The effects of the oil counter-shock: The best is yet to come!

By Eric Heyer and Paul Hubert

After falling sharply over the past two years, oil prices have been rising once again since the start of the year. While a barrel came in at around 110 dollars in early 2014 and 31 dollars in early 2016, it is now close to 50 dollars.

Will this rise in oil prices put a question mark over the gradual recovery that seems to have begun in France in 2016?

In a recent study, we attempted to answer three questions about the impact of oil prices on French growth: will a change in oil prices have an immediate effect, or is there a time lag between the change and the impact on GDP? Are the effects of rises and falls in oil prices asymmetrical? And do these effects depend on the business cycle? The main results of our study can be summarized as follows:

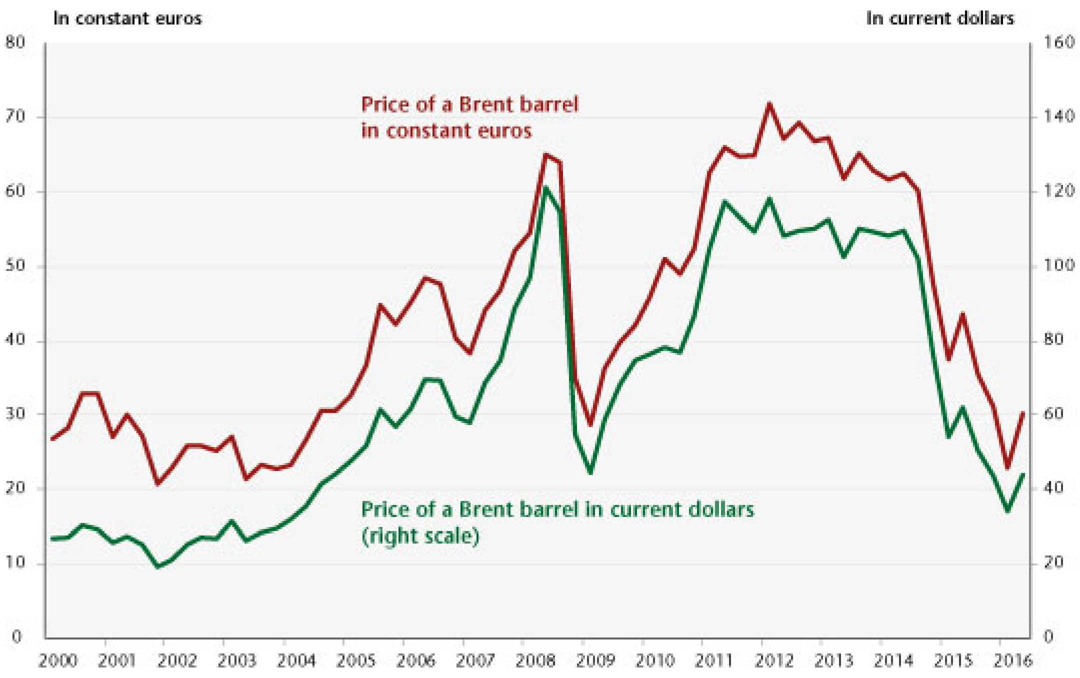
1. There is a time lag in the impact of oil price variations on French GDP. Over the period 1985-2015 the lag was on average about 4 quarters;

1. The impact, whether downward or upward, is significant only for variations in oil prices greater than 1 standard deviation;
2. The asymmetric effect is extremely small: the elasticity of growth to oil prices is the same whether the price rises or falls. Only the speed at which the impact is transmitted differs (3 quarters in the case of a rise, but 4 in the case of a fall);
3. Finally, the impact of oil price changes on economic activity depends on the phase in the business cycle: the

elasticity does not differ significantly from zero in situations of a “crisis” or a “boom”. However, the elasticity is much greater in absolute terms when the economy is growing slowly (an economic slump).

Let us now apply these results to the situation since 2012. Between the first quarter of 2012 and first quarter of 2016, the price of a barrel of Brent crude plummeted from 118 dollars to 34 dollars, a fall of 84 dollars in four years. If we factor in the euro/dollar exchange rate and changes in consumer prices in France, the fall amounts to a 49 euro reduction over the period (Figure 1).

Figure 1. Changes in the price of a barrel of Brent crude

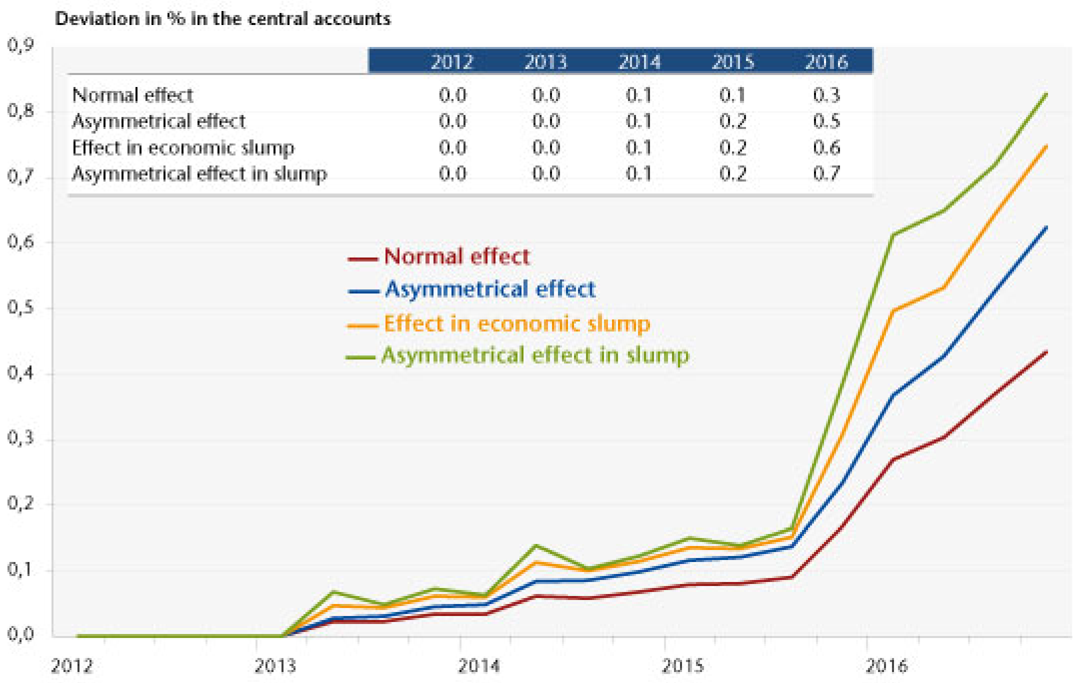


Sources: INSEE, OFCE calculations..

