

Box 1.2.1: Future prices in forecast assumptions

Large swings in commodity prices can have important effects on macroeconomic developments. The two oil price shocks in the 70s were the main cause of the stagflationary patterns observed in Europe and in the US. Similarly, the post-pandemic surge in oil prices – especially in Europe and Asia – and natural gas prices, coupled with sharp increases in the prices of agricultural commodities, are largely responsible for the pick-up in inflation and slowdown in economic momentum. Unlike the price shocks in the 70s, where oil was a broad indicator of energy developments, the changes in the energy mix in the past decades have given a more prominent role to natural gas (especially as it often spills over to electricity market). Predicting developments in energy commodity prices is therefore key to economic forecasts.

This box discusses the merits of relying on futures prices for forecasting commodity prices, with focus on the role of the European gas market.

Since many commodities are traded on both spot and futures markets, forecasters generally rely on their prices in future contracts to anchor projections over the forecast horizon. The idea is that irrespective of whether future contracts are used for hedging against a pre-existing risk or for speculating on price movements, the future price reflects expectations of the interplay of future demand and supply (plus a risk premium commensurate to agents' hedging requirements vis-a-vis the uncertainty of future spot prices). This holds in particular for non-storable commodities, but also for storable commodities for which inventories are relatively small compared to the volume of consumption, as in the case of oil. ⁽¹⁾

Whereas forecasters have long relied on oil futures for forecasting, the poor record of oil futures markets in anticipating the surge of prices in 2003–08 and concerns of heightened volatility on future markets triggered a new critical assessment of the practice. In a 2008 speech, Fed Chairman Bernanke cautioned against ignoring “the substantial amounts of information about supply and demand conditions that are aggregated by futures markets.” Chairman Bernanke however conceded that forecasts of commodity prices obtained from futures markets should be considered as highly uncertain. ⁽²⁾ This – especially at times of heightened volatility and large structural shifts in energy markets – justifies the recourse to scenario analysis largely built around the evolution of future prices.

Much of the recent research has confirmed the key role of futures, highlighting that (1) futures markets convey substantial information about expected supply and demand conditions; (2) potential deviations of spot prices from the path of futures are due to a changing assessment of demand and supply circumstances, rather than a systemic failure of the futures price discovery role; and (3) predictions based on futures markets are generally superior to alternatives. ⁽³⁾ Recent research however has cautioned that financial speculation can hamper the price discovery function of futures. ⁽⁴⁾

Consistent with these findings, the European Commission, in its European Economic Forecast, sets oil price assumptions according to oil price futures. The IMF, the ECB and many central banks, including the Federal Reserve System and the Bank of Japan, follow the same approach. ⁽⁵⁾

⁽¹⁾ In the case of storable commodities with sufficiently large inventories future prices generally correspond to spot price plus carrying costs. Emmons, W. R., and T. J. Yeager (2002). “An imperfect crystal ball,” Federal Reserve Bank of St. Louis *The Regional Economist*, Issue Jan., pp. 10-11.

⁽²⁾ Bernanke, B. (2008). “Outstanding Issues in the Analysis of Inflation.” Speech at the Federal Reserve Bank of Boston’s 53rd Annual Economic Conference. Chatham, Massachusetts, June 9.

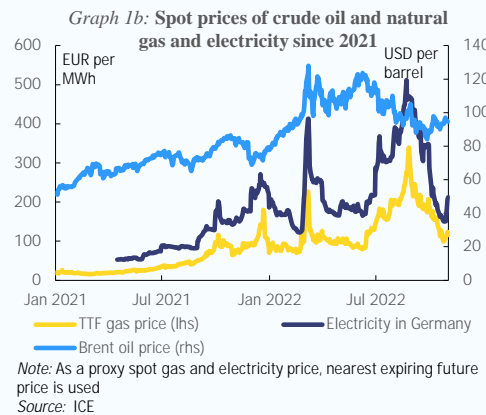
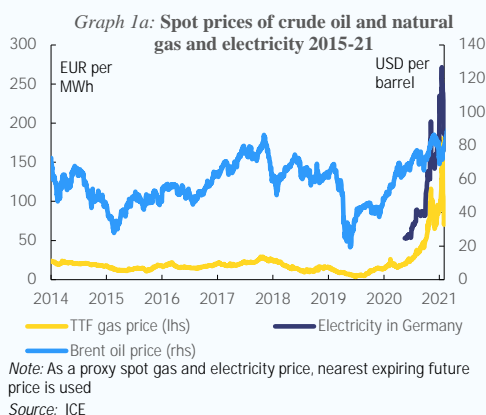
⁽³⁾ See, amongst others, Roache, S. K., and D. A. Reichsfeld, (2011). “Do Commodity Futures Help Forecast Spot Prices?” IMF Working Paper No. 11/254; Reeve, T. A., and R. J. Vigfusson (2011). “Evaluating the forecasting performance of commodity futures prices.” Board of Governors of the Federal Reserve System International Finance Discussion Papers No. 1025, August; Polanco-Martínez, J. M., and L. M. Abadie (2016). “Analyzing Crude Oil Spot Price Dynamics versus Long Term Future Prices: A Wavelet Analysis Approach”, *Energies*, 9 (12), pp. 1-19, December 20.

