

ECONOMICS

in

Action



department of economics
UNIVERSITY OF CALIFORNIA, SAN DIEGO

SPRING/SUMMER 2006
econ.ucsd.edu

Oil Shocks and Aggregate Economic Activity

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Nine of the ten recessions in the United States since World War II were preceded by a sharp increase in the price of crude petroleum. So far, we've weathered the current round of price increases without an economic downturn. What's different this time around?

Economic theory teaches that the marginal product of energy should equal its relative price. A little rearranging of that expression leads to the conclusion that the elasticity of output with respect to a change in the quantity of energy used should equal the ratio of the dollar value of

expenditures on energy to the dollar value of output. That fraction is relatively small for the U.S.—for example, spending on crude oil accounts for less than 4% of current GDP, suggesting that even a 10% drop in energy use would be associated with a drop of GDP of less than one-half of one percent.

If previous oil shocks contributed to economic downturns, the mechanism must have come not from reduced energy use per se but rather from a reduction in the utilization of labor and capital as well. Indeed, the defining characteristic of an economic recession is a sharp rise in the unemployment rate and fall in measures of capital utilization. My view is that previous oil shocks contributed to economic downturns by causing abrupt changes in the pattern of consumption and investment spending, for example, as consumers suddenly stopped buying the bigger, less fuel-efficient cars. These drops in demand in key sectors, rather than some technological changes in energy use patterns on the supply side, appear to be the most plausible explanation for why oil shocks might have made a significant contribution to previous economic downturns.

One difference this time is that the energy price hikes of 2004 and the first half of 2005 did not result from a sudden shortfall of supply, as had previous oil shocks, but instead resulted from booming world oil demand. 2004 in fact saw a huge increase in oil production worldwide. Rising income in the U.S., China, and India were increasing the demand for oil, and the price responded to this pressure.

In such a setting, motorists found themselves paying a few more dollars to buy their gas each month, but incomes were

rising more than enough to allow them to keep doing things more or less as they had been. There was a gradual shift away from less fuel-efficient models, but nothing that could remotely cause a fall in total GDP.

This changed in the fall of 2005, when the hurricanes knocked out 1.5 million barrels of daily crude oil production from the Gulf of Mexico and a half-dozen U.S. gasoline refineries. Auto makers suddenly saw themselves facing a 50% drop in sales of the big SUV's, and these weak auto sales were basically the whole story behind the anemic 1.7% annual growth rate for U.S. real GDP in 2005:Q4—had autos merely held their own, the figure would have instead been a perfectly normal 3.6%.

The temporary nature of the hurricanes, however, was also different from previous oil shocks in which substantial uncertainty persisted for many months. By December 2005, consumer confidence surged back up, oil and gas prices had come down substantially, and car sales, though not robust, recovered significantly.

But now in April 2006 we've seen both the price of crude oil and U.S. retail gasoline prices back up above the highs they'd attained post-Katrina. The current story as far as crude oil is concerned appears to be that continued strong demand is bumping against constraints in increasing global supply, the latter in part due to ongoing conflicts in Iraq and Nigeria. This is compounded in the U.S. market for gasoline by a particularly rocky conversion from winter fuels to summer fuels this year and the shift from MTBE to ethanol for oxygenation.

So what will \$3.00 (or higher) gas mean for American consumers? Time will tell. Key indicators to watch over the next few months are auto sales and consumer confidence, and how these interact with the housing slowdown that might be expected from the continuous tightening of interest rates engineered by the U.S. Federal Reserve.

One reason to be cautious about any forecast is that the current situation is really quite different from previous oil shocks. In the Suez Crisis of 1956, the OPEC embargo of 1973-74, the Iranian revolution in 1978, the Iran-Iraq War in 1980, or the first Persian Gulf War in 1990, close to 10% of world oil production was knocked out. For comparison, the 1.5 million barrels per day lost to last fall's hurricanes amounts to less than 2% of current world production, and the drop in Nigerian output so far has been less than half a million barrels per day. High demand rather than low

Staff Updates

Molly Love, Business Operations Manager for the Department since 2004, has transferred to the Mathematics Department. **Devaney Kerr**, Director of Student Affairs in Economics, has moved into Molly's position. Congratulations to Devaney!

The new Director of Student Affairs is **Rafael Acevedo**. Rafael, formerly the Graduate Student Program Coordinator in Sociology, earned a BA in Psychology from Rutgers and holds a MS in Counseling from San Diego State University. Rafael will join the Economics staff on July 3rd.