We evaluated the impact of a decline like this on France’s quarterly GDP, taking into account the above-mentioned time lag, asymmetry and phase of the business cycle.

Factoring all this in indicates that the oil counter shock ultimately did not show up much in 2015. As illustrated in Figure 2, the impact should make itself felt from the first quarter of 2016, regardless of the hypotheses adopted. The positive effect of the oil counter-shock is yet to come!

Figure 2. Impact on GDP of the fall in oil prices since 2012



Sources: INSEE, OFCE calculations..

Areva, Flamanville and Fessenheim: key players in France’s nuclear turn

By Sarah Guillou

The recent law on “the energy transition to green growth”, promulgated on 17 August 2015, plans for a fall in nuclear energy’s share of electricity production from 75% to 50% by 2025. It also caps the power of the country’s nuclear plants at 63.2 GW. This limit corresponds to current capacity and implies that any new reactor start-up (Flamanville, for example) must result in the closure of a reactor with equivalent power. The decision to postpone the expected closure of the Fessenheim plant comes under this and is now part of this energy equilibrium. The conditioning of the closure of Fessenheim is provoking discontent among all those who believed in the unconditional pledge of Francois Hollande during his presidential campaign.

This decision is coming in a new context for French nuclear power policy and in an international and technological situation that is leading the French state to abandon the country's "all nuclear" approach. Areva, Flamanville and Fessenheim are key players in this shift.

Act I began with the revelation of Areva's losses. In early 2015, the announcement of a loss of almost 5 billion euros for fiscal year 2014 relegated the company from first class status to a company in difficulty, alongside Alstom, whose energy branch is being sold to General Electric, with completion this autumn. The Areva group had a turnover of slightly more than 8 billion euros in 2014. The group's problems are due to the simultaneous emergence of difficulties in its environment, including market and regulatory trends, technological constraints and changes in the competition (see "Areva, vaincue à la croisée des risques" [Areva: defeated at the crossroads of risk], *Note de l'OFCE*, no. 52, September 2015). With private and public governance having proved incapable of taking timely decisions to deal with these adverse developments, the moment for restructuring has come. Areva now needs 7 billion in financing for the 2015-2017 period (to cover losses and debt maturities, without including any provisions for the TVO site). The proposed agreement with EDF presented in late July concerns Areva NP.

Areva NP is already a joint venture of Areva and EDF that handles the construction of reactors and the assembly of fuel and services for the installed base; it accounts for half of Areva's sales. In late July 2015, it was duly accepted that EDF would increase its share of Areva NP's capital by injecting two billion euros, giving it between 52% and 75% of the capital, depending on the inputs of other investors, along with 400 million for the acquisition of other assets. It was also agreed that the additional costs related to the Finnish Olkiluoto OL3 reactor built by Areva would not be borne by EDF but by the State and Areva. There is still uncertainty about how to handle the risks related to the Flamanville reactor, and EDF is conditioning its commitments on lifting these risks.

Foreign capital could participate in replenishing the capital through the purchase of assets. The most likely candidates are Chinese firms, which are already partners of EDF (CNNC and CGNPC), and Mitsubishi, which has partnered with Areva (see above), alongside France’s Engie (GDF Suez). The French government is prepared to bail out the company for at most 2 billion euros.

The integrated model of Areva is therefore on the rocks. Less than 15 years after its birth, Areva’s industrial coherence is under question. The company has been forced to allow the entry of industry partners into its capital and into its vast range of expertise. Its activity is now concentrated on the fuel cycle (the extraction, enrichment and reprocessing of uranium), with nearly one-third of its workload ensured by its client EDF and by maintenance and decommissioning.

The refocusing strategy, market trends and the preferences incorporated in France’s energy policies are mutually consistent. The nuclear market will be centred on the need to maintain plants in operating condition and on decommissioning. Just under 500 reactors are listed worldwide, so there is a vast market for maintenance and decommissioning. This is in fact the area where Areva has won contracts in recent years.

In Act II, Flamanville and Fessenheim found themselves bound by the new energy transition law, illustrating both the technological difficulties involved as well as the budgetary constraints. The completion of the construction of the Flamanville plant is meeting significant technical hurdles from the Nuclear Safety Authority. Its opening is, for the moment, subject to strong conditions. At the same time, the postponement of its opening means that the expected output of electricity production will have to do without it. The closure of the Fessenheim plant, promised for 2016, must therefore be delayed so as to avoid a transition in terms of electrical power output that will have to be filled in one way or another.

Without the capacity in the short run to replace the missing nuclear KWh by KWh from renewable energy, the replacement will have to be done using coal plants – going against the current targets for reductions in CO2 emissions – or by importing electricity – which would hurt the trade balance and could push up electricity prices. Given the necessity of postponing the closure of Fessenheim, the government will not fail to seize the political opportunity of the shortfall between the announcement of the plant's closure and its actual implementation.

Add to these factors the potential compensation – estimated at 5 billion euros – that EDF will request for the early closure of Fessenheim, and it is quite logical that the government is procrastinating as much as possible before deciding on the closing date.

Even today we still do not know the extent to which the State will recapitalize Areva. The government has clearly indicated that it would minimize the amount as much as possible, but for the most part it seems ready to allow foreign players in. So, concomitantly, the law on the energy transition is requiring a decrease in the share of nuclear power and the State is announcing that it can no longer finance the sector in the way it used to. More generally, the globalization of the industry, the rising cost of technology and safety requirements as well as the shift in the preferences of the average voter towards less nuclear power are all combining to redefine the State's commitment to nuclear energy.

The State is thus being politically and economically compelled to withdraw from its "all-nuclear" approach and to accept the end of everything "made in France". The final decisions that will be taken on Areva's future and on the fate of the plants in Fessenheim (which will undoubtedly close in the short term) and Flamanville (whose opening is compromised but financially necessary) will therefore mark a change in the era of nuclear policy, even if the recent energy transition law is subsequently amended by a new party in power.

Oil: carbon for growth

By Céline Antonin, Bruno Ducoudré, Hervé Péléraux, Christine Rifflart, Aurélien Saussay

This text is based on the special study of the same name [Pétrole : du carbone pour la croissance, *in French*] *that accompanies the OFCE's 2015-2016 Forecast for the euro zone and the rest of the world.*

The 50% fall in the price of Brent between summer 2014 and January 2015 and its continuing low level over the following months is good news for oil-importing economies. In a context of weak growth, this has resulted in a transfer of wealth to the benefit of the net importing countries through the trade balance, which is stimulating growth and fuelling a recovery. Lower oil prices are boosting household purchasing power and driving a rise in consumption and investment in a context where companies' production costs are down. This has stimulated exports, with the additional demand from other oil-importing economies more than offsetting the slowdown seen in the exporting economies.

