

A Conversation with Mine Yücel

Shale Renews Excitement in Energy Industry

Mine Yücel, a senior vice president and research advisor at the Federal Reserve Bank of Dallas, leads the Research Department's energy group. She joined the bank in 1989 and is a past president of the International Association for Energy Economics. She discusses the evolution of the energy sector, its role in Texas and her perspective as a female energy economist.

Q. What is energy economics and how does it differ from the study of other commodities?

Energy—whether it be oil, gas, coal or renewables—is an essential input for the economy. Energy prices affect all sectors of the economy, from businesses to households. And because the use of energy is so pervasive, energy supply and energy policy have been frequently deemed important for national security reasons. This was especially true in the 1970s when U.S. oil production started declining and oil prices soared due to geopolitical factors.

When looking at energy markets, oil really stands out. Oil is priced in international markets, but the market is not necessarily competitive. OPEC controls 40 percent of the global crude oil market and can influence oil prices. In the U.S., gasoline and diesel make up 67 percent of oil consumption, so a change in oil prices affects consumer spending directly through fuel and heating oil prices. Oil price changes also have historically affected gross domestic product (GDP) growth and inflation, and, therefore, have been an important consideration for monetary policy.

We have long had a domestic market for natural gas. But as U.S. natural gas production continues to rise, and U.S. liquefied natural gas exports increase, we will be more integrated with global

natural gas markets and could feel the economic effects of changing natural gas prices.

Q. When you started working in energy economics in the 1980s, what were the big questions? What are they now?

I graduated in the early 1980s. Research focused on OPEC, its impact on oil markets and prices, and the effects of high oil prices on the macroeconomy.

As OPEC grew and started flexing its muscles, the price of oil shot up from \$3.50 per barrel in 1973 to around \$37 by 1980. There was much research on OPEC market structure: Was it a cartel, was it targeting market share or targeting revenue?

Oil prices started declining in 1981 and collapsed to near \$14 in 1986. Then, there were questions about whether the impact of oil price changes was symmetric—that is, would falling oil prices benefit the economy, just as rising prices had hurt the economy? There were also questions about the health of oil-producing states such as Texas, Alaska and Louisiana whose economies were very dependent on the oil industry.

Interestingly, we are still researching these same questions. As the economy has evolved, questions about the impact of oil price shocks on the economy remain an ongoing concern, but the

answers have changed somewhat. The source of the oil price shocks matters, and shocks have a smaller impact. Also, as the share of renewables such as solar and wind has increased, issues about how to integrate renewables into the electricity grid have come into focus.

Q. Oil price increases have seemed to always precede recessions. Is that still true?

Oil price shocks have preceded 10 of the 11 post-World War II recessions in the U.S. However, this is not a causal relationship. The recessions were not necessarily caused by oil price shocks. Rather, high oil prices most likely contributed to the weakness of an already fragile economy before the recessions.

Oil prices affect the economy through two channels: a price effect and an allocative effect. For example, when the price of oil goes up, we all feel the impact of higher gasoline prices and higher fuel prices and lower our spending accordingly. This is the negative price effect.

Because oil and goods and services related to oil have now become relatively more expensive, there is also a change in the use of resources that produce these goods and services—a reallocation of resources because of the relative price change. This reallocation effect is also negative.

These two effects are why the economy is affected negatively when oil prices rise. Of course, producers of oil are now better off because of the increase. This positive impact offsets some of the negative effects from the oil price rise.

Q. How has energy's impact on the Texas economy changed in your time?

I came to Texas in 1977. We were in the midst of an oil boom, and the state's economy was growing at double-digit rates. Texas went into a deep recession when oil prices started declining in 1982 and again when they collapsed in 1986.

The oil and gas industry lost roughly 150,000 jobs, about 2.2 percent of employment, from the peak of the boom in 1982 to early 1987. The second recession



▶ *“Horizontal drilling and hydraulic fracturing have been amazing technological developments that completely changed the oil and gas picture in the U.S.”*

coincided with the 1986 Tax Reform Act’s more stringent treatment of investment income and the savings and loan crisis, which also buffeted the Texas economy.

After the bust, the Texas economy diversified, and low oil prices have much less of an impact on the Texas economy now. When oil and gas prices collapsed at the end of 2014, Texas didn’t fall into recession unlike all other states with large oil sectors, such as Alaska, North Dakota, Oklahoma and Louisiana. During the most recent shale oil boom, increased oil production boosted the share of oil and gas in overall Texas GDP, but the share of employment has remained low, reaching a high of only 2.5 percent.

Q. What’s the most exciting oil and gas industry change you have seen in your 30-plus-year career?

The most exciting development has been the shale revolution. U.S. crude oil imports topped 10 million barrels per day in 2004, almost twice what we produced. U.S. crude production had been declining since the peak in 1970, and there was much discussion about whether we were running out of oil. Horizontal drilling and hydraulic fracturing have been amazing technological developments that completely changed the oil and gas picture in the U.S. and the dynamics of the global oil market.

Now, the U.S. is producing nearly 11 million barrels per day, higher than our record in 1970. Since 2009, we have increased production by more than 5 million barrels per day. This is basically adding another Iraq into the global oil market.

Technology has helped with energy research as well. The availability of data and the ease of procuring energy data have

been an immense benefit to research in energy. This is true for all research fields of course, not just energy. Improved econometric techniques are also very useful in parsing out the impacts of changes in energy markets and prices.

Q. How do you see energy markets in the future?

I think we will see increased use of renewables in the future. How close is that future, though? Renewables, such as wind and solar, are used in electricity generation but are still a small part of our energy mix. Currently, renewables account for 13 percent of U.S. energy production. There are a couple of factors hindering renewables in the short run. One is the problem of intermittency. For renewables to gain wider market share, we need better storage technology. Battery technology has been improving, but we’re not there yet.

Another factor: Seventy-one percent of oil is used in transportation, according to the U.S. Energy Information Administration. Electric vehicles have been making inroads, but again, battery technology and infrastructure are limiting factors in the short run. However, France and the U.K. have said that they will ban gasoline and diesel cars by 2040, and India has also declared that all new cars after 2030 will be nonfossil fuel. Such policies may hasten the inroads that electric cars will make.

Q. Which one of your many accomplishments stands out?

My proudest accomplishment was becoming the president of the International Association for Energy Econom-

ics (IAEE) in 2011. The association was founded after the 1970s energy crisis. It is a worldwide organization that has affiliations and members in more than 100 countries. I’ve been going to IAEE meetings since 1986 and have probably met all the prominent energy economists in the world at the conferences. I learned a lot being a part of the IAEE and made lifelong friends from all over the world.

Q. You are a prominent female economist in a male-dominated field. What advice do you give?

Being a woman in the energy field may have initially been somewhat of a hindrance. The profession has slowly changed though. When I first started going to energy conferences in the mid-’80s, there were only a handful of women in the profession. We all knew each other quite well.

There are many more women now, and many young women are entering the profession because it is such an interesting area of study. But it is still a relatively smaller number than the men.

My advice to young economists would be to do your research and get published in peer-reviewed journals. That is what gets you the respect in the profession. Go to conferences to present your work; get to know people in your area. That is how your work gets noticed. Ask the interesting questions. And work on issues that have broad relevance for industry and academia.