⁽⁴⁾ See, for example, Beckmann, J., A. Belke, and R. Czudaj (2014). “Does global liquidity drive commodity prices?” *Journal of Banking & Finance*, Vol. 48, Issue C, pp. 224-234.

⁽⁵⁾ Chahad, M., A.C. Hofmann-Drahonsky, B. Meunier, A. Page, and M. Tirpák (2022). “What explains recent errors in the inflation projections of Eurosystem and ECB staff?” ECB *Economic Bulletin*, Issue 3/2022.

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Box (continued)



Until recently, in Europe, most gas tended to be supplied on the basis of long-term contracts indexed to oil prices.⁽⁶⁾ Close co-movement of oil and gas meant that a single assumption for oil was sufficient to project the evolution of most energy commodities.

Important changes in the production and distribution of gas, coupled with reforms in market structures, have led to a decoupling of gas prices from oil (see Graph 1a).⁽⁷⁾ In parallel, and partly owing to the superior underlying infrastructure and extensive interconnectedness with large part of North West Europe, the Dutch Title Transfer Facility (TTF) emerged over the past decade as Europe’s main gas trading hub, progressively replacing the British National Balancing Point (BNP) as reference benchmark for Europe. TTF prices are currently used as indexes in price formulas for a wide range of gas contracts, from import long-term contracts to retail contracts.

A second important structural change relates to the electricity market. Following decades of relative stability, the electricity market has been profoundly affected by the phasing out of nuclear- and coal-fired electricity generator plants and the increasing share of cleaner intermittent renewable sources. Because of these developments, gas-fired electricity producers (which can easily adjust production to fill the gap between demand and supply) have become price-setters in the wholesale electricity markets. Consequently, movements in gas prices now spill over to electricity prices.

The decoupling of the price of gas from the price of oil has accelerated on the back of tight global supply and rising demand (especially from Asia), and has been recently exacerbated by Russia’s unprovoked aggression against Ukraine (see and Graph 1b). Structural trends and recent developments increase the importance of anchoring the economic forecast to an expected evolution of gas prices. As of the Autumn 2021 Forecast, Commission services have broadened the assumptions about the evolution of energy commodity prices to gas using – just as in the case of oil – future markets (and specifically TTF futures for gas) to anchor the projected trajectory of future prices over the forecast horizon. The approach was justified by recent evidence on the predictive power of futures in gas markets.⁽⁸⁾

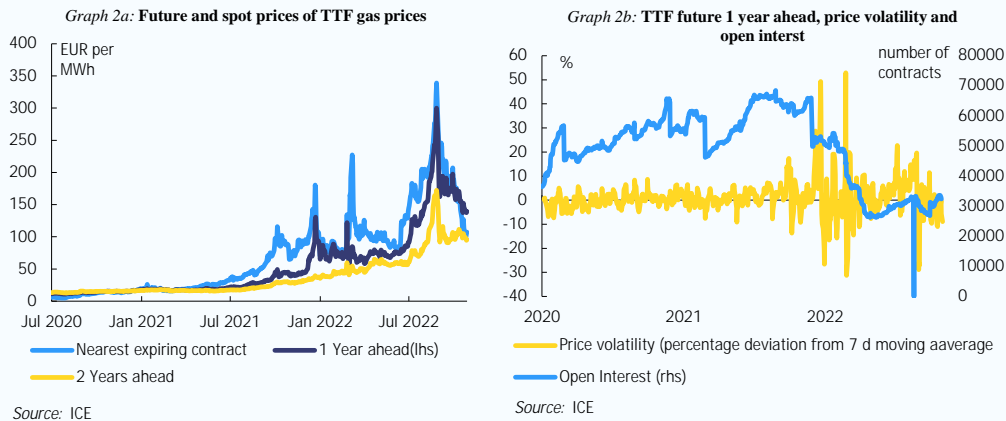
Since mid-2021, nevertheless, gas futures have failed to correctly anticipate the large increases in the price of gas and electricity, resulting in large inflation forecast errors across private and institutional forecasters (see Graph 2). Doubts about the discovery role of futures have been heightened by the