That said, the fall in oil prices is not neutral for the environment. Indeed, the fall in oil prices is making low-carbon transportation and production systems less attractive and could well hold back the much-needed energy transition and the reduction of greenhouse gas emissions (GHG).

This oil counter-shock will have a favourable impact on growth in the net oil-importing countries only if it is sustained. By 2016, the excess supply in the oil market, which has fuelled by the past development of shale oil production in the United States and OPEC's laissez-faire policy, will taper off. Unconventional oil production in the United States, whose profitability is uncertain at prices of under 60 dollars per barrel, will have to adjust to lower prices, but the tapering off expected from the second half of 2015 will not be sufficient to bring prices down to their pre-shock level. Brent crude prices could stay at about 55 dollars a barrel before beginning towards end 2015 to rise to 65 dollars a year later. Prices should therefore remain below the levels of 2013 and early 2014, and despite the expected upward trend the short-term impact on growth will remain positive.

To measure the impact of this shock on the French economy, we have used two macroeconometric models, *e-mod.fr* and *ThreeMe*, to carry out a series of simulations. These models also allow us to assess the macroeconomic impact, the transfers in activity from one sector to another, and the environmental impact of the increased consumption of hydrocarbons. The results are presented in detail in the special study. It turns out that for the French economy a 20 dollar fall in oil prices leads to additional growth of 0.2 GDP point in the first year and 0.1 point in the second, but this is accompanied by a significant environmental cost. After five years, the price fall would lead to additional GHG emissions of 2.94 MtCO2, or nearly 1% of France's total emissions in 2013. This volume for France represents nearly 4% of Europe's goal of reducing emissions by 20% from 1990 levels.

The simulations using the French *e-mod.fr* model can be extended to the major developed economies (Germany, Italy, Spain, the USA and UK) by adapting it to suit characteristics for the consumption, import and production of oil. With the exception of the United States, the oil counter-shock has a substantial positive impact that is relatively similar for all the countries, with Spain benefitting just a little more because of its higher oil intensity. Ultimately, considering the past and projected changes in oil prices (at constant exchange rates), the additional growth expected on average in the major euro zone countries would be 0.6 GDP point in 2015 and 0.1 point in 2016. In the US, the positive impact would be partially offset by the crisis that is hitting the unconventional oil production business[1]. The impact on GDP would be positive in 2015 (+0.3 point) and negative in 2016 (-0.2 point). While lower oil prices are having a positive impact on global economic growth, this is unfortunately not the case for the environment …

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[1] See the post, The US economy at a standstill in Q1 2015 : the impact of shale oil, by Aurélien Saussay, from 29 April on the OFCE site.

The US economy at a

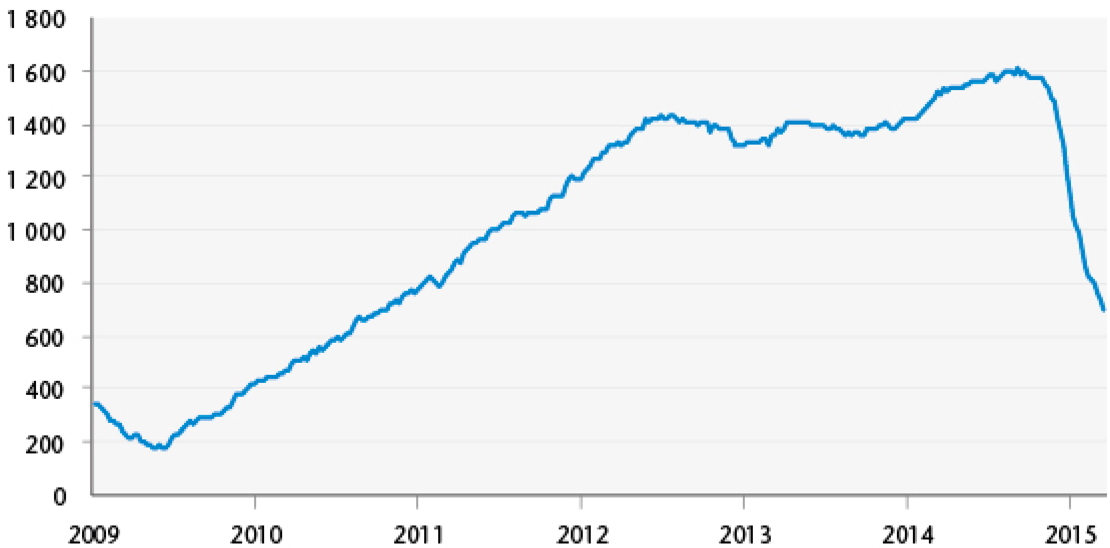
standstill in Q1 2015: the impact of shale oil

By Aurélien Saussay (@aureliensaussay)

The US Bureau of Economic Analysis has just released its estimate of US growth in the first quarter of 2015: at an annual pace of 0.2%, the figure is well below the consensus of the leading American institutes, who had agreed on a forecast of just above 1% – well below the 3% hoped for in early March.

While it is still too early to know the exact reasons for this setback, one factor seems to be emerging: in the United States, the shale oil "revolution" seems to be on the verge of imploding. The sharp fall in crude prices in the second half of 2014 caused a collapse in mining activity: the number of oil rigs operating in the US fell by 56% from November 2014 to April 2015, returning to the level of October 2010 (see chart). The speed of this downturn underscores the fragility of the shale oil boom and its dependence on high oil prices.

Figure. Oil drilling rig count in the continental US



Source : Baker Hughes.

Given the very short lifetime of shale oil wells, *i.e.* less than 2 years, the sharp decline in the pace of drilling should result in an equally rapid decline in production in the coming months: in fact, for the month of May the US Energy Information Agency (US EIA) has forecast that shale oil production will fall for the first time since the start-up of operations in 2010.

This rapid contraction of the shale oil industry could have significant consequences for the US economy. There are two main components to the macroeconomic impact this will have: the business of drilling and completing wells, and the gains in the trade balance from substituting domestic production for imported oil.

In 2013, the hydrocarbons mining industry and mining-related services accounted for 2.1% of the US economy, up from 1.6% four years earlier. At a first order, a decline in the drilling rate could therefore cut US growth by 0.3 GDP point. The Fed’s manufacturing indicator already shows just such a decline: American industrial output is down by 1% on an annual basis in first quarter 2015, a first since the second quarter of 2009. The mining sector seems to be the leading contributor to this decline, with activity falling off by 4% during the quarter.

