THE MACRO BULLETIN
Macroeconomic research from the FEDERAL RESERVE BANK *of* KANSAS CITY
JULY 20, 2015

The Effect of the U.S. Energy Boom on the Trade Deficit

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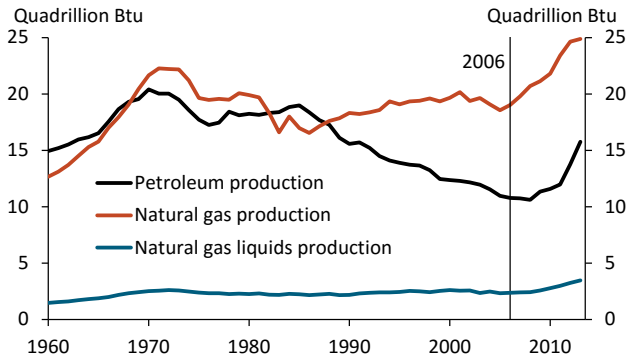
Hydraulic fracturing and horizontal drilling have contributed to a significant decline in net-energy imports since 2005. This trend could change, however, if the recent decline in oil prices spurs a decline in energy production. We separate trade's energy and non-energy components to forecast the trade deficit and predict that real net-energy imports will decline 3.5 percent in 2015, much slower than the average pace of 9.9 percent per year in the four years leading up to 2014.

Over the last two decades, the combination of two new technologies—hydraulic fracturing, or "fracking," and horizontal drilling—led to a significant structural change in energy production. As Chart 1 shows, after declining or holding steady from 1975 to 2005, energy production—crude oil, natural gas, and natural gas liquids—increased starting in 2006.

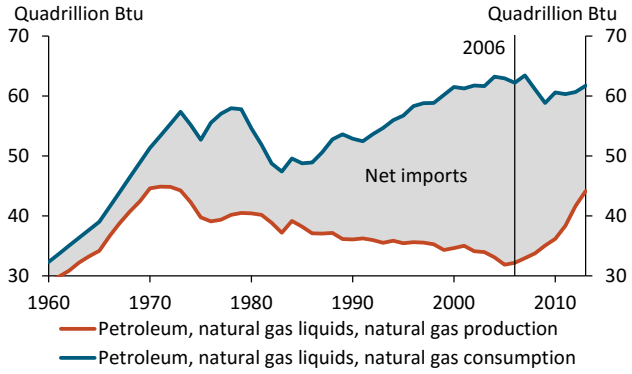
Chart 1: U.S. energy production



Sources: Energy Information Administration and Haver Analytics.

Net-energy imports have dropped significantly since 2006, mainly driven by rising energy production. Chart 2 shows that from the early 1980s through 2005, consumption of crude oil, natural gas liquids, and natural gas grew while production declined, leading to a significant increase in net imports. However, this trend reversed after 2006: consumption was relatively flat while production increased, leading to a significant decline in net imports. Future policy changes could bolster these effects. The Energy Policy and Conservation Act of 1975 (EPCA) banned the export of most crude oil in an attempt to insulate the United States from worldwide price shocks. If this ban is lifted, however, then the recent changes in energy technology may have even larger effects on energy exports and thus overall exports. As a result, distinguishing energy and non-energy trade components may become more relevant for forecasting exports in the longer term.

Chart 2: Production, consumption, and net imports of petroleum and natural gas



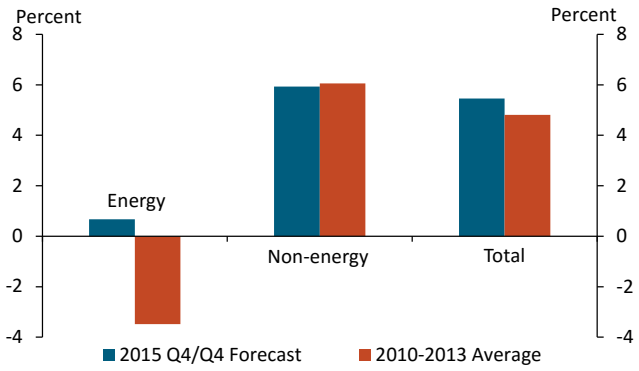
Sources: Energy Information Administration and Haver Analytics.

We use a vector autoregression (VAR) model to estimate the relationship between energy production and energy trade and provide forecasts of the energy and non-energy components of imports and exports. In this model, energy imports and exports both depend on domestic production, the relative price of energy, and energy consumption. Non-energy imports and exports depend on the real exchange rate and a measure of overall demand. As structural changes caused energy production to increase dramatically starting in 2006, we estimate equations for energy imports and exports using data

beginning in the first quarter of 2006 and going through the first quarter of 2015[1]. To provide near-term forecasts, we also incorporate the current low oil prices and recent sharp declines in rig counts into the model, both of which have led forecasters to expect a decline in oil production in 2015. In particular, our forecasts assume energy production will decline by 4 percent in 2015 based on estimates from Melek. In addition, our forecasts assume a constant foreign exchange rate from the second to the fourth quarter of 2015 and foreign growth consistent with the International Monetary Fund's forecast.

