowen notes. “It’s a dialogue, people link back and forth, add to each other’s points. So there’s this open window into the world of economics that you don’t get in other fields.” Most of his readers are not economists, he says, yet they offer important insights. And Cowen ranges widely on the blog — from food to country music, for instance — complete with revenue-producing links to Amazon.com.

“I find [the blog] keeps me very sharp especially because you have open comments. If you say something wrong, you get zapped immediately.”

Even a cursory review demonstrates that blog posts can touch nerves, yet remain civil — even friendly. Some veer toward ideology, and that defines a certain readership, from free-market blogs to liberal Paul Krugman’s blog at the *New York Times*.

“Blogs need to distinguish themselves from one another, and one way to do that is by ideology,” Schiff notes. “I would say that *Freakonomics* and *Marginal Revolution* are pretty neutral,” he observes. “On the other hand, Paul Krugman is very political and Greg Mankiw somewhat less so.”

This dissemination of economic thought and the accompanying controversy seem positive. Economist John Whitehead says he catches heat on the blog *Environmental Economics* that he writes with co-author Tim Haab. While his “geeky” research ideas don’t spike traffic, his posts about global warming economic policies do. Take the debate about whether carbon taxes will reduce greenhouse gas emissions more effectively than cap-and-trade policies. “The party line [in economics] is that carbon taxes are superior for dealing with climate change,” he says, adding that he supports a cap on carbon emissions and the trading of those allowances.

“I get ripped pretty hard from economists about that,” he says. “Every time I mention cap and trade I get a flood of comments.”

Policy economists, of course, find the blog an essential tool. On Mother’s Day, Diane Rogers started the *Economist Mom* blog, “where analytical rigor meets a mother’s intuition.” She wanted to go beyond conventional research papers, conferences, and issue briefs to bring discussions about fiscal responsibility to a wider audience. “It’s such a big and important issue for the future of our economy, the economy our children will inherit.” Rogers works for a non-profit advocacy group in Washington, D.C.

The popularity of these econblogs can only enhance economic education. Every day, Cowen receives 70-some blog-related e-mails. “This notion that you can wake up every day and read the top minds in the field talking to each other ... I think it’s phenomenal and it’s all free. People still underestimate what a breakthrough this is, for economists and the world of ideas in general.”

The Podium

Blogs enhance economics instruction, professors say, with timely examples that textbooks can’t provide. Try it. Sit down with an economist via blog for cyber conversations

about taxes or global warming or gas prices or strategies in wine gifting or ways to divide housework. Those two latter ideas come via Tim Harford, an economics columnist with the *Financial Times* who also writes a blog.

Readers can enjoy lively debates, sometimes accompanied by YouTube videos. Harford and behavioral economist Dan Ariely of the Massachusetts Institute of Technology conducted such an online exchange last spring about the assumptions of irrationality in economics. A subsequent video post showed Ariely debating a picture of Harford pasted above a sofa.

Blogs replace the office door for economist Craig Newmark of North Carolina State. He used to clip and post, but now does so virtually on his blog, appropriately titled Newmark's Door, started in 2002.

"One thing I've found recently is that I've had more than a few students tell me that they are learning from my blog," he says. (Students are often surprised that he blogs. Go figure.) It's no accident that many economics bloggers also teach. "People who teach feel they have something to communicate," Newmark says.

While Newmark blogs purely for pleasure, he says the blog earns him and his wife about \$10,000 a year. He gets some 400 hits a day, but that was bumped up in January and February to 650 for reasons that are unclear to him, he says.

On the downside, blogs can use up valuable research time. A successful blog takes effort to prepare and maintain because it requires more than an occasional post. Instead, blogs need regular updates. People "visit," if not every day, several times a week. For that reason, comments and responses take on a familiar, informal tone. "If you look at it as a snapshot, you miss a big part of what is going on," Cowen notes.

Blogging and Big Ideas

OK, so maybe this generation of blogging economists won't extract a deep enough insight to win the Nobel Prize in economics in 30 years, but you never know. The effects of blogs on traditional academic research are unquantifiable. But research can circulate via blogs, and the collegial nature of the virtual economics department inspires research.

Since we don't know how great minds detect the germ of an idea, a blog is as good a way as any to generate inspiration, says economist William Trumbull, who heads the economics department at West Virginia University. "Where, for example, did John Nash get his ideas for game theory?" Trumbull asks. "It could have been some chance thing, a snippet of a conversation he overheard. It could have been no more significant than something you'd read on a blog."

Academic currency, however, is measured by the number of publications in traditional refereed journals. Blogs seem unlikely to affect that content, says economist Daniel Hamermesh, "except to the extent that the time people spend writing the stuff reduces the quantity and quality of their research." Hamermesh guest blogs for Freakonomics.

Yet blogs popularize research, explain it, bring it to a

wider audience with a mere plug and a link, and can also broadcast ideas that may interest nonacademic publishers. Marginal Revolution has led Cowen to a book contract and a column in the *New York Times*.

And all this would be impossible without an audience, the readers who participate in this social and quasi-academic enterprise. "People tell you about new stuff," Cowen says, and that sets his mind in motion. Plus, he reads widely to keep Marginal Revolution fresh and lively; while he doesn't spend more than an hour or so actually writing a post, he's up late reading. But he'd be doing that regardless.

Posts and ensuing comments provide value and insights. It's more than just a new channel. It changes the way people think and track ideas, and could ultimately influence and affect scholarship, for better or worse.

"University professors spend a lot of time talking about ideas," Newmark says. "If you go to lunch, 50 percent of the talk is about ideas; now we can widen that conversation." While he doesn't want to exaggerate that impact, "it has more than zero effect."

But publication in academic journals remains the priority. "I think any exposure you might get through blogging is just an additional side benefit," Schiff notes.

Blogs could affect research choices and that's not necessarily negative. "Ultimately academics will care about getting published in journals and the opinion of other economists matters more than blogging," Schiff adds. To Cowen, blogs enhance research. "So many academics and economists work on little things that nobody cares about," he says. "If this brings a shift from that, then that's for the better." If a paper is unsound, experts instantly weigh in. That's an immediate and public check that differs from the mysterious referee process.

"It definitely gets people to work on more popular topics. For me that's a good thing," he continues. "It gets people to write more clearly, [for] more people than your 20 specialists."

Blogging also hones research instincts. Whitehead, now that he's blogging, reads more, including other blogs. "It used to be I'd have a geeky research paper and be at a loss at the end about how to sell it in terms of policy and practical applications," he says. "Now, I always seem to have a handle on what makes the paper halfway important or what policy it can be applied to."

Blog technology could also speed publishing. Professional organizations could sponsor blogs enabling real-time discussions on papers rather than formal comments years after publication. "Research could be a whole lot more efficient," Whitehead says. Already, journals publish online as soon as they're ready. But the Internet could speed the discussion and research part of it.

There is a trend toward open publishing, such as the online journal, *The Economists' Voice*, edited by Nobel Prize winner Joseph Stiglitz, along with co-editors Brad DeLong and Aaron Edlin. The journal's editors publish articles, often by prominent intellectuals, that are often

picked up by major newspapers.

Bloggers see their Web sites as complements to scholarship rather than substitutes. “I can’t really see any negative effects from that,” Schiff says. “And the obvious positive effect is that it exposes people to things that otherwise might only get published in academic journals.”

Still, it’s not clear that blogging can enhance a career. Most, if not all, economics bloggers write from the lofty position of tenure. But not all bloggers in every academic discipline do. Rodrik probably wouldn’t blog if he were seeking tenure at a top academic institution. “I guess I’m sufficiently established that I don’t give a damn,” he says.

The blogging wave may have crested but there’s always

room for another voice, however difficult to discern among the cacophony. “For someone like me who is less well known [than Krugman or Rodrik],” Schiff says, “it takes a much longer time to build up a readership.”

As technology evolves, so will the blog, its authors, and dynamic audience. The whole enterprise may embody the ideal of the influential economist Friedrich Hayek, who believed in the power of decentralized, unplanned activity — “spontaneous order.” While there’s no coordination per se, it’s kind of a market where rules emerge, Craig Newmark says.

Perhaps it’s not surprising that some of the Austrian thinker’s devotees have a blog called Café Hayek. **RF**

Is Rational Man Extinct?

Searching for *Homo Economicus*

BY STEPHEN SLIVINSKI

The audience that gathered in the ornate concert hall for that night’s ceremony probably noticed the similarities of the two guests of honor standing next to each other on stage. Both wore tuxedos accented by white bowties and vests as was appropriate for the occasion. Both wore glasses and were about the same height.

But the audience probably noticed a difference too. The guest of honor standing on the right sported a ponytail that reached almost halfway down the back of his tuxedo jacket — a rare sight at a ceremony like this.

Delving into each man’s biography, the spectators might have noticed more differences. The man on the left was born in Tel Aviv and studied psychology as an undergraduate because it struck him as more practical than philosophy. The ponytailed man was an economist born in Wichita, Kan., who, before pursuing the study of economics, started out his academic life in electrical engineering because he wanted to avoid the harder math classes required of physics students.

Yet there was an overriding similarity that evening, and it was the reason for the tuxedos. Both men were about to be awarded the Nobel Prize in Economics.

The date was Dec. 10, 2002. The man on the left was Daniel Kahneman; the man on the right was Vernon Smith. Both are regarded as academic pioneers for their use of laboratory experiments as a way to test the basic premises of modern economics. Yet the conclusions that each came to over decades of their own research appear at odds with each other. At issue is a fundamental question that cuts to the root of economic methodology: Do people act rationally in a market setting and what does that mean for the study of economics?

Or, to put it another way: Did *Homo economicus* ever walk the earth and, if so, is he now extinct?

Homo economicus is a metaphorical species of human who is able to, as economists say, optimize. He exhibits rationality in the economic sense by making decisions, even in uncertain situations, based mainly on self-interest and a strong grasp of the alternatives at hand. The mathematic and analytical models that are the stock in trade of modern economics rely on the prevalence of this form of human for markets to reach equilibrium.

The group of researchers who call themselves “behavioral economists,” like Kahneman, believe people don’t often act that way in reality and have run multiple experiments to try to prove it. On the other side of the debate are Smith and his colleagues — the “experimental economists” — who have been able to show that markets can reach equilibrium when subjected to the right sort of tests in a laboratory. Yet, if people are indeed fundamentally irrational in the economic sense, would they really be able to make the kinds of decisions which help bring the market to equilibrium?

The debate about whether there ever was such a creature as *Homo economicus* has recently broken into the mainstream media discussion about how economists view the world. It’s a discussion that has been at least 50 years in the making and probably won’t end soon.

Efficient Markets and Irrational Men

Vernon Smith notes that his brand of experimental economics began with a bout of insomnia. He was teaching at Purdue in 1955, and in the middle of one particular night he began to think about an experience he had at Harvard as a graduate student.

Economist Edward Chamberlin had run a series of experiments with various groups of Harvard students when Smith was pursuing his Ph.D. Chamberlin would tell some students in this experiment that they were buyers and the rest sellers. He would then give them a card with a number on it. For the sellers, that value represented the minimum selling price for the unit of good they needed to sell; for the buyers, it stood for the maximum buying price. On paper, these values corresponded to places on a hypothetical supply or demand curve. Then Chamberlin let the students circle the room and negotiate whatever contract they wanted. Once a bargain had been struck between a buyer and a seller, the transaction was recorded on the classroom blackboard.

What Chamberlin had in mind was an experimental test of competitive equilibrium theory, which suggests a market will converge on a single price where supply and demand overlap. Instead, his experiments produced trades at substantially different prices, and the observed average price was actually lower than equilibrium theory would predict.

The paper Chamberlin published on the experiments went virtually unnoticed by the economics profession. But Vernon Smith had taken part in one of these experiments and thought there might be something more to them.

“So, there I was, wide awake at 3 a.m., thinking about Chamberlin’s silly experiment,” Smith recounted in a 1991 essay. “The thought occurred to me that the idea of doing an experiment was right, but what was wrong was that if you were going to show that competitive equilibrium was not realizable ... you should choose an institution of exchange that might be more favorable to yielding competitive equilibrium. Then when such an equilibrium failed to be approached, you would have a powerful result.”

Smith’s experiment made two main changes to Chamberlin’s design. The first was in structure: Smith decided to use a “double auction” mechanism in which buyers and sellers called out their bids and the successful trades were recorded by the moderator, an arrangement that more closely mimicked a real-life commodity or stock exchange. He also tried the experiment with the same group of people for multiple rounds to allow them to learn from their previous experience.

A competitive equilibrium emerged from this more structured market environment. Smith initially didn’t believe the results so he tried it with another set of students. And then another. Over the following several years, he found himself producing experimental results that exhibited stunning consistency and robustness. Competitive equilibrium theory was being vindicated.

Meanwhile, a political scientist named Herbert Simon at Carnegie Mellon University published a 1955 *Quarterly Journal of Economics* article titled, “A Behavioral Model of Rational Choice.” With this essay, Simon opened up a line of inquiry that for years to come would challenge the foundation of classical economics.

“Traditional economic theory postulates an ‘economic man,’ who, in the course of being ‘economic’ is also ‘ration-

al,’” wrote Simon. “Rather, I shall assume that the concept of ‘economic man’ ... is in need of fairly drastic revision.” The means by which Simon did this was to bring into the analysis some insights from psychology. He posited that humans have natural limits on their cognitive ability. So instead of supposing a rational man who can instantly reason to the optimal solution to a problem, Simon thought economists should define the agents within their models as exhibiting “bounded rationality.” This uniquely human form of rationality is one in which a person arrives at a solution that may not be perfect in a computational sense but is simply good enough to satisfy them. “Because of the psychological limits of the organism ... actual human rationality-striving can at best be an extremely crude and simplified approximation to the kind of global rationality” that is often implied in economics models, Simon wrote.