However, this figure neglects the ripple effect from the sector onto the rest of the economy – which goes beyond the impact simply on upstream industries: for example, in the regions affected, shale oil operations were accompanied by a real estate boom generated by the influx of workers into the shale fields. Texas and North Dakota, for example, which concentrate 90% of the total production of shale oil, contributed over 23% of US growth from 2010 to 2013, whereas they accounted for only 8% of the economy in 2010. The negative impact of the collapse of the oil industry could thus be more important than the size of the oil sector alone might suggest.

The rise in US production of over 4 million barrels per day in

2014 also led to an improvement in the trade balance, contributing an additional 0.7 GDP point to growth. If the reduction in the number of wells is followed by an equivalent decrease in production starting in the second half-year, and oil prices stay at around USD 60, US domestic production would now contribute only about 0.2 GDP point, half a percentage point less than in 2014.

Finally, the rapid exploitation of shale oil deposits was mainly due to the so-called independent producers who specialized in this activity, and who are therefore particularly vulnerable to the volatility in international prices. This is a very capital-intensive activity: the independents made use of bonded debt to finance their operations – for a total of USD 285 billion as of 1 March 2015, including USD 119 billion in high-yield bonds[1]. The impact of the fall in oil prices has been particularly important for this last segment: the share of "junk bonds" rose from 1.6% in March 2014 to 42% in March 2015[2], *i.e.* 50 billion dollars. It should be noted that this increase has resulted mainly from the deterioration of existing bonds, even though new bond issues have also contributed. If this trend continues, it could lead to a crisis in the high-yield segment of the US bond market, which would hurt US corporate financing conditions this year at a time when the Fed wishes to begin to tighten monetary policy.

The implosion of the shale oil industry will test the strength of the recovery in the US: if it turns out to be weaker than expected, the shock of the sharp slowdown in the production of shale oil could be enough to bring the American economy to near stagnation in 2015.

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[1] Yozzo & Carroll, 2015, "The New Energy Crisis: Too Much of

a Good Thing (Debt, That Is)”, *American Bankruptcy Institute Journal.*

[2] Source: Standard & Poor’s.

The promotion of renewable energy innovation: when State intervention and competition go hand in hand

by Lionel Nesta and Francesco Vona[1]

In contrast with the common belief that competition demands no State intervention, innovation policy and competition complement each other. This is the main conclusion of our investigation concerning innovation in the realm of renewable energy (RE)[2], summarized in the OFCE Briefing Paper, n°8, October 6, 2014.

By and large, innovation is the only answer to both sustaining current life standards and overcoming severe environmental concerns. This is especially true in the case of energy, where increasing resource scarcity calls for the rapid development of renewable energy sources, such as biomass, solar and wind.

The issue is: despite this considerable increase, renewable energy can still not compete with fossil fuel, the production of the latter being cheaper and its distribution more efficient. Hence without a long-term perspective, the development of renewable energy cannot take place. Public support, it is well-known, is better equipped than private parties to take such a stance. And to understand which policy design may best spur innovations in renewable energy is a key question.

Public policies aim to spur investments in green capacity and technical change and to reduce the cost of RE generation. The adoption of the Kyoto agreement on climate change mitigation too has created a consensus about certain environmental policies (i.e. emission trading schemes). Over the past 20 years, OECD countries have increasingly supported innovation in RE by diversifying the range of RE policies (see Figure 1 for selected countries).

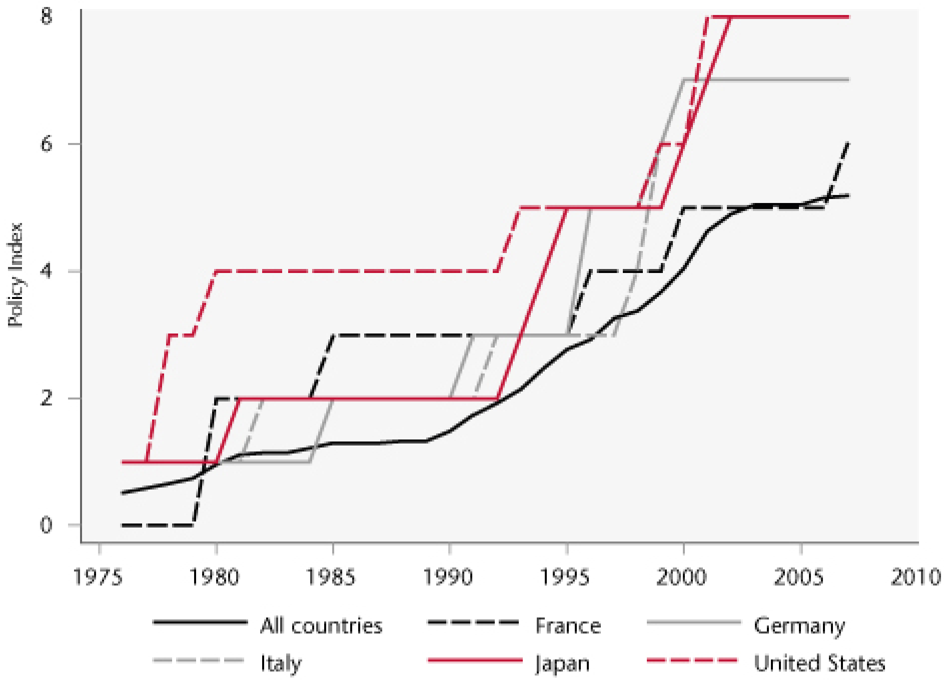
Meanwhile, liberalization has changed the working of energy markets in most OECD countries. It has increased market competition by lowering entry barriers and privatizing energy producers. We view liberalization of the energy market as positive for innovation. Radical innovation is mainly developed by newcomers. And large incumbents have little incentive to fully develop new technologies that would question their past investments in large-scale energy production.

In a context of amplified public support to RE innovation and increased liberalization of energy markets, it is important to test how the interplay between the two affects innovation in renewable energy.

We find that renewable energy policies are more effective in fostering green innovation in liberalized energy markets. We find that such policies are three times as effective in highly deregulated energy markets than in more regulated ones. In general, this complementary effect is one of the largest drivers of innovation, especially for frontier patents. This result is summarized in Figure 2 where we depict the estimated effect of RE policies on innovation as a function of the degree of market deregulation. This effect is positive only for countries with a level of regulation below average, as is the case for Germany and the United States.