Upcoming RoundTable Guests

Alison (Lynn) Reaser, Managing Director, Chief Economist Investment Strategies Group, of the Bank of America will speak on "Framing the Economic Outlook: The Forces Driving the Numbers" on Tuesday, July 25th. Dr. Reaser is responsible for tracking and forecasting economic trends and evaluating their effects on the financial markets for the \$443 billion Bank of America's Investment Strategies Group.

On Thursday, October 12th, **Glenn Hubbard**, Former Chairman of the President's Council of Economic Advisors will present "Tax Policy and International Competitiveness: A Cross-Country Comparison." R. Glenn Hubbard is the Dean of Finance and Economics in the Graduate School of Business at Columbia University and a research associate of the National Bureau of Economic Research. Dr. Hubbard has served as the chairman of the Council of Economic Advisors appointed by President George W. Bush and is widely believed to be the primary mover behind the President's tax-cut package.

For more information on these speakers or to register for a presentation, please visit the RoundTable's website - <http://econ.ucsd.edu/roundtable/index.shtml> or contact Edie Munk at (858) 822-0510.

Undergraduate Awards, 2006

The winner of this year's Seymour E. Harris Award for excellence in economics is Marika Cabral. Harris, a prominent government advisor from the 1940s-60s, was the founding chairman of our department.

The Joel Dean Award is shared by Dan Leitner and Brian Brockett. Dean, a prominent management scientist and a visiting professor in the department, was one of the pioneers in establishing the Management Science major.

Congratulations to these students on their achievements!

Arnaud Costinot: Modeling Issues In International Trade

By Barry Jagoda, UCSD Communications



Arnaud Costinot
UCSD Economics Department

Dunkirk is a port city in Northern France, most famous as the evacuation point of 330,000 allied soldiers just before the fall of France in 1940. After the war what had been a major French shipbuilding center was closed down because of international competition. If you come from Dunkirk, as does Assistant Professor of Economics Arnaud Costinot, you know that economics, globalization and international trade really matter.

And, if you eventually matriculate at France's leading school of engineering and happen to take some elective courses in the humanities and social sciences it might gradually dawn upon you that "hard questions can often be solved if you are able to develop a simple model" for deeper understanding.

This idea was to anchor much of Arnaud's thinking through university at France's Ecole Polytechnique, where he earned a bachelor of science degree in applied mathematics and economics; at the Ecole des Hautes Etudes en Sciences Sociales (one department of which has since been named the Paris School of Economics) where he took the M.A. in economics and into his graduate study in the theoretical zones of Princeton University's Department of Economics, where he received the Ph.D in 2005.

Now 28, living with his wife Nadege in La Jolla, Arnaud has completed almost a full year as a member of the Economics Department Faculty.

From conversations with faculty advisors in France it became apparent that the best place to study economics was in an American graduate school. Since Arnaud knew he had an interest in theoretical economics it got down to the great programs at the University of Chicago and at Princeton. But, since the boy from Dunkirk already knew he would tackle International Trade, the decision to go to Princeton, with its strong programs in theoretical economics and international trade, seemed like the right option.

One big surprise: In a class of 25 graduate students, 23 were not Americans, three from Spain, three from Italy, three from France and so on. Princeton took the best applicants that came its way, a strong class, but many U.S. students seemed to go elsewhere.

Asked about the first year at Princeton, Arnaud says, "You work a lot," adding that the most difficult part of the first year of economics graduate school is coming to terms with the math. "But I had a break here because when you come from an engineering school you have a big advantage with the math."

Arnaud's dissertation focused on what was to become his deep interest: How institutions, and other interests within a country, shape the pattern of international specialization, that is, who produces what. He returned to the concept of a simple model, predicting that

Modeling Issues *continued from page 2*

a country with better institutions and more well-educated workers should have a comparative advantage in complex industries because agreements, or contracts, would more likely be enforced in such an environment.

In recent work a more sophisticated economist begins to appear, as Araud realized that getting beyond theoretical insights and the testing of ideas, models, as he puts it, “have to be more complex, enriched.”

Professor Costinot has just completed a term with graduate students in a sequence of the international trade course. Asked to compare what he is teaching versus what was presented to him at Princeton, “We have a more empirical approach.”

And how does he view his work, and the field, now? “A lesson that gradually becomes clear: You are not going to revolutionize the world—but keep thinking and at some point you might have an impact.”