⁽⁶⁾ Asche, F., A. Oglend, and P. Osmundsen (2017). “Modeling UK Natural Gas Prices when Gas Prices Periodically Decouple from the Oil Price.” *The Energy Journal*, Vol. 38 (2), pp. 131-148; and Zhang, D., and Q. Ji (2018). “Further evidence on the debate of oil-gas price decoupling: A long memory approach”. *Energy Policy*, Vol. 113(C), pp. 68-75.
⁽⁷⁾ European Central Bank (ECB) (2014). “Developments in consumer gas prices in the euro area.” *Monthly Bulletin*, Box 2, October.
⁽⁸⁾ Chinn, M. D., and O. Coibion (2014). “The Predictive Content of Commodity Futures,” John Wiley & Sons, Ltd. *Journal of Futures Markets*, Vol. 34(7), pp. 607-636.

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Box (continued)

extreme volatility and concerns about the role of financial speculation in the gas futures market ⁽⁹⁾ and falling market liquidity (see graph 2a). ⁽¹⁰⁾



These concerns do not appear fully justified. First, data from the US Futures Trading Commission (CFTC) reveals that on aggregate non-commercial traders have not increased their long net positions on the gas market as the spot price of TTF gas surged, showing that financial speculation has not increased. ⁽¹¹⁾ Second, the low liquidity in the TTF future gas market appears to be more the consequence than the cause of the volatility. With rising prices, the initial margin requirements set by ICE Clear Europe, the central counterparty (CCP) for trade in TTF, have surged to cover the increased risks of loss. The rising cost of meeting margin requirements has led many commercial traders to reduce their trading of futures. Notwithstanding these liquidity constraints, evidence of a strong bi-directional causality between spot and future prices suggests that spot and future prices on the TTF market react simultaneously to new information. In other words, the fact that future prices have recently failed to anticipate the trajectory of spot prices reflects unpredictable developments in demand and especially supply conditions in a context of a major structural break of normal demand and supply relations, rather than systematic failures in the price discovery function.

If anything, doubts about the use of the TTF futures as reference for future developments in European gas market relate to emerging bottlenecks in the underlying delivery infrastructure. With the Dutch infrastructure (originally designed in view of large inflows from the East) now operating at or close to maximum capacity, spot TTF prices have surged above those of other hubs, e.g. the UK NBP. Until these bottlenecks have been resolved, the Commission has proposed the development of a complementary benchmark for LNG (liquefied natural gas).

This forecast continues to assume that the EU economy will avoid gas shortages and that spot prices will evolve in line with TTF futures. Ongoing changes in the European gas market could nevertheless lead to different approaches in upcoming forecast rounds.

⁽⁹⁾ Although the TTF futures contracts result in physical delivery, the opportunity to trade the contract multiple times before maturity and to close trading position without taking physical delivery opens the trade to non-commercial traders. Differently from commercial traders, who mainly seek to hedge an underlying exposure to commodity risk, non-commercial agents seek exposure to commodity price fluctuations in an attempt to achieve returns.

⁽¹⁰⁾ Sufficient market liquidity is key to process information into price signal. See Nick, S. (2016). "The Informational Efficiency of European Natural Gas Hubs: Price Formation and Intertemporal Arbitrage." International Association for Energy Economics *The Energy Journal*, Vol. 0(2), pp. 1-30.

⁽¹¹⁾ See Mezzomo L. and Corsini D., (2022). "La crisi energetica in Europa: cause e possibili soluzioni", Focus Commodity, Intesa San Paolo, Direzione Studi e Ricerche, 6 September.