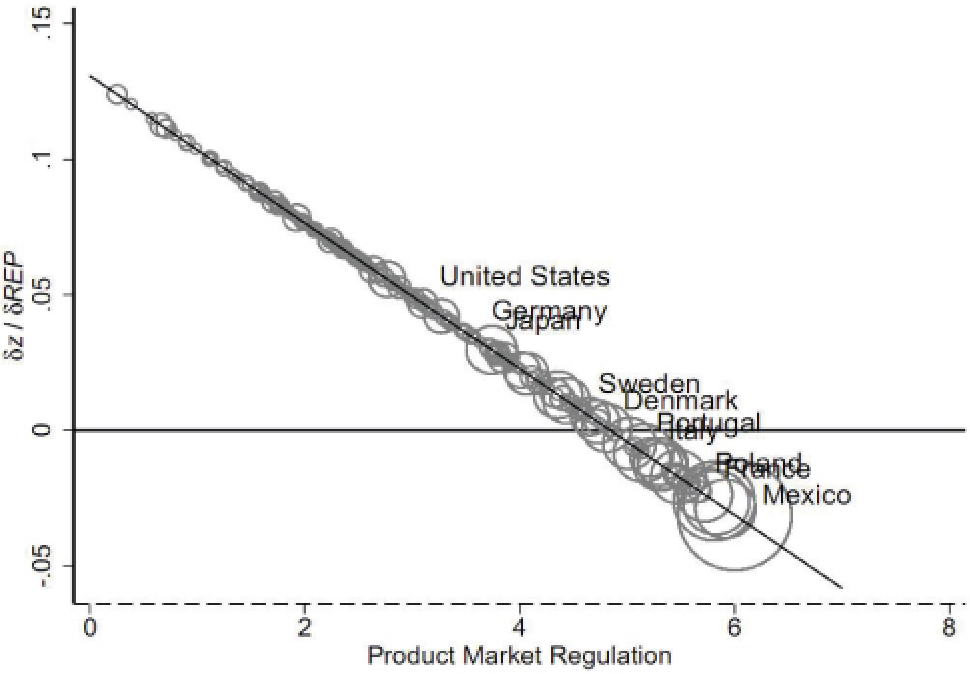
Our conclusion is that the effect of RE policies on innovation is crucially mediated by the degree of competition in the energy market. Therefore, and again, in the energy sector, in contrast with the common belief that competition demands no State intervention, innovation policy and competition complement each other.

Figure 1. Evolution of the Policy Index (REP) for 5 countries and for all countries (1976-2007)



Source: See Nesta *et al.* (2014).

Figure 2. Estimated marginal effect of RE policies on RE innovation



Source: Nesta *et al.* (2014).

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[1] This research project benefited from funding from the European Union Seventh Framework Programme (FP7/2007-2013) under grant agreement n°320278 (RASTANEWS).

[2] See: Nesta, L., Vona, F., Nicolli, F., 2014. “Environmental Policies, Competition and Innovation in Renewable Energy,” *Journal of Environmental Economics and Management*, vol. 67(3), 396-411.

The energy companies: Green is making them see red

By Sarah Guillou and Evens Salies [1]

Does the common energy market unduly favour renewable energy sources ("renewables")? This is the opinion of the nine energy companies that appeared before the European Parliament in September. According to them, meeting the target of having 20% of final energy consumption in the EU come from renewable sources by 2020 would have a negative impact on the electric energy sector, and in particular could harm both the energy companies' financial results and the security of the electricity supply. There is no denying that since the late 1990s the EU has conducted a very active policy promoting RES in this field. The European Commission (EC) has made numerous suggestions to the Member States about ways to meet the 20% target (see Directive 2009/28/EC), including guaranteed purchase prices for electricity produced from renewable energy sources, tax credits, etc. Moreover, in 2011 this set of measures has enabled the EU-27 to hit a level of 22% of electricity generated from renewables, hydroelectricity included (Eurelectric, 2012) [2].

How does this policy hurt the historical producers or threaten the security of the supply? Let's look at a few stylized facts about the consumption and management of electricity production. Average consumption is lower at night ("base" period) than in the daytime when it experiences a peak or two (periods called "spikes"). As electricity is not storable, the least expensive way to meet the base-to-peak transition is to draw on power plants according to their "order of merit". A producer using several sources of energy then calls on them in order from the least flexible (slow start-up, low marginal cost) to the most flexible (fast start-up, high marginal cost). In theory, the stack is/was: nuclear-coal for the base period, nuclear-coal-gas for the peak period [3]. It is during peak demand, when the wholesale price can soar, that producers earn the most money. The production of RES plants is in turn contingent on the vagaries of the weather ("intermittent"): these plants produce only when the associated primary resource (wind, sun, etc.) is sufficient; they are then prioritized for meeting electricity consumption.

The integration of RES into the generation fleet changes the merit order. The stack above becomes wind-nuclear-coal for the base, and wind-nuclear-coal-gas at peak, with wind substituting for some uranium, coal and gas. Given that for RES plants the marginal cost of production is close to zero, their integration in the energy mix, however minimal, reduces the average price on the wholesale markets. As a result, with the integration of RES, fossil fuel plants are less well paid. As for the RES plants, they always enjoy a guaranteed purchase price (in France, 8.2 c€/kWh for wind and between 8 and 32 c€/kWh for solar, etc.) [4]. The loss in earnings is greatest during periods of peak demand. Producers have less incentive to invest in the construction of fossil fuel power plants, whose output is nevertheless needed during these periods. Hence the risk to the security of supply: with the gap between available capacity and peak demand potentially reduced, there is a greater risk that the real gap between output and consumption becomes negative.

One possible solution is the creation of a “market for capacity”. In this market, making the output capacity of a power plant available well in advance would be remunerated, even if there is no actual output. The nine energy companies considered this kind of market as interesting, insofar as they are equipped with gas power plants and / or are sellers of gas, which is what is demanded in peak periods. In France, the NOME Law of 2010 provides for the establishment of such a market at the end of 2015.

It is also worth noting that since a substantial share of fossil fuel plants are not at the end of their physical life, the integration of RES is adding capacity to a European market for electricity that is already characterized by overcapacity. This is now being exacerbated by the economic crisis, which is hitting energy demand. This mainly concerns gas plants that already face stiff competition from coal-fired plants, which have become more profitable since the import of surplus US coal, which has been supplanted by shale gas. The excess supply is, however, helping to contain electricity prices.