Simon received a Nobel Prize in Economics for this approach in 1978, making him the first noneconomist to win that prize. But the research program that eventually became known as behavioral economics didn’t really come into its own until psychologist Daniel Kahneman and his co-author Amos Tversky (a cognitive psychologist based at Stanford University before his death in 1996), began to make their mark on the economics profession.

One of the first high-profile articles their collaboration produced appeared in the journal *Econometrica* in 1979 — a contribution that would turn out to be the most-cited article in that journal’s history. In it, the authors proposed a new way to look at how people make decisions. They too suggested that people do not weigh risky choices the way a computer (or *Homo economicus*) would.

They tested this insight with a series of experiments in which participants were asked if they would accept certain gambles. The result was that people’s answers tended to diverge from what they would be if the respondents were optimally assessing the true risks of each gamble. That’s because, Kahneman and Tversky posited, people don’t think in terms of traditional probability theory. People instead think in terms of the prospects for losing what they already have.

“If you think in terms of major losses, because losses loom much larger than gains — that’s a very well-established finding — you tend to be very risk-averse,” Kahneman told *Forbes* in 2002.

“I’ll give you an example: Suppose someone offered you a gamble on the toss of a coin. If you guess right, you win \$15,000; if you guess wrong, you lose \$10,000. Practically no one wants it. Then I ask people to think of their wealth, and now think of two states of the world. In one you own [your current assets] minus \$10,000 and in the other you own [your current assets] plus \$15,000. Which state of the world do you like better? Everybody likes the second one. So when you think in terms of wealth — the final state — you tend to be much closer to risk-neutral than when you think of gains and losses.”

Kahneman’s conclusions spawned a host of articles that

sought to displace the old assumptions about rationality in economics. The collection of observations were grouped loosely under the umbrella of what came to be known as “prospect theory.”

After the publication of the *Econometrica* article, Kahneman began collaborating with economist Richard Thaler, currently of the University of Chicago, on a few experiments that were meant to flesh out the boundaries of prospect theory. What they and their colleagues discovered would stand for about 20 years as one of the more enduring insights of behavioral economics. New research, however, has begun to call into question the robustness of some of these results.

The Endowment Effect

Imagine that you decide to participate in one of these behavioral economics experiments. When you show up at the lab, you are given either a ballpoint pen or a coffee mug. Which one you get is decided by purely random chance. Then you're asked if you'd like to trade what you've been “endowed” — that's economist-speak for what you've been given. In this case, say it's the mug. If you decide to give up the mug, you'll get the pen which, you are told, is of equal value.

Behavioralists predict, based on the many versions of this experiment they've conducted, that you probably won't trade the mug for the pen. But it's not because the mug is inherently nicer than the pen. In fact, when the option to take home the mug is given to those who have the pen, most of them decide not to trade either.

According to standard economic theory, that shouldn't happen. Since the goods were randomly distributed, there should be much more trading in these experiments than actually occurs.

Behavioral economists call this the “endowment effect.” It predicts that the subjects in the experiment would have an inherent aversion to losing what they already have. Parting with the endowed good is perceived by the mug holders as a loss greater than the potential gain from acquiring another good of equal value. If true, this could tarnish some of the classic notions about the efficiency of markets and the ability of people to trade rationally within them. A world in which some trades don't occur simply because too many people are scared of parting with their goods would be one with many suboptimal economic outcomes.

Economists Charles Plott of Caltech — a pioneer in experimental economics — and Kathryn Zeiler of the Georgetown University Law Center, were able to duplicate the results of these experiments (particularly one by Kahneman and Thaler, but also one by their occasional co-author, Jack Knetsch, currently of Simon Fraser University). But when they did so, they began to notice some interesting things.

For instance, in the original experiments, subjects were told to raise their hand when they wanted to trade their good for the other good. When Plott and Zeiler ran the

same experiment, they noticed that subjects were looking to others for cues. “When we asked them after the experiment how they made their decision, many of them said they looked around the room to see what other people were doing,” says Zeiler. So, Plott and Zeiler decided to rerun the experiment and introduce a secret ballot in which players mark their decision to trade or not on a note card.

They didn't take for granted any other element of the original experiments either. They even played around with the procedures by which the good was handed to the experiment's participants. In the original experiment, the subjects were told, “I'm giving you the mug. It is a gift. You own it. It is yours.” But Plott and Zeiler speculated that might have signaled a certain high level of value for the mug. Besides, the subjects might not know if the pen they might get as a result of the trade is really any good. So, Plott and Zeiler simply told the participants: “The mug is yours. You own it.”

They also adjusted for other possible factors that might have skewed the original results. The participants got to inspect the other good before they made their choice. None of these were options given to the participants in early endowment effect experiments of Kahneman and Knetsch.

“Once you control for these other things that might be causing the gaps — even if you leave in place all conditions necessary to trigger prospect theory — you don't see gaps anymore,” says Zeiler. “If endowment effect theory was correct, we should still see those exchange asymmetries.”

It's a good example of how rules and institutions can change an experiment's outcome. In fact, that's a crucial element in the debate between behavioralists and experimentalists. The experimentalist camp's main critique is that modern behavioralists are interested mostly in uncovering deviations from the textbook versions of rationality, not in discovering whether there is something unique about markets that help people reach socially beneficial outcomes. For instance, some behavioral experiments don't give the subjects an opportunity to learn from their mistakes in the context of a market mechanism or a trading situation that is repeated more than once. Yet markets in the real world provide no shortage of educational experiences and repeat encounters.

Rediscovering *Homo Economicus*

“In principle, as I see it, experimental market economics and behavioral economics are complementary,” writes Vernon Smith in his most recent book. The man who sought to make economics a more experimental enterprise in the first place instead suggests that the goal of experiments should be to more closely approximate real-world markets.

In many of Smith's own experiments, the markets in the laboratory reach a competitive equilibrium even though the traders don't consciously realize how optimal their behavior really was. As he wrote in 1991, “subjects are not aware that they are achieving maximum profits collectively and

individually, in equilibrium, and, in fact, deny this when asked.”

Humans do seem to optimize, in the aggregate, over a long time period. Experimental research provides solid evidence that a structured market environment is important to this process. In the real world, laws and trading procedures are essential for markets to function well. And experiments can give us critical insight about how best to structure those rules.

Progress needs market participants who can learn from

experience too. “People can make a lot of cognitive ‘errors’ on the way to creating a new market,” writes the once-ponytailed Smith. (Eyewitness accounts confirm he opted for shorter hair sometime in 2007.) “What are important about individual choices are the decisions that cause people across time and generations to change tasks, locations, and directions in an effort to better themselves in response to market prices.”

In other words, there is still a little *Homo economicus* in all of us. We just have to know how to lure him out of hiding. **RF**

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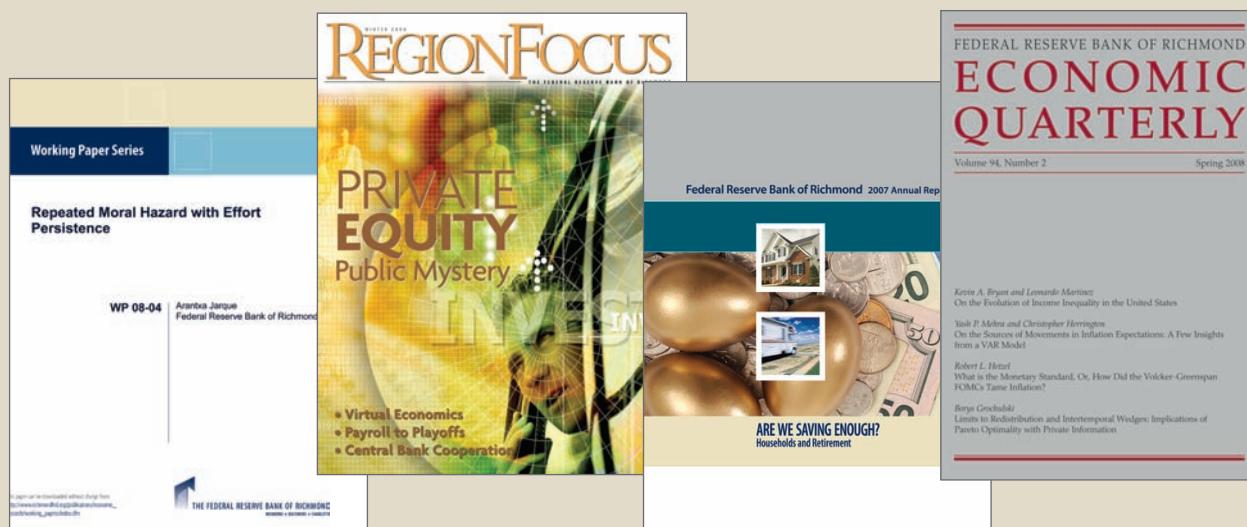
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South Carolina recently ranked third among the 31 U.S. states with nuclear capacity, making it the state with the most nuclear capacity in the southeastern United States. South Carolina's V.C. Summer is among the nuclear plants planning to add a new reactor.

Going Nuclear

The future looks brighter for a once-maligned industry

BY VANESSA SUMO

The partial meltdown of a reactor core at the Pennsylvania Three Mile Island nuclear power plant in 1979 was a watershed event. Although it resulted in no deaths or injuries, it is considered the most serious accident in the domestic nuclear power industry's operating history. No new plants were proposed in the United States after that incident, and the plant construction that was underway saw cost overruns exceed 250 percent, according to a Congressional Budget Office (CBO) study.

Poor performance, safety concerns, and the high cost of constructing a nuclear plant relative to other sources of power continued to plague the industry for several years. But the industry's fortunes seem to be turning. With the demand for electricity in the United States expected to grow 20 percent by the end of the next decade, the country needs more power generation capacity. That could be satisfied by building coal, natural gas, or nuclear plants — power sources that can provide electricity around the clock. Growing concerns over global warming, however, are prompting policymakers, investors, and even environmentalists to take a fresh look at nuclear power.

Unlike plants that generate electricity by burning fossil fuels, nuclear power does not produce carbon dioxide, a primary greenhouse gas which many consider to be at alarming levels already. As a result, expanding nuclear power is often regarded as a vital component in a portfolio of solutions to the problem of global warming.

In choosing the type of plant to build, companies certainly are looking at the possibility that lawmakers may

decide to limit carbon dioxide emissions. That would effectively put a price on this greenhouse gas and increase the cost of electricity generated by using fossil fuels.

There are other factors, too, that will help make nuclear power a more attractive bet. New licensing procedures, investment incentives under the Energy Policy Act of 2005, and significant technological improvements in the latest generation of advanced nuclear reactors are giving companies the confidence to invest in new nuclear plants.

The most visible sign of renewed interest is that since 2007 about nine companies have filed for applications with the Nuclear Regulatory Commission to build new nuclear reactors, the first applications in 30 years. Most of these companies operate in the Fifth District, including Dominion, Duke Energy, Progress Energy, South Carolina Electric & Gas, and UniStar Nuclear Energy — a joint company formed by Constellation Energy and the EDF Group, a European energy company.

The industry seems to be in a good position to make a comeback. But while favorable conditions are giving the industry hope, the task ahead is still a daunting one. "I think there is certainly a brighter prospect today," says Eugene Grecheck, vice president for nuclear development at Dominion. "But that needs to be tempered by the fact that we still [have] a lot of work to do."

The Economics of Nuclear Power

More than 100 nuclear reactors currently provide about one-fifth of the total electricity generated in the United

States. Nuclear plants produce electricity using the heat generated by nuclear fission — a process that splits the nucleus of a heavy element, causing a carefully controlled chain reaction that releases a tremendous amount of energy.

Once the plant is built, nuclear power can be a relatively cheap source of electricity. The average cost of producing electricity from nuclear power in 2006 was about 34 percent to 66 percent lower than the electricity generated from fossil fuels, according to the Energy Information Administration. While the cost of operating and maintaining a nuclear power plant is higher than the upkeep required for plants using fossil fuels, nuclear fuel — typically uranium — is cheaper than coal or natural gas.

The existing fleet's performance has also improved significantly over time. "Fortunately we've figured out how to run our plants well," says David Modeen, director of external affairs at the Electric Power Research Institute, a think tank. In the past, protective shutdowns — called "trips" — frequently occurred that forced plants to go temporarily offline. Today, a much more fluid and refined control system has dramatically brought down a nuclear reactor's average number of trips a year. "Most plants don't trip in a year, they just run," says Modeen. As a result, the industry's plants have recently been running at about 90 percent of capacity, up from about 60 percent two decades ago.

Industry executives certainly think that the nuclear plants' safety technology has improved greatly since the Three Mile Island accident. "We've had a long period of demonstrated safe and reliable energy supply from our current nuclear fleet," says Joe Turnage, senior vice president for strategy at UniStar. "As an investor, you would not proceed to put the capital in these projects unless you had a compelling case that your performance and safety track record are assured," he says.

The latest generation of nuclear reactors is expected to continue to improve that record. For instance, some of the new designs include "passive safety" systems that use natural forces such as gravity and natural circulation to prevent an accident in the event of malfunction. No operator intervention is required. A simplified design also makes these reactors easier to operate and less prone to mechanical errors.

But while its performance is encouraging, the price tag for building a nuclear plant and the uncertainty around that estimate might give investors some pause. Each plant can cost several billions of dollars and is more expensive than building one that runs on gas or coal — alternatives that can also generate electricity 24 hours a day. How much more expensive may be hard to pin down. "The history of the industry on cost forecasting is not too good," noted MIT economist Paul Joskow at a 2006 conference on nuclear power. Nuclear plants built in the 1970s through the early 1990s cost much more than was anticipated, mostly because of regulatory delays, safety scares, and poor designs.