David Miller: Game Theory's Long Middle Between Real Problems and Real Solutions

By Barry Jagoda, UCSD Communications



David Miller
UCSD Economics Department

Although he majored in environmental science and public policy at Harvard, David Miller recognized that he had “always gravitated more toward the abstract version of things.”

So, after a year's graduate school in the Department of Economics at Stanford, David concluded that he wanted to be a game theorist. “Game theory was a complete self-contained framework for studying just about any question and it was just right for an abstract framework type of thinker,” he said. Now in his second year at UCSD, as Assistant Professor of Economics,

David is introducing another crop of UCSD graduate students to game theory and to microeconomic theory. At the same time he is deepening his own work with advanced issues in these fields.

“Game theory gets at the root of what I have long thought was the problem with neoclassical economics,” says David, whose introduction to the field was in a year long undergraduate course from one of the most famous of American economists, Martin Feldstein. “Most of what he taught assumed that the markets were competitive, leading to optimal outcomes and that you didn't much want the government to fool with them. But game theory says there is no reason to believe that the outcome will be efficient, because people are acting in their own interests while taking into account the interactions between their own actions and what others are doing.”

All this perspective has come to David after four years of college, two years as a research analyst with a Boston consulting firm and six years of graduate school. “I was always a good class-taker, but in graduate school you have to switch from taking classes to doing

research. I found that difficult, and it took me an extra year in grad school to get the right idea about how to approach research. My advisor, Susan Athey, an inspirational role model, helped me get on track.”

Then there were the two summers he spent in China. At the end of his first language study session there, just before graduate school, he met a Shanghai woman who, two years later, would become his bride. After their marriage Heather Gao enrolled at the University of California, Berkeley, earned her bachelor's degree and, today, is finishing up work as UCSD biology laboratory assistant and enrolling in Pharmacy school in the fall.

David's formative years were, relatively, more conventionally American, with his dad a suburban Connecticut psychiatrist, his mom a nurse, who turned to speech and language therapy, and a sister, who is a photographer, living in New Haven.

Eventually though, having successfully completed his dissertation work, all papers in game theory, David underwent the normal job search and landed an offer from UCSD. “I was fortunate,” he says, “UCSD is a great department, especially for a theorist. This is one of the best because there is such a concentration of prominent theorists here.”

Still, David maintains that game theory is not all theory: “You can take any real world situation where you think there are strategic actors involved. You make a model and try to make predictions. Everything begins with applications and ends there, but you can have a long middle. Eventually it has to come back to the application, though, or what's the point.”

In his current game theory work David is deeply focused on situations where parties have concealed information. “What I'm really interested in is work that makes the abstract theory more realistic and this is where private information comes in, since it is a ubiquitous feature of the real world and we need to be able to account for it.”

What I've been telling my students is that “the more realistic you make the model the more difficult it is to analyze. The simple models that are not necessarily realistic can give you a clear conclusion. The realistic models can be intensely complicated and you have to wrestle with them to get results. So to keep the model under control it's important to choose only the realistic elements that really make a difference.”

A counter-intuitive lesson from a devotee of abstract analysis.

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supply remains the most important factor behind current high prices, and, insofar as that high demand results from rapid income growth, it is good economic news, not bad.

What we really need for a proper test of the theory is a full-blown conflict that took out, for example, all of the 4 million barrels per day currently coming from Iran or a good chunk of the 9.5 million barrels per day from Saudi Arabia.

Reading the news headlines, it certainly seems possible we may get such data sometime within the next few years.

Economics in Action is published twice a year by the Department of Economics at UC San Diego.

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In Memoriam

Captain Michael Martino, a Marine Corps pilot and UCSD Economics Alum (1996), was killed on November 2, 2005 in western Iraq when his helicopter went down under hostile fire. Martino, 32, of Fairfax, Virginia, was with the Marine Light-Attack Helicopter Squadron 369, Marine Aircraft Group 39, 3rd Marine Aircraft Wing, I Marine Expeditionary Force out of Camp Pendleton.

Captain Martino joined the Marines in 2000, and died during his second tour in Iraq. Martino was known as such a good listener that his call sign during his first tour was "Oprah." His father, Bob Martino, said his son once told him not to worry. "I'm doing what I love and what I believe in," the elder Martino recalled him saying.

Captain Martino is survived by his parents, Bob and Sybil Martino; a brother, Robert; a sister, Lauri; and two nieces. He was buried in Arlington National Cemetery.



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