In the end, the hearing involving the nine energy providers in the European Parliament reveals two major difficulties facing any energy transition policy. The first is the cost of adjusting to the new energy mix. The energy companies are, like these nine, complaining (rightly) that this cost is jeopardizing their profitability and that in order to cope some of them will be forced to close or even dismantle production sites (Eon in Germany). The consumers, for their part, are financing among other things the obligation to buy electricity – in France, through the contribution to the public electricity service (700 million euros in 2010). The cost of adjusting is inevitable and even necessary to the adjustment: it is because the providers have to bear an additional cost that they will change their energy portfolio. The second problem comes down to a single question: how can support for RES be reconciled with a secure supply? While energy policy is contributing to a genuine improvement in air quality, it still seems ineffective in managing the security of supply, which is nevertheless a public good.

The EC is moving toward cooperative solutions. As in the case of the coordinated development of the interconnection of the national transport networks, led by the network managers, it is considering the feasibility of a common market for the exchange of electricity generation capacity. The EC would also like the Member states to coordinate the setting of guaranteed purchase prices. These rates could in practice create a windfall, especially for equipment makers (see Guillou, S., 2013, Le crépuscule de l'industrie solaire, idole des gouvernements, Note de l'OFCE No. 32) [Guillou, S., 2013, "The twilight of the solar industry, the darling of governments", OFCE *Note* 32]. What remains is to find ways to facilitate the coordinated management of the security of the EU's electricity supply, while making room for RES. The hearing of the energy providers in the European Parliament should lead to a more general consideration of the security of supplies in the EU with respect to all sources of energy.

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[1] We would like to thank Dominique Finon, Céline Hiroux and Sandrine Selosse. Any error is, however, our own responsibility.

[2] The figure of 20% covers a number of sectors, beyond just the electrical energy sector.

[3] This principle was especially true before the liberalization of the wholesale markets, at a time when a vertically integrated producer decided which power plants to start to meet national demand.

[4] Guaranteed purchase prices were introduced so that the technology for producing electricity from renewable energy sources, which was not yet mature, was not put at a disadvantage.

Solar power is cooling Sino-European relations

By Sarah Guillou

In early July 2013, yet another company in the solar industry, Conergy, declared bankruptcy. The departure of this German company, established in 1998, marks the end of a cycle for the solar industry. This bankruptcy adds to a series of closures and liquidations across every country that have highlighted the rising trade tension over solar panels between the United States and Europe on the one hand and China on the other (see *OFCE Note 32*: "The twilight of the solar industry, the darling of governments", from 6 September 2013). As this tension peaked, in May, the European Commission decided to threaten China with a customs duty of over 45%. A trade war has thus concluded a decade of government involvement, as if this were a matter of saving the public money invested. But what it signifies most is the industrial failure of a non-cooperative global energy policy.

A promising, but chaotic, industrial start

Government worship of solar power, which took off in the early 2000s on both sides of the Atlantic, but also in the emerging economies (and especially China), has undoubtedly propelled solar energy to the forefront of renewable energies, but it has also fueled a number of market imbalances and serious industrial turmoil. With the price of oil rising constantly from 2000 to 2010, the need to accelerate the energy transition along with the commitments of the Kyoto Protocol led governments to support the production of renewable energy, with solar energy being the great beneficiary. The global industry experienced a tremendous boom, with growth of more than 600% from 2004 to 2011.

Public support, together with private investment, sparked massive market entries that destabilized the price of the main resource, silicon, the amount of which could not adjust as quickly. Fluctuations in the price of silicon due to imbalances in the market for photovoltaic panels created great instability in its supply, which was exacerbated by technological uncertainties facing companies trying to innovate in the field (such as the American firm, Solyndra, which finally filed for bankruptcy in 2013).

The trade war for a star

The intensification of Chinese domination of the industry has in turn affected the competitive uncertainty. China is now the world's largest market, and the involvement of the Chinese government in the industry's development is unparalleled. Today ranked third in terms of installed capacity (after Germany and Italy), China is also the world's largest producer of solar panels. It now accounts for half of the world's output of panels, whereas it produced only 6% in 2005. Chinese producers have received massive support from central and local government, which has also helped to saturate the Chinese market.

In addition to this public support, China also enjoys a distinct advantage in labour costs, which makes the business of manufacturing solar panels very competitive – the more technologically-intensive steps are upstream in the industry, at the level of the crystallization and slicing of the silicon. In addition to this competitive advantage, Chinese producers have also been accused of dumping, *i.e.* selling below the cost of production. Their competitiveness is thus unrivalled … but increasingly under challenge. In October 2012, the United States decided to impose tariffs on imports of Chinese cells and modules, with anti-dumping duties varying from 18.3% to 250% (for new entrants), depending on the company.

Europe, which imports many more photovoltaic components from China than does the United States, initially opted for the approach of imposing anti-dumping duties, and launched an investigation in September 2012, triggered by a complaint from EU ProSun – a trade association of 25 European manufacturers of solar modules – on imports of panels and modules from China. In June 2013, the Commission finally decided to impose a customs duty of 11.2% on solar panels, while threatening to push this up to 47% if China does not change its position on pricing by August 6th.

The Empire counter-attacks

The counter-attack was not long in coming: in July 2013, China decided to apply anti-dumping duties on imports of silicon from the United States and South Korea. A serious threat is also hanging over the head of Europe's firms, as China is one of the largest markets for the continent's silicon exporters (870 million dollars in 2011).

This trade war essentially reflects a defensive position taken by China's industrial rivals in the face of a support policy that they consider disproportionate and unfair, during a period when China has been nibbling away at the industrial jobs of its competitors for ten years. But one could question the industrial logic underlying this trade policy.

First, this policy contradicts previous government policies promoting solar energy. The trade-off between climate change goals (developing low-cost energy transition tools) and the profitability and sustainability of the industry seems to have been decided in favour of the latter. Second, while this now provides producers direct support, it could handicap installers, engineering firms involved in pre-installation work, and manufacturers of panels using Chinese components. Finally, this is leading to serious exposure to potentially costly trade retaliation, which could mean exporters of poly-crystalline silicon or machinery used in the solar industry, or other industries such as wine or luxury cars.

Out of fear of a probable lack of approval by a majority of EU members or in order to "slay other dragons" more freely (the coming telecoms conflict), the agreement reached in late July by Commissioner Karel De Gucht and approved by the European Commission on August 2nd should not lead to trade retaliation nor disturb market supply too much. It commits nearly 90 Chinese producers not to sell below 56 cents per watt of power. This price is a compromise between what is considered consistent with the cost of Chinese production and the current average price on the market on the one hand and what is acceptable to European competitors on the other.