For investors to jump into nuclear power, cost estimates

must be credible. And after the numbers are crunched, the total cost of constructing and operating a nuclear power plant must be lower than conventional fossil fuel alternatives.

A 2003 MIT study finds that, under most conditions, a new nuclear power plant would be more expensive than a coal or a natural gas plant. But assuming a high natural gas price scenario, nuclear plants may be able to compete with natural gas plants as long as the cost of building a nuclear plant falls by 25 percent, construction time is cut by one year, and the cost of financing it becomes as low as funding a coal or gas plant.

Life gets easier for nuclear, however, if carbon dioxide emissions are priced. Electricity generated from a coal or natural gas plant emits high levels of carbon dioxide that is thought to be harmful to the environment. However, the cost of these side effects is not reflected in the price of electricity. But if emissions were to be priced through a tax or a cap and trade system, the cost of electricity generated by burning fossil fuels could go up significantly.

The MIT study finds that at a price of \$100 to \$200 per ton of carbon emitted, nuclear becomes more attractive than coal and can even be cheaper than natural gas. A more recent 2008 CBO study likewise finds that at a charge of \$45 per metric ton of carbon dioxide (about \$165 per ton of carbon), nuclear power would be the least expensive choice for building new base-load plants. However, if this price falls below \$5, conventional coal plants would be the lowest cost source of generating capacity. Between these two prices, natural gas would have an advantage over both nuclear and coal.

Emission charges would certainly make nuclear power a more attractive investment than conventional fossil fuel generation. But even in the absence of a price on carbon emissions, the CBO study notes that the investment incentives under the Energy Policy Act of 2005 "would most likely lead to the planning and construction of at least a few nuclear plants in the next decade." Of these incentives, the industry thinks that the loan guarantee program, which covers 80 percent of construction costs, is particularly valuable because it brings down the cost of financing a new plant — a major hurdle in wooing investors to what is perceived to be a relatively risky project. If the first round of nuclear plants to take advantage of this benefit can demonstrate that construction can be completed with only a few snags, then the uncertainty of building the next round of plants — and the financing cost — may fall substantially even without loan guarantees.

An improved licensing process for the new generation of nuclear plants removes another key uncertainty. In the past, nuclear plants were required to get two separate licenses — one to build and another to operate. That meant a fully constructed plant could wait years before it operated commercially. Today's process combines those two licenses and grants approval before a major commitment to construction and a huge amount of expenditure has been made.

Powering Up

	Function	Power Source
Baseload Plants	The backbone of the electric power grid; designed to operate continuously except during breakdowns or scheduled shutdowns.	Coal, nuclear, hydroelectric, or natural gas
Intermediate Plants	To supplement baseload plants, these plants operate during the daytime, and are turned on as needed during the evening.	Coal or natural gas
Peaking Power Plants	To provide additional electricity only during periods of peak demand.	Natural gas or hydroelectric

SOURCE: European Nuclear Society

Another important difference that allows the construction of nuclear plants to proceed more smoothly this time around is that the plant designs are now highly standardized. “Out of the 104 plants currently operating in the United States, almost all of them are custom designed,” says Grecheck. Companies today can take a largely completed design and simply make minimal changes to adapt it to a specific site. They can also learn from the construction experience of a similar plant in the country or abroad. UniStar’s chosen reactor design, for instance, is being constructed in Finland and France. “Ours is probably serial number 5,” says Turnage. “We did not want first-of-a-kind engineering risk. We did not want to be serial number 1.”

The economics of nuclear power may also be improved by various state policies. Many of the proposed nuclear plants are located in states that regulate the rates which power companies charge. Rate regulation may provide these companies some guarantee that its customers will pay back the cost of building a “traditional plant.” In contrast, a “merchant plant” that relies on the market for setting its rates places the risk squarely on investors rather than its customers. So which type of plant will most likely be built? “There will be a mix,” says MIT professor John Deutch and one of the authors of the 2003 MIT report. “But with the size of capital [needed], regulated plants will be easier to finance.”

Some states with rate regulations, such as Georgia, Florida, North Carolina, South Carolina, Mississippi, and Kansas, are also allowing utilities to recover the cost of new nuclear plants while construction is in progress. But even in states that have no rate regulations, like California and Maryland, lawmakers are considering limits on carbon dioxide emissions that would give nuclear a definite advantage.

Public Attitudes

Concern over global warming is perhaps the biggest driver in the renewed interest in nuclear power among policymakers. Studies have found that a sizeable reduction in greenhouse gas emissions cannot be achieved without a shift toward

less carbon-intensive technologies. Electricity companies are looking at the entire spectrum of possible generation sources to meet the growing demand for electricity, not just nuclear. Renewable energy is another carbon-free alternative. But unlike solar and wind power, which produce electricity only when the sun is shining or the wind is blowing, nuclear power can provide constant base-load electricity much like coal and natural gas plants.

As a result, a number of environmentalists have spoken out in favor of nuclear power to meet the growing demand for electricity. “The only technology ready to fill the gap and stop the carbon dioxide loading of the atmosphere is nuclear power,” noted environmentalist and *The Whole Earth Catalog* creator Stewart Brand in a 2005 article.

Public opinion toward nuclear power has inched up over the last two decades, says MIT professor Stephen Ansolabehere, who conducted a survey of people’s attitudes toward nuclear power and other power sources. In 2007, the survey found that about 39 percent felt that the United States should reduce the use of nuclear power. That’s down from about 47 percent in 2002. Oil is still the most disliked power source but its popularity has dropped even more, which might have helped increase support for nuclear power. That the accident at Three Mile Island happened almost three decades ago seems to have pushed it further from people’s minds. “As generations replace each other, you forget about what events shaped people’s impressions,” says Ansolabehere.

However, it seems that people are warming up to nuclear power *not* because of concerns about climate change. Indeed, the survey finds that the issue of global warming is uncorrelated with people’s preferences about nuclear power — or just about any other energy source. “People don’t really connect global warming and nuclear power,” says Ansolabehere. And when people were asked which energy source they thought contributed most to global warming, a strikingly high percentage answered “nuclear power.” So while policymakers, investors, and others who are very much engaged in this issue tend to agree that nuclear is an important part of the solution to stabilizing greenhouse gas emissions, public attitudes seem to lag behind.

The survey also revealed that people were willing to pay only about \$5 more a month on their energy bill to help mitigate global warming. Ansolabehere says that this is about a fifth of what is needed to reduce greenhouse gases under the Kyoto Protocol, an international agreement on climate change. This suggests that most would rather stick to cheaper but dirtier electricity than switch to a cleaner but more expensive source like nuclear power.

Ansolabehere’s survey also finds that nuclear power is

viewed as somewhat harmful by the public. Safety is still an important concern, but the management and disposal of radioactive nuclear waste is the biggest reservation. When presented with solutions to this issue, support for nuclear power expansion goes up.

While the results of the survey suggest that the public seems to have gotten it wrong in terms of the relationship between nuclear power and greenhouse gas emissions, they seem to be spot-on in identifying the waste problem as one of the most important challenges facing the industry.

A Nuclear Power Renaissance?

Without new investments in nuclear power plants, the country's capacity for generating electricity from this power source will quickly decline after 2030, said Joskow at a 2006 nuclear power conference. But if the industry is to expand in such a way that it can continue to play an important role in future electricity supply and at the same time make a significant contribution to stabilizing greenhouse gases, a number of concerns must be addressed.

What to do with spent fuel from nuclear plants that will remain highly radioactive for thousands of years is perhaps foremost among these concerns. "The perceived lack of progress towards successful waste disposal clearly stands as one of the primary obstacles to nuclear power expansion around the world," noted the 2003 MIT report. Efforts to find solutions have been mostly focused on the planned construction of a permanent disposal facility at Yucca Mountain in Nevada, but that has been much delayed.

Today's cost estimates for building new nuclear plants have also been climbing — at least double what the industry quoted just a few years ago. The cost of copper, steel, concrete, and manufactured components that go into these plants has been rising. Moreover, a significant expansion of nuclear power in the next few decades would only exacerbate the scarcity of materials and skilled labor — electricians, plumbers, pipe fitters and the like, not just engineers — who are necessary to build and run nuclear plants. "With the potential for multiple companies moving forward with plans for new nuclear, the availability of critical materials and qualified workers could pose a challenge," says South Carolina Electric & Gas spokesman Eric Boomhower.

The long hiatus in construction in the industry has not helped. "We've lost much of the infrastructure in the United

States that existed 30 years ago to support nuclear plants and we're going to have to rebuild that," says Turnage. Companies will be looking all over the world to find what they need, but supply overseas is tight too. For instance, Turnage says that there is only one company in the world which makes ultralarge forgings that are used in construction of the reactor pressure vessels — that's where the nuclear fuel is contained. He's starting to see a response, however, from companies that are eager to supply their needs. Turnage says that because of the size of their order for turbine generators, Alstom, a big player in the power business, is investing in a plant in Chattanooga, Tenn.

None of the companies that have filed for a license have actually committed to building a plant. While waiting for their license, companies are working hard to get more certainty on what the costs of building these new plants will be. "All the stakeholders in approving such a large investment would like to be confident that we understand what the costs are going to look like," says Grecheck. These companies are also ordering materials that require a long lead time, applying for a loan guarantee, looking at future market conditions, and seeking approval from state agencies before they can begin construction. If all these elements come together as planned and on schedule, the first new nuclear plants in a generation could start operating by the middle of the next decade.

Despite the challenges and a long to-do list, some say that we're already seeing a veritable renaissance for nuclear power. But many in the industry say that they still have a long way to go.

"I kind of cringe when I hear 'renaissance,'" says Modeen of the Electric Power Research Institute. "It's a heartfelt respect for the technology, somewhat humbled by the daunting task before us and we want to do it well. It's not going to be easy." Given the industry's history, Modeen would love to see those first few plants built very well and go from there. He understands that even one accident could upset the hard work that has been put in to overcome the public's long aversion to nuclear power. "Society is not to the point [with nuclear power] like we are with plane crashes. People will still be flying planes tomorrow," says Modeen. For the modern nuclear power industry, an old adage seems appropriate: It's best to proceed slowly but surely. **RF**

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Charles Holt

The field of experimental economics became more widely known with the awarding of the Nobel Prize in economics to the groundbreaking experimentalist Vernon Smith in 2002. It has many practitioners today, but one of the most respected — and busiest — is Charles Holt of the University of Virginia.

In addition to racking up an impressive track record of market experiments, Holt has helped bridge the gap between the laboratory and the real world. He designed a new type of auction that was used by the Federal Communications Commission (FCC) this year to lease critical segments of the electromagnetic spectrum. Recently, he has been involved with designing a market for carbon emissions among the northeastern states that would improve on the less-than-successful experience with carbon markets in Europe.

As an early advocate of the experimental approach to economics, Holt was active in the formative years of the Economic Science Association — the professional organization for experimental economists — and counts Vernon Smith as one of his professional influences and close friends. Holt also co-authored the first comprehensive textbook in the experimental economics field.

Stephen Slivinski interviewed Holt at his office on the University of Virginia campus on June 26, 2008.



RF: When did you know you were interested in studying economics?

Holt: The football coach in my high school history class, in Blacksburg where I grew up, made a comment about how he couldn't understand why baseball teams traded one player for another. He wondered: Didn't they know the one player was getting the short end of the stick? I remember thinking: Gee, what if one team has extra first basemen and another has an extra pitcher. They could make a swap and both teams would win more games and be better off. So, I think I was interested in economics early on.

Later, there was a required religion class in my Northern Virginia boarding school, and we were having a discussion on usury. I remember asking why, if there's a shortage of funds, the people who have the money couldn't charge a high interest rate. I remember all these people looking at me like I was saying something very sinful.



Then I went to Washington and Lee. I majored in economics and politics. One year we read the book, *The Calculus of Consent*, which was written by James Buchanan and Gordon Tullock. They were at the University of Virginia and had written the book the year before. So it had come over the mountains and into the classroom one year after it was written and long before it had really gotten widespread attention.

So, I remember being interested in politics and economics and wondering which one I wanted to go to graduate school for. I realized that the things I was learning in economics will still be established principles in 20 years, while the things I was learning in politics seemed more fluid and undeveloped.

RF: Who were your influences in grad school?

Holt: I went to grad school at Carnegie Mellon. It was a tiny program — I took maybe eight classes. Two of them were taught by people who later won Nobel Prizes.

Robert Lucas was one of them. That was a class of six or seven people. When he started class he would say something like: "This is a pattern of employment participation across

different countries, and here's a correlation. I want to try to explain it. So let's do an econometric exercise." In the next class he would say, "I'm going to show you the starting point of a model that doesn't quite explain what I want it to. So I'm going to throw it away and start again." It was like an ongoing insight into his research process. He took his time. But what I liked was that he would focus on what he thought was an important empirical pattern and didn't go off into the theoretical world without thinking about what was really going on.

Ed Prescott, who was one of my thesis advisors, was another one. Ed was the same way. He would always ask about what empirical regularity you were trying to explain. He was focused. He took great joy in doing research.

Carnegie Mellon was largely an engineering school, and the business school had a practical feel to it. The department heads would basically tell the economics faculty that if they wrote a paper with a graduate student, they would just assume the faculty member did all the work so they shouldn't worry about sharing their ideas. They would still be getting full credit for them. As a result, they did a lot of joint work with graduate students, and I was a direct beneficiary of that.