Chart 3 shows that given these historical relationships and recent trends, the future paths of energy import and export growth will be very different from those of non-energy import and export growth. Our forecast projects energy imports will slightly increase in 2015 due to the expected drop in energy production. This is in contrast to their average annual decline of 3.5 percent from 2010 to 2013.[2] However, our forcast projects non-energy imports will grow 5.9 percent in 2015, close to their average growth in the 2010-13 period. Given the higher growth in energy imports, our forecast projects growth in total real U.S. imports to reach 5.5 percent in 2015, above the average pace of 4.8 percent from 2010 to 2013.

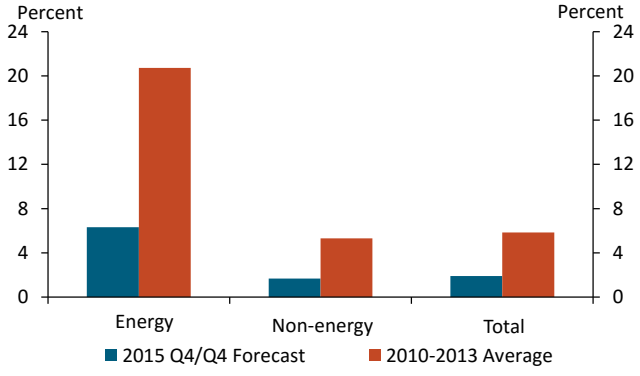
Chart 3: Imports forecast



Sources: Bureau of Economic Analysis, Bureau of Labor Statistics, Census Bureau, Energy Information Administration, Federal Reserve Board, Haver Analytics, and authors' calculations.

Our exports forecast suggests energy exports will increase 6.3 percent in 2015. This forecast is significantly lower than the average pace of 20.7 percent from 2010 to 2013, reflecting the large effect of an expected decline in energy production on energy exports (Chart 4). Non-energy exports are expected to increase 1.7 percent in 2015. This forecast is much lower than the 2010-13 pace of 5.3 percent, but consistent with the large appreciation of the dollar since last summer and the gradual pickup in foreign demand. Combining forecasts for energy and non-energy exports, our forecast projects the total growth in exports in 2015 will be 1.9 percent, significantly below the 2010-13 average pace of 5.8 percent.

Chart 4: Exports forecast

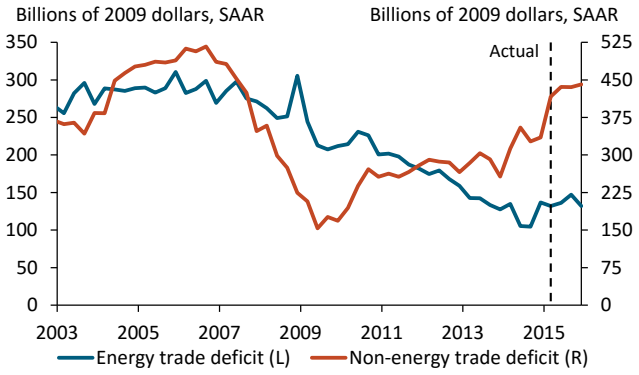


Sources: Bureau of Economic Analysis, Bureau of Labor Statistics, Census Bureau, Energy Information Administration, Federal Reserve Board, Haver Analytics, and authors' calculations.

The above forecasts imply a small decline in the energy trade deficit and a continued widening in the aggregate trade deficit in 2015. The U.S. real trade deficit, the difference between real imports and real exports, was $471 billion in the fourth quarter of 2014. Of that total, the real energy deficit made up about 29 percent, or

$137 billion (Chart 5). This analysis suggests the real energy deficit will decrease slightly to $132 billion by the end of 2015, halting their significant downward trend over the past few years. Taking energy and non-energy trade deficits together, we expect the overall trade deficit to increase to $573 billion by the end of 2015, about 21 percent higher than its level at the end of 2014.

Chart 5: Trade deficits forecast



Sources: Bureau of Economic Analysis, Bureau of Labor Statistics, Census Bureau, Energy Information Administration, Federal Reserve Board, Haver Analytics, and authors' calculations.

[1] For data not available in the first quarter of 2015, we obtain estimates using a univariate autoregression with four lags.
[2] The comparison period does not include 2014, because data in 2014 are very volatile.

References

Melek, Nida Çakır. 2015. "What Could Lower Prices Mean for U.S. Oil Production?" Federal Reserve Bank of Kansas City, *The Macro Bulletin,* April.

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