Finally, over the decade from 2002 to 2012 the solar photovoltaic industry has undeniably become global and highly competitive, despite clear-cut government interventionism. In reality, even the governments competed. Now they are settling their disputes by playing with international trade rules. Costly state support has propelled the growth of the sector beyond all expectations: by creating excess supply, the price of solar panels dropped sharply and accelerated the incredible boom in solar power. In 2013, solar power represented more than 2% of the electricity consumed in the European Union. This breakthrough by solar energy was accompanied by numerous entries and exits from the market, without so far giving rise to a significant business concentration. The choice of a public pull-back in favour of trade policy represents a new page in the history of this industry, which is no longer being driven so much by energy policy or even by industrial policy. There is obviously no dusk without a future dawn. But tomorrow's dawn will certainly see the rise of a different "solar". Europe's future in the manufacture of solar panels will involve technological innovation aimed not so much at reducing costs as at improving performance.

Tales from EDF

By Evens Salies[a]

The challenge facing policy-making on the reduction of greenhouse gas emissions is not just environmental. It is also necessary to stimulate innovation, a factor in economic growth. Measures to improve energy efficiency [1] demand high levels of investment to transform the electricity network into a smart grid. To this end, EU Member States have until 2020 to replace the meters of at least 80% of their customers in the residential and commercial sectors with "smarter" meters. In France, these two sectors account for 99% of the sites connected to the low-voltage grid (< 36 kVA), or about 43% of electricity consumption and nearly 25% of greenhouse gas emissions (without taking into account emissions from the production of the electrical power that supplies these sites).

These new meters have features which, as has been shown by research, lead to lower energy consumption. The remote reading at 10 minute intervals of data on consumption, which is transmitted in real time to a remote display (a computer screen, etc.), immediately shows the savings in electricity, which, with two surveys per year, was previously impossible. High-frequency remote reading also makes it possible to expand the range of vendor contracts to include rates that are better suited to customers' actual consumption profiles. The "pilot" flying the transmission network can better optimize the balance between demand and a supply system that has fragmented due to the growing number of small independent producers. For distributors [2], remote reading solves the problem of gaining access to meters [3].

These features are supposed to create the conditions for the emergence of a market for demand-side management (DSM) that is complementary to the supply market. This market would give non-traditional suppliers an opportunity to differentiate themselves further by offering services that are tailored to the needs of the DSM customer [4]. This could lead to significant gains in innovation if other companies that specialize in information and communication technology also develop software applications that are adapted to the use of the smart meters. However, in France, the policy on the roll-out of smart meters does not seem to be facilitating greater competition. Innovation could stop at the meter due to a decision by the French Regulatory Commission (CRE) which states that:

“The features of advanced metering systems must strictly meet the missions of the electricity [distributors] … Thus the additional features requested by some stakeholders [essentially suppliers] which are subject to competition (basically remote displays) are not accepted.”

A reading of this paragraph would seem to indicate that the suppliers are not willing to bear the cost of developing these features. However, according to Article 4 of this decision, which specifies the list of features for distributors, none of them seems to have been left exclusively to the competitive sector. In practice, households with a computer can check their consumption data without going through their provider or a third party.

It is worth considering the costs and benefits of such an approach, which *a priori* would seem to amount to the monopolization of the DSM market by the distributors.

This approach will make it possible to quickly reach the goal of 80%, since the CRE has opted for a public DSM service: the distributors, who have public service obligations, will roll out the smart meters. The “Linky” meter alone, from the dominant electricity distributor, the ERDF, will be installed on 35 million low-voltage sites, covering 95% of the national distribution network [5]. There is thus little risk of under-investment in the demand-response capacity that electricity suppliers will soon have. In fact, as the suppliers do not have to bear the costs of the manufacture and deployment of the meters, they can quickly invest in the development of these capabilities. In addition, the equalization of subcontracting costs for the manufacturing of the meters and their installation throughout the French distribution network will make for considerable economies of scale. Finally, the low rate of penetration of meters in countries that have opted for a decentralized approach (the cost of the meter and services are then borne partly by the households concerned) argues in favour of the French model. This model is more practical since it removes most of the barriers to adoption.

Despite this, the degree of concentration in the business of the distribution and supply of electricity to households raises questions: ERDF is affiliated with EDF and has a virtual monopoly on the supply of electricity to households. In terms of innovations in DSM services, it would seem that EDF has little reason to go beyond its subsidiary's Linky project – first, because of the costs already incurred by the Group (at least five billion euros), and second, because the quality of the default basic information mechanism in Linky will be sufficient to lead to a cost for migrating to DSM services offered by competitors. [6] Alternative suppliers will of course be able to introduce innovative tariffs. But so will EDF. One way to overcome this problem would be to set up a Linky platform so that other companies' applications could interact with its operating system. With the agreement of the household and possibly a charge for access to the data, the business would of course be regulated, but entry would be free. This would stimulate innovation in DSM services, but would not increase competition since these companies would not be electricity suppliers. Would the consumer have a lot to lose? This would obviously depend on the amount of the reduction in their bills. Given that the price of electricity is likely to rise by 30% by 2017 (including inflation), we are worried that consumers' efforts to optimize their consumption will not be rewarded. The net gain in the medium term could be negative.

Finally, we can ask ourselves whether with Linky the EDF group is not trying to reinforce its position as the dominant company in the supply of electricity, a position that has grown weaker since the introduction of competition. With DSM service installed by default on 95% of the country's low-voltage sites, Linky will become an element in the network infrastructure that all DSM service providers will have to use. From the point of view of the rules on competition, one must then ask whether ERDF and its partners have properly communicated information about the Linky operating system, without any favouritism being shown to the EDF Group and its subsidiaries (Edelia, NetSeenergy). The story tellers would like to tell us a beautiful tale about encouraging innovation in energy and the digital economy in order to deal with the ecological transition. Knowing that the current CEO of the company in charge of the architecture of the Linky information system, Atos, was Minister of the Economy and Finance just prior to the launch of the Linky project in 2007, there seems to be room for doubt ….

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[1] "Energy efficiency improvement" and "energy savings" are used interchangeably in this post. For precise definitions, see Article 2 of Directive 2012/27/EU of the European Parliament and of the Council.

[2] The distributors manage low and medium-voltage lines. ERDF has the largest network. The networks and meters are licensed equipment, which are the property of the local public authorities.

[3] This would nevertheless involve, for example for ERDF, the elimination of 5000 jobs (compared with 5900 retirements, see Senate Report no. 667, 2012, Vol. II, p. 294).

[4] In accordance with the NOME law of 2010, suppliers and other operators must be able to make ad hoc reductions in the consumption of electricity for certain customers (temporarily cut the supply to an electric boiler, etc.), which is called demand-response load-shedding.

[5] In areas where the ERDF is not a supplier, other experiments exist, such as that of the distributor SRD in Vienna, which has installed its smart meter, i-Ouate, on 130,000 sites.