I remember working on a paper with the president of the university, Dick Cyert. He had been a co-author with Herbert Simon and Franco Modigliani, and he was involved in the early days of behavioral economics. Cyert and I were working with Morris DeGroot, the statistician who was my other thesis advisor, and we would meet on Saturday mornings to work on our paper. The great thing I remember about that was these guys had a lot of confidence. We wrote a couple of papers together, and they each got rejected. But it didn't phase them at all. Another thing I remember about that experience was that they spent a lot of time on the process. We read the papers out loud before we sent them to journals. Every sentence had to be perfect.

RF: When did you become interested in economics experiments?

Holt: After grad school, I went to the University of Minnesota and taught there. I became interested in experiments at that time. I had written a thesis on auctions that compared revenues raised in different types of auctions. When journal editors would see the word "auction" in the title of a paper that was submitted, they'd want to get a theorist's point of view. So I was receiving these papers to referee. I got one

from Vernon Smith that I thought was very interesting. I got another from Charlie Plott, and I remember thinking it was very interesting too. What struck me was that you would see patterns in the data that were consistent with what you would see in the theoretical models. Then the Economic Science Association started having meetings in Tucson in the '80s. I went to the very first ones of those, and I kept going. They had a big influence on me.

RF: You designed an auction to help Georgia apportion irrigation rights in 2000. Tell me about that.

Holt: There was a drought that year and Georgia had some money from the national tobacco settlement. The officials there didn't want to hold hearings and decide which land would be taken out of production. So, they decided on a program to pay farmers not to irrigate. It was a voluntary program in which the farmers would bid on how much they would want to receive — a lump-sum payment on a per-acre basis — for not irrigating that season.

Ron Cummings, Susan Laury — both from Georgia State University — and I started running experiments with students as soon as the law passed. We came up with some designs that the Georgia Environmental Protection Division (EPD) steered us away from for political reasons, and that was perfectly sensible. We ended up with a multi-round auction where the provisional winners — those who were asking for the least amount of money not to farm — were announced after each round of bidding.

In the experiments to test the auction design, we used students but we let them talk to each other and collude. It was a very uncontrolled situation for a normal laboratory experiment. That's because we knew the farmers who were going to be involved in the auction had cell phones and probably knew each other. So we wanted to create that kind of environment.

The EPD officials from Atlanta would come to some of the experiments and just sit down to watch the process. I think it gave them a good idea of how a multi-round auction would play out. We also did a field test in southern Georgia where we set up bid stations in different towns about 50 miles apart. Everything was run through the Web to a site in Atlanta where the EPD officials could watch the bids coming in.

Then they asked us to run the actual auction for them. We set up bid sites in seven or eight different locations around the Flint River

Charles Holt

► Present Position

A. Willis Robertson Professor of Political Economy, University of Virginia

► Previous Faculty Appointment

University of Minnesota (1977-1983)

► Education

B.A., Washington and Lee University (1970); M.A. and Ph.D., Carnegie Mellon University (1977)

► Selected Publications

Author or co-author of papers in such journals as the *American Economic Review*, *Games and Economic Behavior*, *American Political Science Review*, and *Southern Economic Journal*. Co-author (with Douglas Davis) of the textbook, *Experimental Economics* (1993)

► Awards and Offices

Past president of the Southern Economic Association and the Economic Science Association; Honorary Professor, University of Amsterdam

Valley in southern Georgia, and the EPD officials would watch the bids from Atlanta and decide if they wanted to go to another round of bidding. Because the bidders never knew if the first round would be the last round, they knew they had to be serious about their bids.

The farmers would fill out their bids by hand on paper — they were basically contracts — we would review them, and then enter them into the computer. My bid site was a grade school dining hall that had those little, low seats. And these farmers were big guys so it was amusing to watch.

The people who were more willing to not irrigate during that growing season posted the lowest bids, and they would be included in the next round of the auction. You, of course, want the most valuable land and crops to be irrigated, so the farmers of those crops — like peach trees, for instance — would either bid high or not participate in the auction at all.

The auction took place one Saturday morning. It was over and done about three weeks before the deadline for planting. That's the great thing about auctions: They're fast and they're fair.

RF: What sort of auction did you design recently for the FCC and what was unique about it?

Holt: My co-author Jacob Goeree [of Caltech] and I contacted Martha Stancill at the FCC. We sent her an idea on how to set up a simple combinatorial auction that doesn't have a zillion possible combinations of licenses and so it would be easy for bidders to understand how pricing works.

This type of auction is one in which you can bid on a collection of licenses. Say you have one national license and multiple regions across the country. The goal is to let the bidding determine if the license gets awarded as a single national one or a bunch of regional ones. In general, in a combinatorial auction the number of possible combinations gets large very quickly — it's an exponential function. That complexity deterred officials from using them for a decade. The procedure we suggested was simple enough that you could do it with a paper and pencil if you needed to. That simplicity also gave the officials confidence that they could answer questions about it in a press conference if they had to.

For a company like Verizon, it might be more valuable to have a collection of licenses in a region. So, if in a particular round of bidding, the highest regional bids add up to more than the national bid, you would provisionally declare the regional bidders the winners. But you would reveal those regional bids so the national bidder would know how high they have to go to knock out the regional bidders.

Conversely, if the highest bid is a national bid, as it was sometime during the actual FCC auction, then the differ-

For me, experiments provide a hands-on connection between the beauty of economic theory and actual human behavior.

ence between the national bid and the sum of the regional bids is how much higher the regional bidders have to go to knock out the national bidder. In a case like that, our procedure would take the difference between the bids and allocate it to the regional level. So, each region had a price which

was their current high bid, plus a share of the increase needed to beat the national bid. These prices provided information to the bidders during the auction about how high they needed to go to get into the action.

One idea behind that procedure is that it helps the bidders on the regional level solve a coordination problem. Each person would prefer someone else to raise their bid to knock off the national bidder. What this does is push everybody up together. The FCC gave this procedure a name (Hierarchical Package Bidding), an acronym (HPB), and decided to use it for a large band (the C block) of the 700 MHz spectrum auction held this past spring.

There was no set number of rounds either. The FCC procedure has always been to let the auction keep going until there are no more bids coming in. So the process lasted a couple of months, from January to March, and consisted of over 100 rounds. This auction raised about \$19 billion.

RF: You've been involved with helping to design a regional greenhouse gas emission auction among the northeastern states recently. How has that differed from the European experiment with carbon permit trading?

Holt: Carbon trading was tried in Europe, but there were problems with how things were implemented. They took the current emissions levels and then divided them by a certain number of allowances — each allowance was good for one ton of carbon dioxide. From the current level, the officials would then scale down the total level of emissions to a specific target and release that number of allowances into the market. Since the electric power companies were one of the groups who needed many of these allowances, they argued to their governments that, if they had to pay for their allowances, they would simply raise the price of electricity. That's never a popular thing to do, so they were given the allowances for free, and approximately proportional to their past emissions.

Some of the companies that had extra allowances in the Eastern European countries would turn around and sell them and suddenly the prices were very high for a while. Those companies got windfall profits from that. And the price of electricity rose anyway — if you cut back on output, price, of course, will tend to rise. This created a backlash against the entire cap-and-trade process.

Here in the United States, a number of northeastern states, led by New York, set up an arrangement where they would cooperate to regulate carbon dioxide emissions in that region. They wanted to focus on the electric power generators.

Early on, a decision was made — and I think this was a very important decision — to require at least 25 percent of the allowances to be allocated by auction instead of simply giving them away. Then New York announced early that they would allocate 100 percent of their allowances by auction, and everyone is anticipating that most, if not all, of the allowances the other states issue will be allocated by auction too. This is the opposite of the European approach where about only 5 percent of the allowances were auctioned. Now the Europeans are interested in what the Regional Greenhouse Gas Initiative in the northeast states — or RGGI, pronounced “Reggie” — is doing. They send representatives to the RGGI meetings, and I think they will go to 100 percent auctions fairly soon.

The states in RGGI are doing this with the understanding that the proceeds of the auctions could be spent on a variety of things, such as strategic energy initiatives or conservation programs. Or, if the price of electricity rises, the proceeds could provide relief for low-income consumers.

RF: How will the RGGI system work and what were your contributions to its development?

Holt: The RGGI administrators will set the cap on emissions, and electricity providers will bid on the number of allowances, each of which equals a set number of tons of carbon. The goal of the administrators initially is to set a fairly loose initial cap so there are no surprises in the auctions — no bottlenecks or dramatic run-ups in price. Then, over time, they would gradually tighten the emissions cap for the next 15 years so the firms can scale their emissions down in a planned, coordinated way. This also gives conservation programs time to come into effect.

The Georgia and FCC auctions were meant to be held only once. The RGGI auctions will be held quarterly in an ongoing fashion, beginning this September. That actually takes a little bit of pressure off the auction design process — if one design doesn’t work so well, you can try another one later. But I think it’s important, for the success of the program, for the first several auctions to go well.

The RGGI auction design team included environmental economists Karen Palmer and Dallas Burtraw from Resources for the Future in D.C., Jacob Goeree from Caltech, and Bill Shobe from the University of Virginia, who had run an innovative clock auction for nitrous oxide emissions allowances for the state of Virginia several years before. My role was to set up the laboratory experiments. There was a concern in the RGGI meetings about possible collusion in the auction process. So, in many of our experiments, we focused on the possibility of firms to either collude tacitly or even explicitly — we would let

subjects talk to each other in a chat room to see what effect that had.

For instance, one of the possible auction types we tested was a clock auction. That’s when you announce a price — in this case, you start low — so demand is much higher than supply. Then the auctioneer notches the price up in increments, and each time you do that demand falls a little bit. You stop when demand equals supply.

In the experiments with opportunities for open discussion, you could look at the chat room transcripts and see what the participants were thinking. You would see them say things like, “Well, in the last auction we all started off demanding a lot. And when the price rose, we all cut back our demand. In the end, we had to accept the result. So, with the next round, why don’t we just start with what we got in the end of the last round? Instead of letting the price go up, let’s agree to stop the auction right at the beginning.” So, many of the clock auction experiments stopped right away because of that collusion. Also, the discussion focused on only one dimension — the quantity dimension — and not on the price dimension because that was determined by the clock.

For the September auction, the RGGI administrators have opted for a sealed-bid uniform-price auction. In that one, the bids are submitted secretly to the auctioneer, they are ranked from high to low, and the price at which supply equals demand is where the price of the allowance is set. When we tested it, we discovered that this design was somewhat more resilient to collusion than the clock auction, both when chatting was permitted and when it was not.

It’s important to realize what you can take away from these experiments. In the real world, collusion is illegal. There will also be lots of bidders. Brokers can buy allowances in our scenario and then sell them to different companies. That’s going to make collusion a lot harder too.

RF: How can experiments be used to teach economics?

Holt: Economic research can be fun and exciting if you follow your interests. For me, experiments provide a hands-on connection between the beauty of economic theory and actual human behavior. The auctions and games I use in research are great for adding excitement to economics classes, which otherwise can be dauntingly theoretical. Teams of students in my classes design their own experiments and use the lab software to run them on the other students, followed by a presentation of the results in the next class. Those who have been in the auction or market have seen the economic process from the inside, learned lessons the hard way, and class discussions are often lively and focused as a result. There’s no better way to teach notions like opportunity cost or sunk cost when some of the students have earned 40 percent less than some of their classmates who priced correctly. In case you’re wondering, I pick one person at random afterward and pay them some small fraction of their earnings. **RF**

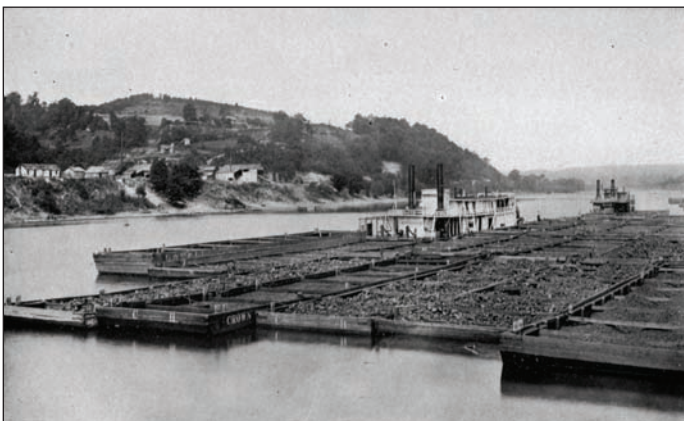
ECONOMIC HISTORY

Liquid Gold

BY CHARLES GERENA

More than a century ago, West Virginians tapped into their vast reserves of coal and turned it into a valuable form of oil

Before the federal government built locks and dams on the Kanawha River to make it more navigable for coal barges like this one, coal oil production provided a way for mining companies along the river to make money.



More than three decades ago, President Gerald Ford met with coal producers at the White House to discuss his proposals to support their industry's growth. At a dinner held on March 21, 1975, he extolled the virtues of coal as an alternative to oil, whose supply had been cut off for five months by OPEC the year before.

"Coal represents one immediate and dependable answer to the question of how we solve our energy needs in this nation," said Ford. "It represents an American answer, not one based on uncertain resources in far-away lands with different ideas and diverse interests. It represents our hope for the future. Coal is America's ace in the hole."

Since then, the federal government has supported research and development of what is called "coal liquefaction" technology. Yet no American liquefaction plants are in commercial operation today.

You have to look as far back as the mid-19th century to find a time when coal was liquefied into a usable form on a broad scale. One product called "coal oil" was widely sold as a lubricant to keep machines moving and as a lamp fuel to keep communities out of darkness. Among those who benefited from the boom were coal mining companies along West Virginia's Kanawha River and one of its tributaries, the Elk River.

The boom would last only a decade, however. The emergence of petroleum as

a competing product and the disruptions caused by the Civil War during the 1860s would eventually undermine the market for coal oil. Still, the devel-

opment of this commodity was an important step in the development of the nation's energy supply. Its story offers some lessons for those who view coal liquefaction as a path away from dependence on petroleum.

There's Black Gold in Them Hills

If the United States is the "Saudi Arabia of coal" as some have called it, West Virginia would be one of the reasons for that designation. As early as 1742, coal was found in what was then considered western Virginia. After the turn of the 19th century, it heated people's homes, stoked the furnaces of salt manufacturers, and powered the steamboats that traversed the Ohio River.

Still, through the mid-1800s commercial mining was limited in the southern counties of the future West Virginia. "Here [in the Kanawha River Valley], in their attempts to match capital, labor supply, and transportation facilities to abundant resources, mine operators experienced advantages and obstacles commonly encountered by other Southern industrialists," wrote West Virginia historian Otis Rice in the November 1965 issue of the *Journal of Southern History*.

The problem was it would be decades before the Kanawha River Valley had the canals and railroads to ship coal in large quantities. "For Kanawha coal the only outlet was the Kanawha River, which was navigable for only about six months each year," noted Rice. "Because of the hazardous state of the [river] and the lack of other transportation facilities, Kanawha Valley coal producers made very few attempts prior to 1850 to ship coal out of the valley."

Rice added, "As a result, the richness of the Kanawha resources, revealed by the findings of William Barton Rogers in the Old South's most

thorough geological survey, stood out in sharp contrast with the valley's share of the nation's expanding coal market." While most of the region's coal was consumed locally, Pennsylvania became the nation's leading coal producer.

So, West Virginians knew they were sitting on an abundant natural resource. But how would they extract the value of that "black gold" in a broader marketplace? Coal oil would provide the answer.

By the mid-19th century, the Industrial Revolution had transformed England and was spreading across the Atlantic to the United States. All of the machinery that kept factories humming needed lubrication, so people turned to oils derived from animal fat and vegetables.

Coal oil turned out to be a good replacement for these lubricants. It kept the parts of a machine moving, while lacking the acidity of organic lubricants that ate at metal and accelerated wear and tear.

Another significant market for coal oil also emerged: illumination. People used a variety of substances in lamps and street lights, from oils extracted from animal fat and plants to concoctions like grain alcohol and camphene — a mixture of alcohol and turpentine, plus camphor oil to improve its odor. The downside of many chemical fuels was their volatility, while oils derived from lard congealed if they weren't kept warm. One of the leading animal fat-derived fuels, whale oil, became scarcer and more expensive as fisheries along the East Coast were depleted of sperm whales.

Coal already played a role in the illumination market, but not in liquid form. So-called "manufactured gas" was extracted from coal and used in lighting throughout the 19th century. However, its use was limited to businesses, municipal streetlights, and wealthy households since it was expensive. Also, burning manufactured gas produced soot and a strong odor, which is one of the reasons why natural gas and electricity would supplant it in the next century.

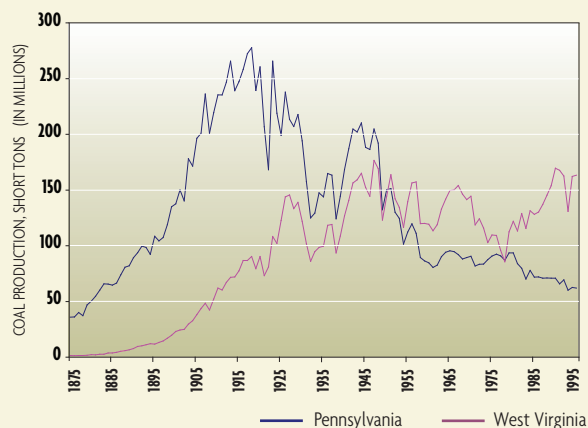
By the 1850s, coal oil stepped into the spotlight. "The building blocks and more importantly, the economic incentives, were in place," wrote lighting expert Daniel Mattausch in a recent magazine article on the history of lamp fuels. "With increasing frequency, inventors investigated three materials, raw petroleum, cannel coal, and the tar left over from the production of illuminating gas."

Inventor-entrepreneurs on both sides of the Atlantic found they could modify the production process for manufactured gas to yield a liquid byproduct that had several advantages over existing lamp fuels. Derived from cannel coal that had a high hydrogen content, coal oil burned brightly and produced less residue than either whale or lard oil. In addition, it resisted cold weather like whale oil and was much cheaper — 50 cents a gallon versus \$2.00 to \$2.50 per gallon for the most desirable whale oils. Camphene sold for about the same price as coal oil, but the latter wasn't as volatile.

Most importantly, coal oil was a value-added product that enabled Cannelton and other communities near the

Playing Catch-Up

Transportation improvements helped open up coalfields in southern West Virginia starting in the 1880s, boosting the state's coal production. West Virginia would eventually catch up to Pennsylvania, the Appalachian Basin's leading coal producer, partially due to the latter's decline in anthracite mining.



SOURCE: *The COALPROD Database: Historical Production Data for the Major Coal-Producing Regions of the Conterminous United States*, U.S. Geological Survey, March 2003

Kanawha and Elk rivers to take advantage of the cannel coal deposits surrounding Charleston, W.Va. "There was still a lot of bulk there" to transport, notes Mattausch in an interview. But "it was a lot better than shipping tons of coal."

Boom and Bust

As lamps that optimally burned coal oil were invented and put on the market, coal oil cut into sales of whale oil. By 1860, dozens of coal oil plants were in operation in big cities like Boston, New York, Cincinnati, and Pittsburgh.

In West Virginia, more than 40 companies secured charters for mining cannel coal (also known as "candle" coal) along the Kanawha and its tributaries. "All but two or three of these groups were formed after the discovery of cannel coal at Cannelton, and the acts by which they were incorporated show clearly that the vast majority of them expected to engage in the mining of cannel coal and in the manufacture of coal oil and other cannel-coal derivatives," wrote historian Otis Rice.

Not all of the mines yielded what their investors hoped, while others found more profitable types of coal to mine and sell. Still, at least six refineries produced coal oil in West Virginia, including four in Kanawha County.

Despite using wasteful methods of liquefying coal, noted Rice, the Cannelton factory managed to extract two gallons of oil from each bushel of cannel coal. (According to several accounts, that was about the best yield any producer could obtain.) Some of the oil was shipped to a refinery in Maysville, Ky., about 180 miles northwest of the factory, and some was likely shipped to Boston for sale under contract.

Perhaps some version of coal oil would have continued to

fuel the Industrial Revolution and eventually fill the tank of every automobile on the road today. Instead, petroleum assumed that pivotal role in the nation's economy.

Petroleum was skimmed off of ponds and scooped from holes in the ground for centuries. (West Virginia salt miners considered the oily substance a nuisance when they found it.) The flammable liquid was used in weapons; as an additive to mortar, paints, and adhesives; and as a remedy for itchy skin and a variety of other ailments.

During the 19th century, lamps burned petroleum, but only on a limited basis since it produced a lot of smoke and a strong odor. Also, supplies were generally limited to locations where petroleum seeped out from underground reservoirs.

Then a former railroad conductor named Edwin Drake was hired to dig a well in Titusville, Penn. He was searching for "rock oil" as an alternative to whale oil and struck pay dirt in August 1859. The subsequent rush led to the creation of a petroleum-derived competitor to coal oil: kerosene.

The coal oil industry may have paved the way for the petroleum industry. The backers of the Titusville oil well sought the profits that coal miners were making from producing lamp fuel. Later, much of the refining and distribution infrastructure for coal oil would eventually be used for petroleum.

The Civil War shut down mining operations in the Kanawha River Valley during the early 1860s, but mining expanded significantly with postwar transportation improvements.

"The Chesapeake & Ohio Railroad in 1873 and the Norfolk & Western in 1881 opened up the southern West Virginia smokeless coal reserves," says C. Stuart McGehee, chair of the history department at West Virginia State University. "The Kanawha River was not channeled with locks until the 1930s to allow serious barge traffic, now mostly to electric power plants on the Ohio River." Indeed by that time, other profitable uses for coal had emerged besides oil for illumination.

What about the commercialization of the incandescent light bulb around 1880? "Edison's light was a poor competitor with the gas and kerosene lights," describes historian Dan Mattausch. "It was much more expensive; it was something wealthy people showed off. Gas lights put out several times the output of an electric light bulb and cost a fraction of the price." Eventually, though, electricity obviated the need for coal oil, kerosene, or any fuel for lights.

Dethroning Petrol

The rise and fall of coal oil in West Virginia illustrates how market demand can drive the development of new commodities. As the supply of one product approaches exhaustion and becomes relatively expensive, companies are motivated to find alternatives.

Today, hydrogen is often mentioned as the country's next-generation energy source. But it's hard for any new commodity to compete with petroleum, which has been a relatively cheap transportation fuel for so long and has an extensive production and distribution infrastructure developed around it.

There are a couple of historic examples of periods when other countries used coal to make oil. In both cases, the countries did so mainly because they were shut out of the more routine channels of supply for oil. Nazi Germany used coal liquefaction technology to keep their warplanes in the air during World War II. South Africa used gasoline and diesel fuel extracted from coal when the world turned its back on the country during its age of apartheid.

If coal was turned into liquid fuel on a mass scale, the end product could utilize the same infrastructure as petroleum and be useable in the same vehicles by adding hydrogen to it or removing carbon. However, using indirect liquefaction — the same method South Africa has used — would produce more than twice the amount of carbon dioxide as the production of diesel fuel.

Other countries are discovering there might be important investment opportunities for this sort of technology. The Shenhua Group in China, the world's largest coal producer, is building a plant in Inner Mongolia — 375 miles west of Beijing — based on the Germans' direct liquefaction process. West Virginia University is working with the company to study the environmental and economic impact of the plant.

With crude oil prices breaking new records, there could be more talk in the United States of liquefying coal on a large scale. Of course, the price of coal and the cost of building liquefaction plants compared to the financial and ecological costs of sticking with petroleum will ultimately be the deciding factor.

In the meantime, Dan Mattausch has some advice for those who are pursuing coal liquefaction. "It won't lead where you think it's going to go. The people working with coal oil had no concept that they were preparing the way for something they had never heard of." **RF**

READINGS

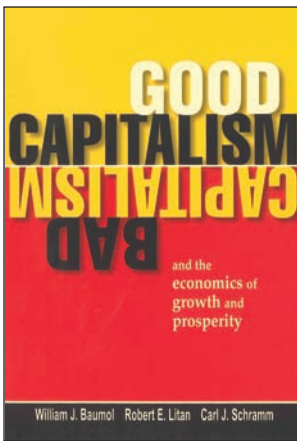
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**GOOD CAPITALISM, BAD
CAPITALISM, AND THE
ECONOMICS OF GROWTH AND
PROSPERITY**

BY WILLIAM J. BAUMOL, ROBERT E.
LITAN, AND CARL J. SCHRAMM

NEW HAVEN, CONNECTICUT: YALE UNIVERSITY PRESS, 2007
321 PAGES

REVIEWED BY STEPHEN SLIVINSKI

This intriguing book — aimed mainly at the educated nonspecialist — rests on two ideas. The first is capitalism hasn't emerged in one specific form everywhere that it has taken root. Some countries exhibit forms of "bad capitalism" and others "good capitalism." The second is to define the best sort of good capitalism and which policy prescriptions can help bad capitalist systems transition to the good variety. Or, for that matter, ensure that the good capitalist economies don't backslide into the other category.

The characteristic that makes all of the types of economic systems described in this book worthy of the title "capitalism" is the right of individuals to hold private property. That, however, is where the similarities end. The mechanisms that direct the productive energies and investments in each capitalist system are what differentiate one form from another. Yet, teasing out which countries fit into each category can sometimes be a tricky task, and one that doesn't really have a precise answer over time. Indeed, most developed countries — including the United States — exhibit characteristics of at least two of the four forms of capitalism described in the book.

Looking at bad forms of capitalism, the first type is given the name "state-guided capitalism." A country subject to this system is one in which government, not private investors, decides which industries and firms will be winners in the marketplace and public policy is designed to "direct economic traffic," in the authors' description. Modern-day China is one of the best examples, although as the authors point out, even China does not exhibit a pure form of this sort of top-down capitalism and is slowly moving away from this model.

The second bad form is "oligarchic capitalism." It's similar to the state-guided version but the key element here is that most of the property and wealth is held by a few firms or owners. Another subtle difference between the two is that in oligarchic systems, the stated goal of public policy is patronage — think of Russia in the years immediately following the collapse of the Soviet Union, for instance. In a

state-guided system, however, the goal is presumably to maximize economic growth.

In turning to good forms of capitalism, the authors first describe what they call "big firm capitalism." Here, the economy is dominated by established large enterprises. What makes the firms in this model different from those in an oligarchic capitalist system is that ownership is widely dispersed among many private shareholders.

"Entrepreneurial capitalism" is the second form of good capitalism. In it, small innovative firms play the most significant role in the economy. Dramatic innovation distinguishes it from the incremental innovation that characterizes big-firm capitalism.

The authors don't jump to the conclusion that nations should aspire only to entrepreneurial capitalism. Instead, they suggest that the optimal capitalist system is a hybrid of both the entrepreneurial and big-firm versions. As they note, "no advanced economy can survive only with entrepreneurs (just as individuals cannot survive by eating just one type of food). Big firms remain essential to refine and mass-produce the radical innovations that entrepreneurs have a greater propensity to develop or introduce."

The book excels when it lays out the case for a new taxonomy of capitalism and how the world can be viewed more coherently in light of it. Additionally, many of the authors' policy prescriptions are sensible — such as tax reforms that encourage more risk-taking, or lowering barriers to trade and immigration to encourage economic competition.

But others might strike the reader as inconsistent with the arguments made elsewhere in the book. For example, the authors make a compelling case that an oversupply of regulation is what trips up developing economies interested in working their way into the ranks of the developed world. Yet they don't really grapple with the fundamental notion that once the government's power to regulate markets is let out of the cage — even in a good capitalist economy — it is often difficult to sufficiently leash it. This is a shortcoming mainly because some of their proposals rest on the idea that government policy can be used to keep the mix of big firms and small firms at an optimal level. But this mix is the result of a spontaneous process of market interactions, not one that can be predicted by policymakers or even the firms themselves.

Nor is it clear that a government entity could ever possess the ability to know what that optimal economic mix is or to keep the policymaking process free from undue influence by one coalition or another. In the final analysis, the lessons that economists have learned about how decisions are made in legislative bodies or how economic organizations emerge should influence the reader's appraisal of the policy approaches proposed in this book. **RF**

DISTRICT ECONOMIC OVERVIEW

BY SONYA RAVINDRANATH WADDELL

Economic activity in the Fifth District grew at a somewhat softened pace in the fourth quarter of 2007 and the first quarter of 2008 as weakness in housing and retail sales offset growth in other sectors of the service-providing industries. Employment and income continued to grow, but at a slower pace.

Healthy Labor Markets

District labor market conditions remained generally healthy in the end of 2007 and into 2008. Payroll employment in the Fifth District grew 1.0 percent over the year ending in the first quarter of 2008, a rate double the 0.5 percent national payroll growth over the same period. Although household unemployment ticked up 0.3 percentage point over the six months spanning the end of 2007 and the beginning of 2008, Fifth District joblessness settled at 4.5 percent by the end of March 2008 — a solid 0.6 percentage point below the national jobless rate of 5.1 percent.

Employment growth over the year reflected solid growth in the service-providing industries, although employment growth within this sector was mixed. While education and health services payrolls grew 3.0 percent, employment in the financial activities and information sectors

declined 0.8 percent and 0.4 percent, respectively. Other indicators of service-sector activity were also mixed over the last quarter of 2007 and the first quarter of 2008. According to our surveys, while revenue growth in non-retail services firms was steady or growing over the period, retail firms

orders and shipments fell and demand for certain products weakened. Toward the end of the first quarter, however, there was some indication of potential turnaround in the manufacturing sector with growth in export demand.

Real Estate Weakens

Residential real estate activity weakened further in the final quarter of 2007 and first quarter of 2008. Permit issuance declined 34.5 percent over the year ending in March 2008, with declines of more than 20 percent reported in all Fifth District jurisdictions. Housing starts and home sales also declined across all jurisdictions, with 30.3 percent and 25.6 percent drops, respectively, in the Fifth District as a whole over the year.

Declining sales activity coincided with cooling house price growth. After many quarters of declining house price growth, Fifth District house prices fell outright over the first quarter of 2008 (0.1 percent) and since the first quarter of 2007 (0.3 percent). Although North Carolina, South Carolina, and West Virginia still saw growth in house prices over the quarter, prices in the District of Columbia, Maryland, and Virginia all declined, with D.C. and Maryland house prices experiencing declines of between 1.0 and 2.0 percent over the quarter and the year.

Economic activity in the Fifth District grew at a somewhat softened pace in the first quarter of 2008.

experienced sizeable drops in sales, particularly of big-ticket items. Similarly, retail price growth picked up, particularly in the first three months of 2008, while overall service-sector price growth remained steady.

The biggest job losses in the Fifth District were in the goods-producing industries — manufacturing firms shed 28,700 jobs for a 0.3 percent decline in payrolls and mining and construction shed 5,000 jobs for a 0.6 percent decline. Other manufacturing indicators from our survey also describe a cooling of activity as new

Economic Indicators

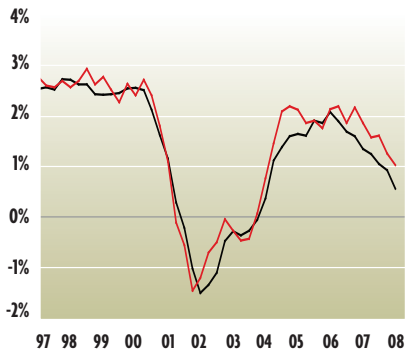
	1st Qtr. 2008	4th Qtr. 2007	Percent Change (Year Ago)
Nonfarm Employment (000)			
Fifth District	14,005	13,979	1.2
U.S.	137,917	138,031	0.9
Real Personal Income (\$bil)			
Fifth District	949.0	946.8	2.2
U.S.	9,998.9	9,970.7	2.7
Building Permits (000)			
Fifth District	36.1	35.7	-24.2
U.S.	226.7	262.8	-26.1
Unemployment Rate (%)			
Fifth District	4.4%	4.3%	
U.S.	4.9%	4.8%	

Households Faring Well

Household financial conditions remained solid in the last quarter of 2007 and the first quarter of 2008, as personal income continued to grow at a 1.0 percent annualized rate between the fourth quarter 2007 and the first quarter 2008 — approximately on par with national income growth. In addition, although mortgage delinquency rates rose in the final quarter of 2007, delinquency rates fell in every jurisdiction of the Fifth District in the first quarter of 2008.

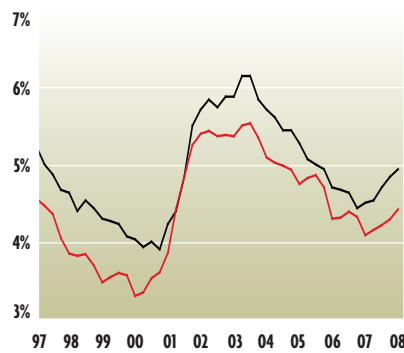
Nonfarm Employment

Change From Prior Year
First Quarter 1997 – First Quarter 2008



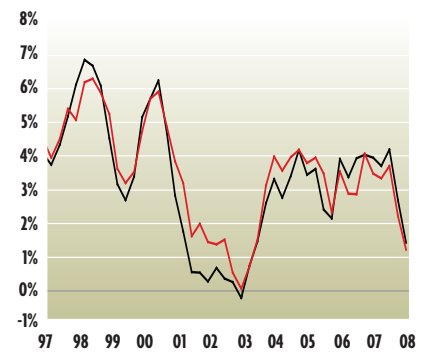
Unemployment Rate

First Quarter 1997 – First Quarter 2008



Real Personal Income

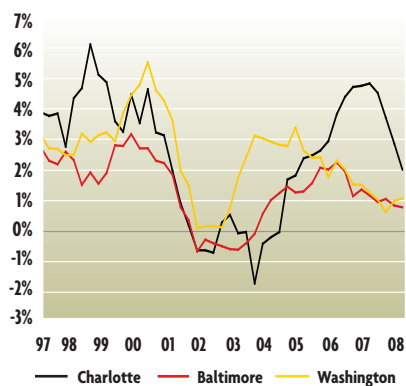
Change From Prior Year
First Quarter 1997 – First Quarter 2008



Fifth District — **United States**

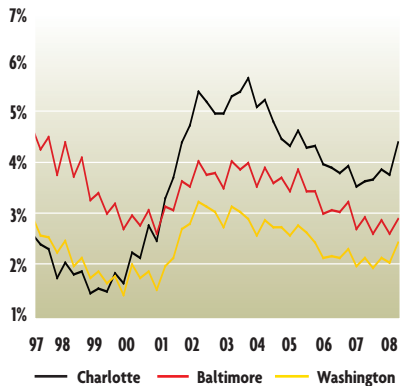
Nonfarm Employment Metropolitan Areas

Change From Prior Year
First Quarter 1997 – First Quarter 2008



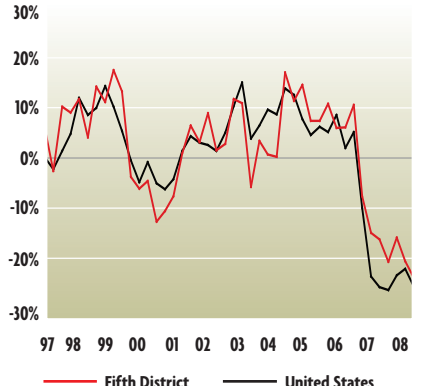
Unemployment Rate Metropolitan Areas

Change From Prior Year
First Quarter 1997 – First Quarter 2008



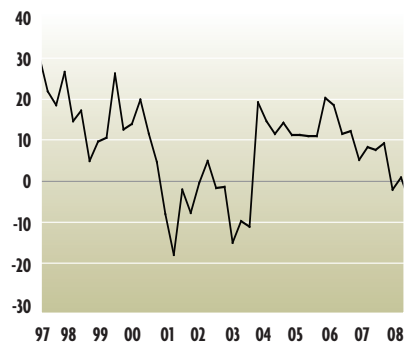
Building Permits

Change From Prior Year
First Quarter 1997 – First Quarter 2008



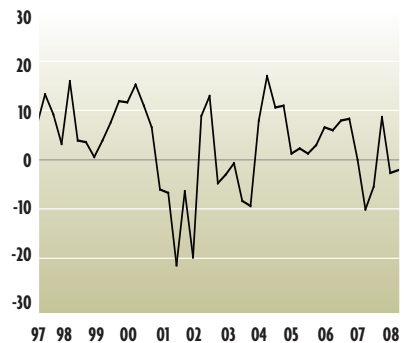
FRB-Richmond Services Revenues Index

First Quarter 1997 – Fourth Quarter 2008



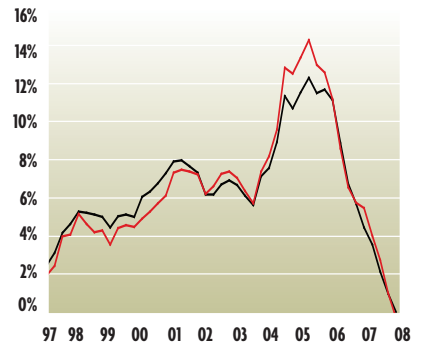
FRB-Richmond Manufacturing Composite Index

First Quarter 1997 – First Quarter 2008



House Prices

Change From Prior Year
First Quarter 1997 – First Quarter 2008



Fifth District — **United States**

NOTES:

1) FRB-Richmond survey indexes are diffusion indexes representing the percentage of responding firms reporting increase minus the percentage reporting decrease. The manufacturing composite index is a weighted average of the shipments, new orders, and employment indexes.
2) Metropolitan area data, building permits, and house prices are not seasonally adjusted (nsa); all other series are seasonally adjusted.

SOURCES:

Real Personal Income: Bureau of Economic Analysis/Haver Analytics.
Unemployment rate: LAUS Program, Bureau of Labor Statistics, U.S. Department of Labor, <http://stats.bls.gov>.
Employment: CES Survey, Bureau of Labor Statistics, U.S. Department of Labor, <http://stats.bls.gov>.
Building permits: U.S. Census Bureau, <http://www.census.gov>.
House prices: Office of Federal Housing Enterprise Oversight, <http://www.ofheo.gov>.

For more information, contact Sonya Ravindranath Waddell at (804) 697-2694 or e-mail sonya.ravindranath@rich.frb.org

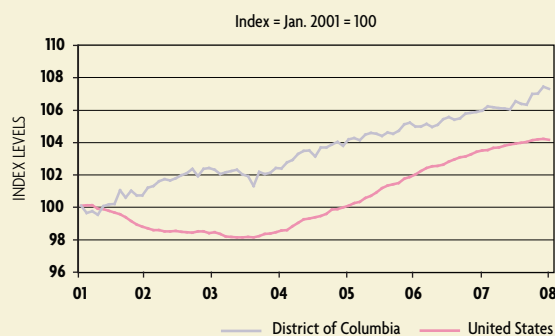
STATE ECONOMIC CONDITIONS

BY SONYA RAVINDRANATH WADDELL

District of Columbia

Economic conditions in the District of Columbia were mixed in the last quarter of 2007 and into the first quarter of 2008. Real estate conditions weakened as house prices, permitting activity, housing starts, and existing home sales fell and foreclosures grew over both quarters. Nonetheless, despite the rise in the household unemployment rate, payrolls in the area grew and income growth remained steady.

U.S. and D.C. Employment Growth Since Jan. 2001



SOURCE: Nonfarm Payroll Employment, BLS/Haver Analytics

Conflicting reports from the payroll and household employment surveys indicated mixed conditions in the D.C. labor market. Firms in the district added 4,900 jobs in the fourth quarter of 2007 and 1,200 jobs in the first quarter of 2008, for 0.9 percent growth over the two quarters. Payroll growth in professional and business services and government employment fueled much of the increase, although government employment fell slightly in the first quarter of 2008. Despite the payroll increases, however, household unemployment ticked up to 6.2 percent in the beginning of 2008 after remaining unchanged at 5.7 percent at the end of last year. By the end of the first quarter of 2008, unemployment settled at 6.1 percent.

Housing market conditions in the District of Columbia deteriorated further over the two quarters. Its House Price Index fell 1.0 percent in the final quarter of 2007 and a further 1.8 percent in the first quarter of 2008. This is the first time that the jurisdiction has seen two straight quarters of house price decline since 1997. In addition, new residential construction fell over the period as residential permitting activity and housing starts dropped over the six months. Furthermore, existing home sales in the district fell 13.0 percent in the fourth quarter and 5.0 percent in the first

quarter, marking the third and fourth consecutive quarters of decline.

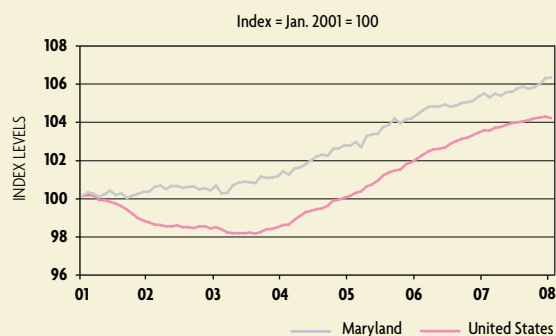
On a more positive note, households remained in decent financial condition overall, as real personal income growth advanced at a 1.8 percent annualized rate in the first quarter of 2008. In addition, although overall mortgage delinquency rates rose in the final quarter of 2007 (for the third consecutive quarter), they fell back in the first quarter of 2008. This decrease was spurred entirely by drops in the percentage of mortgages more than 30 days past due. The percentage of mortgages more than 90 days past due continued to creep up in the first quarter, for the seventh consecutive quarter. Meanwhile, the rate of foreclosures continued to climb to its highest level since 2001.

Maryland

According to recent data, Maryland's economy showed signs of continued weakness in the real estate market, although household employment and financial conditions remained solid. Residential permitting activity, house prices, and home sales all fell over the six months spanning the end of 2007 and the beginning of 2008, while mortgage delinquency rates and foreclosures were up. On the other hand, payrolls grew at a healthy clip, unemployment rates remained steady, and household balance sheets were buttressed by growth in real personal income.

Labor markets in Maryland continued to advance toward the end of 2007 and into 2008. Firms added 6,400 jobs to the state economy (0.2 percent growth) in the last quarter of 2007, and 11,700 jobs (0.4 percent growth) in the first quarter of 2008. The latest period marks the 20th consecutive quarter of payroll growth in the state. The strongest and

U.S. and MD Employment Growth Since Jan. 2001



SOURCE: Nonfarm Payroll Employment, BLS/Haver Analytics

most consistent growth over the six months was in the professional and business services, educational and health services, and leisure and hospitality sectors. Only the manufacturing sector shed jobs over both quarters. Unemployment rates in the state remained steady, between 3.5 percent and 3.6 percent throughout 2007 and into 2008. At 3.5 percent unemployment in the first quarter of 2008, Maryland tied with Virginia for the lowest unemployment of all Fifth District jurisdictions.

Housing market conditions were less rosy. According to the House Price Index, house prices fell 0.1 percent in the last quarter of 2007 and 1.2 percent in the first quarter of 2008, for the second and third consecutive quarters of decline. This marks the first time since 1994 that the state has seen three straight quarters of house price decline. House prices in the first quarter of 2008 were 1.3 percent lower than year-ago levels, marking the first quarter of year-over-year decline since 1997.

In addition, according to the National Association of Realtors, home sales have fallen for four consecutive quarters, although the last quarter's decline of 0.6 percent is far less than the previous three quarters of declines that each exceeded 10.0 percent. The number of house foreclosures continued their rise over the last quarter of 2007 and into the first quarter of 2008, for the sixth and seventh quarters of consecutive quarterly increases.

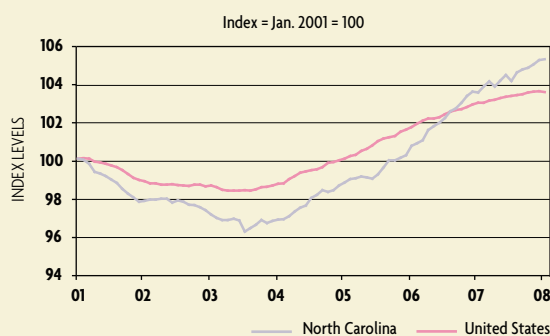
Despite the clear contraction, the housing market showed some positive signs. Although mortgage delinquency rates were up over the last quarter of 2007, peaking at 5.7 percent (the highest rate since 2002), they fell to 5.2 percent over the first three months of 2008. Furthermore, looking forward, residential permitting activity edged up 4.8 percent over the first three months of 2008 after having dropped 25.3 percent in the fourth quarter of 2007. Finally, real personal income continued to grow at an annualized 1.4 percent rate in the fourth quarter of 2007 and 1.5 percent rate in the first quarter of 2008, indicating that household financial conditions remain solid.



North Carolina

North Carolina's economy showed signs of both weakness and rebound toward the end of 2007 and into 2008. Labor market conditions softened somewhat in the first quarter of 2008, with reduced growth in payrolls, a jump in unemployment, and no income growth. Nonetheless, housing market conditions showed signs of improvement, with growth in house prices, increases in residential permitting activity, and drops in mortgage delinquencies and foreclosures.

U.S. and NC Employment Growth Since Jan. 2001



SOURCE: Nonfarm Payroll Employment, BLS/Haver Analytics

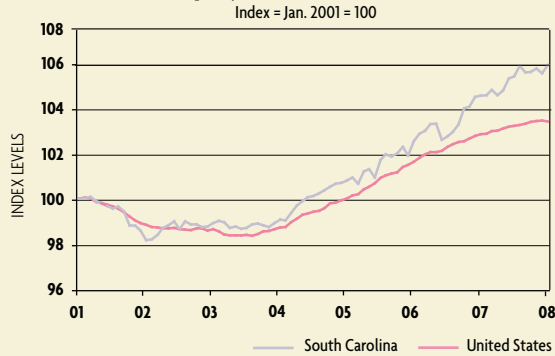
Employment surveys indicated that while labor market conditions improved in the final quarter of 2007, they softened heading into 2008. Payroll employment grew 0.6 percent (25,000 jobs) in the fourth quarter of 2007, but only 0.2 percent (9,600 jobs) in the first quarter of 2008. The first-quarter increase marked the smallest number of jobs added to the state economy in a quarter since early 2005. The biggest loss in the first three months of 2008 was in manufacturing (4,500 jobs). In addition, 400 professional and business services jobs were lost in the first quarter of 2008 after 6,300 jobs were added in that sector in the final quarter of 2007.

Household unemployment data painted a similar picture to payroll data. State unemployment remained steady at 4.7 percent in the last quarter of 2007, but jumped up to 5.0 percent in the first quarter of 2008, for the highest quarterly unemployment since 2005. Household earnings reflected the employment data; real personal income rose 0.5 percent (1.8 percent annualized) in the last quarter of 2007 and was flat over the first quarter of 2008.

Data on real estate conditions, while mixed, indicated a slight improvement in housing market conditions heading into 2008. Although home sales dropped for the fourth consecutive quarter, house prices, according to the House Price Index, continued on their 17-year growth streak and rose 1.1 percent in the fourth quarter of 2007 and 0.8 percent in the first quarter of 2008. Although residential permitting activity was down 19.9 percent in the fourth quarter (the third straight quarter of decline), activity edged up 1.2 percent in the first quarter of 2008.

Finally, both mortgage delinquencies and foreclosures fell in the first quarter of 2008. Mortgage delinquencies declined 0.7 percentage point after three quarters of increase, and the percent of mortgage foreclosures initiated edged lower by 0.04 percentage point after two quarters of increase.

U.S. and SC Employment Growth Since Jan. 2001



SOURCE: Nonfarm Payroll Employment, BLS/Haver Analytics



South Carolina

Economic conditions were mixed in South Carolina in the six months spanning the end of 2007 and the beginning of 2008. Payroll employment figures indicated a weakening in the labor market, although unemployment declined over the first three months of 2008. Conditions in the real estate market varied, with house prices and home sales growing while permit levels fell.

South Carolina's labor markets weakened somewhat over the last three months of 2007 and first three months of 2008. Firms added 200 jobs over the fourth quarter of 2007, but shed 2,000 net jobs in the first quarter of 2008. The starkest losses were felt in the construction sector (5,000 jobs) and the trade, transportation, and utilities sector (1,700 jobs). The first quarter of 2008 marked the largest loss of jobs in a single quarter in South Carolina since early 2003.

Although the number of employed persons in the state declined over the first quarter, so did the number of unemployed persons, and the steeper drop in the labor force led to a 0.3 percentage point drop in the unemployment rate (after a 0.3 percentage point rise in the fourth quarter of 2007). South Carolina, therefore, ended the first quarter of 2008 with the same 5.8 percent unemployment rate recorded in the third quarter of 2007.

Household balance sheets seemed to be improving, as mortgage delinquencies rose 0.3 percentage point in the final quarter of 2007, but then dropped 0.9 percentage point in the first three months of 2008. Foreclosures also declined in the first quarter of 2008 after two quarters of increase. In the aggregate, real personal income levels continued along their five-year growth streak at a moderate pace, with a 0.9 percent annualized increase in the final quarter of 2007

and a 0.4 percent increase in the first quarter of 2008. In per-capita terms, however, real quarterly personal income levels fell over the period by 0.5 percent and 1.1 percent annualized in the end of 2007 and the beginning of 2008, respectively.

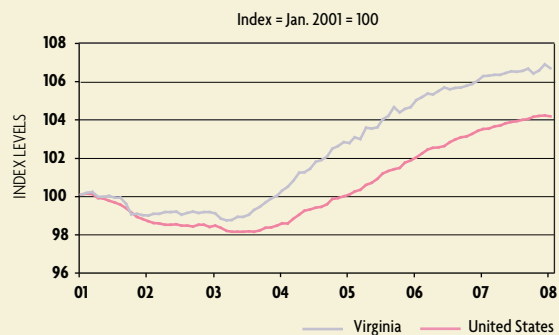
In the real estate market, conditions were mixed. On the one hand, house prices, according to the House Price Index, continued along their 17-year growth streak, with 1.8 percent house price growth in the final quarter of 2007, and 0.9 percent growth in the first quarter of 2008. Similarly, home sales edged up 3.1 percent in the first quarter after two quarters of decline. On the other hand, permit levels fell 12.8 percent in the fourth quarter and a further 3.9 percent in the first quarter. This left South Carolina with its largest year-over-year decline in permit levels in any quarter since 1989.



Virginia

In Virginia economic conditions remained somewhat shaky in the last quarter of 2007 through the first quarter of 2008. The Commonwealth experienced tepid payroll growth and increases in unemployment. Real income and mortgage delinquencies showed signs of improvement, but with high delinquency rates, increases in foreclosure rates, declining house prices, and falling home sales, Virginia's housing sector remained in a somewhat weakened state.

U.S. and VA Employment Growth Since Jan. 2001



SOURCE: Nonfarm Payroll Employment, BLS/Haver Analytics

Firms added 1,800 jobs in the final quarter of 2007 and 4,700 in the first quarter of 2008. Although this is the 18th consecutive quarter of payroll increases, these are some of the lowest quarterly payroll increases that the state has seen since the 2001-2003 period. The goods-producing sector continued to shed jobs as the construction and manufacturing sectors lost 1,700 jobs and 1,800 jobs, respec-

tively, in the first quarter of 2008. The tepid payroll growth can partially explain, then, a steadily increasing household unemployment rate that reached 3.2 percent in the final three months of 2007 and 3.5 percent in the first three months of 2008. Virginia is still tied with Maryland, however, for the lowest unemployment in the Fifth District.

Real personal income fell slightly in the fourth quarter of 2007 but rebounded in the first quarter of 2008, buttressing household balance sheets. Similarly, mortgage delinquencies fell in the first quarter after three quarters of increase. Still, fourth-quarter delinquencies hit their highest point since 2001. In addition, the percentage of mortgages past due by 90 days or more rose to 1.22 percent — a series high by a wide margin. Foreclosure rates continued to grow, hitting a record high of 0.7 percent in the first quarter of 2008.

The housing market remained sluggish although there were signs of possible turnaround. The quarterly decline in home sales flattened to zero in the first quarter of 2008 — home sales were down 24.8 percent since the first quarter of 2007. Meanwhile, according to the House Price Index, Virginia house prices fell 0.2 percent for the third consecutive quarter of decline, marking the first quarter of year-over-year decline since 1995. Looking forward, however, permitting activity grew 9.1 percent in the first quarter, after two straight quarters of decline.

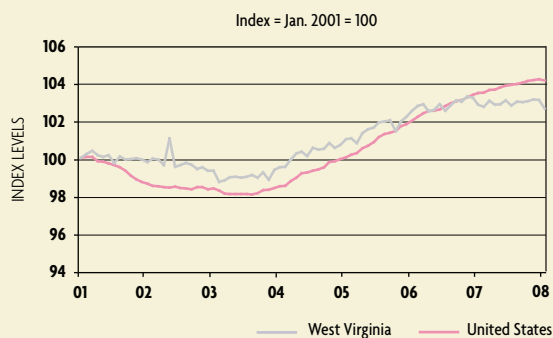


West Virginia

Economic conditions in West Virginia showed some signs of improvement in the six months spanning the end of 2007 and the beginning of 2008. Although there was little change in employment and some weakness in the state's housing markets, the state did see some encouraging indicators, including positive real income growth, reduced delinquency and foreclosure rates, and relatively steady house price appreciation.

Data on West Virginia labor markets indicated that conditions have changed little since the third quarter of 2007. Firms added 1,100 jobs in the fourth quarter of 2007 and 400 jobs in the first quarter of 2008, for just under 0.2 percent growth and 0.1 percent growth, respectively. Relatively small gains and losses were felt across sectors in

U.S. and WV Employment Growth Since Jan. 2001



SOURCE: Nonfarm Payroll Employment, BLS/Haver Analytics

both quarters, with only the construction and manufacturing sectors experiencing declines in both quarters while educational and health services and leisure and hospitality increased in both quarters. Not surprisingly, then, household unemployment surveys indicated that unemployment rates remained at 4.6 percent for both quarters — down from 4.7 percent in the third quarter of 2007.

The housing market was steady in West Virginia, although there was a strong decline in residential permitting activity in the first quarter of 2008. According to the House Price Index, house prices increased 0.8 percent in the first quarter of 2008 after edging up 0.5 percent in the fourth quarter of 2007. Home sales were also up in both the fourth quarter and in the first quarter. On a less positive note, first-quarter residential permitting activity was down after growth in the final quarter of 2007. In fact, the last quarter marked the largest quarterly decline in permitting activity since 1997.

Household financial conditions in West Virginia were similar to, though slightly better, than those in the third quarter of 2007. Real personal income grew slightly (0.4 percent annualized) in the final quarter of 2007 and flatlined in the first quarter of 2008, as did per-capita income. After three quarters of increase, mortgage delinquency rates fell 1.1 percentage points in the first quarter. Foreclosure rates also fell slightly.



For the latest in Fifth District economic conditions, check out our **new** regional **Snapshot** publication at www.richmondfed.org/research/regional_conditions/snapshot

State Data, Q1:08

	DC	MD	NC	SC	VA	WV
Nonfarm Employment (000's)	700.8	2,630.3	4,187.3	1,958.0	3,770.1	758.3
Q/Q Percent Change	0.2	0.4	0.2	-0.1	0.1	0.1
Y/Y Percent Change	1.2	1.0	1.6	1.0	0.4	0.3
Manufacturing Employment (000's)	1.6	130.8	531.4	247.6	273.3	57.9
Q/Q Percent Change	-4.0	-0.3	-0.8	-0.4	-0.7	-1.1
Y/Y Percent Change	-5.9	-1.6	-2.8	-1.2	-2.9	-2.7
Professional/Business Services Employment (000's)	156.0	402.6	508.1	223.8	648.5	61.3
Q/Q Percent Change	0.1	0.5	-0.1	-2.6	0.3	1.4
Y/Y Percent Change	1.6	1.9	3.4	0.7	1.4	2.1
Government Employment (000's)	233.4	482.3	702.8	341.0	691.8	145.0
Q/Q Percent Change	-0.1	0.5	0.0	0.7	0.6	-0.1
Y/Y Percent Change	1.2	1.3	1.9	1.9	1.4	-0.2
Civilian Labor Force (000's)	331.3	2,994.0	4,541.5	2,138.0	4,099.5	812.7
Q/Q Percent Change	1.1	0.1	0.2	-0.5	0.4	0.3
Y/Y Percent Change	1.9	0.6	0.8	0.4	1.8	0.7
Unemployment Rate (%)	6.1	3.5	5.0	5.8	3.5	4.6
Q4:07	5.7	3.6	4.7	6.1	3.2	4.6
Q1:07	5.7	3.6	4.5	5.8	2.9	4.4
Real Personal Income (\$Mil)	30,834.3	221,698.7	261,262.1	117,411.6	272,116.5	45,715.0
Q/Q Percent Change	0.5	0.4	0.0	0.1	0.4	0.0
Y/Y Percent Change	2.0	1.2	1.3	1.7	0.8	0.6
Building Permits	153	3,662	16,119	7,060	8,247	849
Q/Q Percent Change	-7.8	4.8	1.2	-3.9	9.1	-32.0
Y/Y Percent Change	-81.7	-32.9	-30.4	-32.8	-14.5	-3.6
House Price Index (1980=100)	652.0	532.5	346.4	327.8	471.4	235.8
Q/Q Percent Change	-1.8	-1.2	0.8	0.9	-0.2	0.8
Y/Y Percent Change	-1.5	-1.3	4.0	3.8	-0.1	2.5
Sales of Existing Housing Units (000's)	7.6	68.0	181.6	94.4	102.0	29.6
Q/Q Percent Change	-5.0	-0.6	-2.2	3.1	0.0	7.2
Y/Y Percent Change	-34.5	-38.6	-25.6	-16.9	-24.8	-11.9

NOTES:

Nonfarm Payroll Employment, thousands of jobs, seasonally adjusted (SA) except in MSAs; Bureau of Labor Statistics (BLS)/Haver Analytics. Manufacturing Employment, thousands of jobs, SA in all but DC and SC; BLS/Haver Analytics. Professional/Business Services Employment, thousands of jobs, SA in all but SC; BLS/Haver Analytics. Government Employment, thousands of jobs, SA; BLS/Haver Analytics. Civilian Labor Force, thousands of persons, SA; BLS/Haver Analytics. Unemployment Rate, percent, SA except in MSAs; BLS/Haver Analytics. Building Permits, number of permits, NSA; U.S. Census Bureau/Haver Analytics. Sales of Existing Housing Units, thousands of units, SA; National Association of Realtors®

Metropolitan Area Data, Q1:08

	Washington, DC MSA	Baltimore, MD MSA	Charlotte, NC MSA
Nonfarm Employment (000's)	2,415	1,307.9	862.1
Q/Q Percent Change	-1.0	-1.9	-1.2
Y/Y Percent Change	1.0	0.7	2.0
Unemployment Rate (%)	3.4	3.9	5.4
Q4:07	3.0	3.6	4.7
Q1:07	3.1	3.9	4.6
Building Permits	4,388	1,232	3,583
Q/Q Percent Change	-10.1	-8.1	-6.0
Y/Y Percent Change	-31.3	-29.3	-36.4
	Raleigh, NC MSA	Charleston, SC MSA	Columbia, SC MSA
Nonfarm Employment (000's)	522.8	297.8	368.7
Q/Q Percent Change	-0.9	-0.9	-1.1
Y/Y Percent Change	3.9	2.0	2.0
Unemployment Rate (%)	4.1	4.7	5.1
Q4:07	3.5	4.8	5.3
Q1:07	3.6	4.6	5.3
Building Permits	3,117	1,333	1,036
Q/Q Percent Change	8.8	7.9	-10.1
Y/Y Percent Change	-23.3	-6.4	-38.1
	Norfolk, VA MSA	Richmond, VA MSA	Charleston, WV MSA
Nonfarm Employment (000)	768.0	631.0	149.1
Q/Q Percent Change	-1.5	-1.1	-0.9
Y/Y Percent Change	0.8	0.6	0.4
Unemployment Rate (%)	4.1	3.9	4.6
Q4:07	3.3	3.2	3.7
Q1:07	3.2	3.1	4.7
Building Permits	1,363	1,671	39
Q/Q Percent Change	10.6	28.4	5.4
Y/Y Percent Change	-35.5	-7.6	-48.0

For more information, contact Sonya Ravindranath Waddell at (804) 697-2694 or e-mail sonya.ravindranath@rich.frb.org

More Theory, Please

BY JOHN A. WEINBERG

This issue of *Region Focus* features a special section on the “state of modern economics.” Some of the articles report on debates regarding the direction of the discipline. Are economists asking the right questions? Are they employing the right methods? Is their work relevant to the general public? In short, has the economics profession lost its way?

These are all healthy questions to ask. Economists shouldn’t blindly proceed, simply assuming that they are heading in the right direction. Occasionally, a little self-reflection is necessary.

But, I think, the hand-wringing that some economists have been doing is overwrought. I am sympathetic to the argument that much economic research should ultimately have policy relevance. After all, I work as an economist in the Federal Reserve System. That doesn’t mean, however, that this research must eschew formal, mathematical modeling. Quite the opposite.

Economics has a long and storied past. The classical economists of the 18th and 19th centuries had valuable insights, many of which remain relevant today. Those insights, however, can be made more precise by the use of contemporary formal methods. Such methods also permit us to find new implications or limitations to the classical economists’ ideas.

Indeed, the formal methods of modern economic theory are essential to policymaking. To take just one example, let’s consider central bank lending. In the wake of the credit market turmoil that began in 2007, the Fed and other central banks expanded their provision of credit to the financial system. It is impossible to understand the arguments for or against such actions without reference to a theory of how financial markets function and under which conditions they may malfunction. Moreover, without the tools of formal analysis we cannot determine whether the theory on which we are basing our policy choices “makes sense,” or exactly what assumptions are needed to make its logic correct.

Of course, the relevance of a theory relies on its ability to explain some observable facts — that is to say, data. This requires the use and refinement of formal quantitative tools. For policymakers, the desirability of various choices often comes down to questions of magnitude. How big of a change will a certain policy choice produce?

Consider the issues of subsidies and taxes. Economists know that when you subsidize something, you are likely to get more of it, and when you tax something, you are likely to

get less of it. That’s helpful to know, but it often isn’t sufficient. For instance, you might wish to subsidize a certain activity — say, education — if you believe it yields positive externalities. But, first, you want to know how large those externalities will be — and if there would be a more efficient way to achieve them. To determine this, we must turn to contemporary tools of data analysis.

For macroeconomists, the “New Keynesian” framework has become a workhorse model for policy analysis. It is rich enough to generate quantitative predictions about how key macroeconomic indicators are likely to perform under alternative settings. This, of course, is key to central bankers and other policymakers. But even as this framework is used

extensively, researchers are studying its limitations. This will ultimately lead to even better models and better policy.

In the introductory article to the special section, the question is asked: “Why isn’t there a Milton Friedman today?” While this question might seem to suggest that modern economists have gotten bogged down in mathematical minutiae to the detriment of speaking to the public, I think the answer actually lends support to my argument. It’s true that most people know Friedman from his *Newsweek* columns, his books *Capitalism and*

Freedom and *Free to Choose*, and his television appearances. He wanted to directly address the public, and he did so eloquently. But you can’t divorce his popular work from his academic work. Friedman was first and foremost a great economist. It was his technical, scientific contributions that informed his policy views and popular writings, not the other way around. Without Friedman the mathematically inclined economist, there likely would not have been Friedman the influential policy analyst.

We can question whether the economics profession adequately rewards speaking to the public — there is, in my opinion, an important role for economic education — but that public communication will be most valuable if it reflects recent advances in economic theory and quantitative analysis. The discipline is making significant strides in understanding a wide range of economic phenomena. We should not abandon that work. Rather, the trick is to effectively communicate it to a broad audience. It’s not an easy task, but one well worth pursuing. **RF**

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John A. Weinberg is senior vice president and director of research at the Federal Reserve Bank of Richmond.

Homeownership

Increasing the homeownership rate in the United States has been a primary policy goal for decades. But despite various government policies that subsidize investment in owner-occupied real estate, the rate of homeownership hasn't budged much in the past 30 years. Meanwhile, few stop to question whether tilting the playing field in favor of homeowners has any downside. Is it possible that the homeownership rate in America is actually too high?

Carbon Trading

The debate over the best way to reduce carbon emissions has boiled down to a choice between a carbon tax and a cap-and-trade system that uses market forces to determine which companies should curtail their carbon emissions the most. Both approaches have advantages and drawbacks. Yet, while economists debate the issue, state governments in the Northeast have embarked on an ambitious effort to institute a carbon permit trading market in their region. The results could have dramatic implications for the future of environmental policy in the Fifth District.

Immigrant Entrepreneurs

A recent study noted that a quarter of all the companies started with venture capital in the United States over the past 15 years had at least one founder who was born outside of the country. Is there something inherent in the experience of many immigrants that makes them uniquely suited to becoming entrepreneurs?

Interview

We talk to Joseph Gyourko of the Wharton School of Business at the University of Pennsylvania about urban economics and the housing market.

Jargon Alert

Not sure of the best way to motivate your employees. Then you have a "principal-agent problem."

Book Review

Russell Roberts' new book *The Price of Everything: A Parable of Possibility and Prosperity* shows that fiction can be an effective way to illustrate basic economic principles.

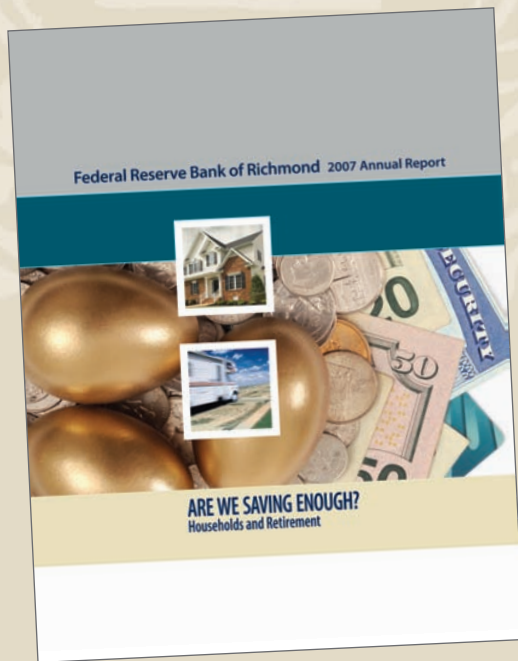
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Savings and Retirement

How financially prepared are Americans when it comes to retirement? The Federal Reserve Bank of Richmond's *2007 Annual Report* attempts to answer this in the feature essay, "Are We Saving Enough? Households and Retirement."



Authors Senior Vice President and Director of Research John Weinberg and economics writer Doug Campbell examine the extent to which Americans are financially prepared for retirement. In the essay, they describe the results of careful studies on American saving habits. Review of the research and data shows that most families nearing retirement are saving adequately — or the best they can given their lifetime expected incomes. However, estimates about savings adequacy depend on the assumption that entitlement program benefits will be forthcoming. Population aging and the movement of baby boomers into retirement challenge that assumption and may portend a future in which some people would need to consume less than they would otherwise. The authors describe the trade-offs involved with various approaches, and conclude that the sooner we settle on a solution to our federal retirement problems the better off all generations are likely to be.

The annual report also includes reports on the region's economy, as well as the Bank's operational and financial activity, and takes a special look at the Richmond Fed's involvement in Fifth Federal Reserve District communities.

The *2007 Annual Report* is available on the Bank's Web site at www.richmondfed.org, or by contacting the Bank's Public Affairs Department at 804-697-8109.

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