[6] See the document by the DGEC, 2013, the Working group on smart electricity meters (GTCEC) – Coordination document, February [in French].

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Valuing energy savings fairly

By Evens Salies **[1]**

Following the first meeting of the *Commission mixte paritaire* (a joint commission of the two houses of the French Parliament) on the proposed legislation to "make the transition to a sound energy system", it is important to examine the reasons that led the Senate to adopt a motion on 30 October 2012 to dismiss this bill. This rejection is based on errors of judgment that reflect the difficulty of defining a residential energy pricing that is efficient and fair in light of the government's objectives to control energy demand. It also seems appropriate to seek clarification of whether the proportional pricing in force needs to be corrected in order to reward energy savings.

The opposition of the parliamentarians focuses on the following point: the bonus-malus system breaches the principle of equal treatment of citizens regarding access to energy.[2] This argument is reminiscent of the annulment by the Constitutional Council in 2009 of the carbon tax.[3] It is nevertheless surprising, since the principle of equal treatment is not fully respected by the current system of tariffs. In practice, each household pays two local taxes on their final consumption of electricity. However, the taxes differ from one town or department to another, for reasons that are difficult to explain. The Senators also criticized the progressivity of the bonus-malus system that is to be superposed on the current rates, treating it as a hidden tax. There seems to be little grounds for this criticism in that the social tariffs already introduce some progressivity.[4]

The innovative element of the bill concerns the compatibility between the proportional pricing in force and the valuation of energy savings. Between households of similar composition who are subscribers at the same rate, there is already a reduction for the household that controls its usage. But is this reduction sufficient to compensate for the effort? In other words, should we consider that a kilowatt-hour of savings that costs an effort has the same economic value, in absolute terms, as a kilowatt-hour that is simply consumed? Everything depends on whether the savings in question is considered a gain or a loss. For households in the latter situation, the savings is seen as a cost. So the savings is not made, which is why the bonus-malus system would be effective. The others do not need an added incentive.

The bonus-malus system does not simply offer a discount (bonus) that is to be funded by the overages. [5] It also aims to inform individual households about their behaviour, *i.e.* whether it is virtuous or not, which is consistent with several recent observations in the literature: a household does not base its energy consumption on tiny marginal pricings, which are counted in centimes per kilowatt / hour and which people understand only imperfectly. Changes in the amount of the energy bill and announcements of price fluctuations play a greater role. Bonuses and penalties thus matter less as absolute values than as signals sent to households by their relative values on the invoice.

The superposition of the bonus-malus system on the rates in effect will of course initially simply amplify the gaps in spending between users. But the bonus that would apply on the bill of households whose behaviour benefits everyone is no less legitimate than the discounts enjoyed by households who changed suppliers once the retail energy markets were opened to competition.

Unfortunately, the rejection of the Brottes bill has ended any educational discussion about the relationship between energy efficiency and residential energy pricing. The lack of enthusiasm for the topic in the public debate is easy to perceive from reading the recent, voluminous report of the Commission of Inquiry on the actual cost of electricity. This is not so surprising in a sector where innovation is encouraged more on the supply side. The *effacement diffus* scheme is the latest example.[6] But without innovation in the structure of energy tariffs too, will France be able to achieve its goal of reducing energy consumption?

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[1] The author would like to thank Marcel Boiteux, Marc-Kévin Codognet, Jérome Creel, Gilles Le Garrec, Marcelo Saguan and Karine Chakir. The opinions expressed in this note are the responsibility of the author alone.

[2] This principle is ensured by tariff equalization: the schedule of tariffs is the same regardless of the place of residence.

[3] On the grounds that this tax violates the equality of taxpayers with respect to the public tax burden.

[4] Crampes, C., Lozachmeur, J.-M., 10 Sept 2012, “Les tarifs progressifs de l’électricité, une solution inefficace”, *Le Monde*.

[5] In the case where the sum of the penalties is not enough to cover the bonuses, the State will finance the deficit. And even in the absence of a deficit, as the distribution of virtuous consumers is not necessarily the same from one provider to another, an equalization of the bonus-malus balances should be applied so that everyone ends up with a zero balance.

[6] This consists of interrupting the power to a radiator or boiler for 10 or 15 minutes.

Underlying deflation

Christophe Blot, Marion Cochard, Bruno Ducoudré and Eric Heyer

A look at the latest statistics on price trends indicates that the risk of deflation seems to have given way to renewed inflation in the major developed countries. So do we really need to fear the return of inflation, or are these economies still structurally deflationary?

First, note that the nature and scale of the economic crisis we have been living through since 2008 are reminiscent of what led to past periods of deflation (the crisis of 1929, the Japanese crisis of the 1990s, etc.). The recessionary pattern that began in 2008 has followed the same path: the shock to activity led to a slowdown in inflation – and sometimes lower prices or wages – in most of the developed countries. However, a fall in prices is not necessarily synonymous with deflation: this has to be long term and, above all, it must be anchored in expectations and a vicious cycle of debt deflation. But this deflationary scenario did not materialize. Far from sitting by idly, at the end of 2008 governments and central banks took fiscal and monetary measures to stabilize activity and limit the rise in unemployment. Moreover, independently of the response by economic policy, price trends were strongly influenced by changes in commodity prices. While the collapse in oil prices in the second half of 2008 accelerated the deflationary process, the rise in prices since 2009 has fuelled more general price rises and held off the risk of deflation. Moreover, business has partially cushioned the impact of the crisis by accepting cuts in margins, which has helped to mitigate rising unemployment, a key factor in the deflationary process.

In a study by the OFCE published in its journal of forecasts (Prévisions de la Revue de l'OFCE), we start from a wage-price model to develop a method for assessing the way that oil price dynamics and labour market adjustments affect changes in inflation. We show that if oil prices had continued their upward trend after they peaked in the summer of 2008, and if the adjustment on the labour market had been, in all countries, the same as in the US, then the year-on-year change in inflation in second quarter 2011 would have been lower, by 0.7 points in France to 3.4 points in the UK (Table 1). This confirms that these economies are still structurally deflationary.

Despite the central banks' repeated efforts at quantitative easing, they need not fear the return of inflation. The macroeconomic environment is still characterized by a risk of deflation, and therefore by the need for an accommodative monetary policy.

Impact of shocks on consumer prices

Year-on-year change

	Impact on the inflation rate…	2010 Q1	2010 Q2	2010 Q3	2010 T4	2011 Q1	2011 Q2
Germay	*… of the speed of productivity adjustment*	0.3	0.5	0.6	0.8	0.8	0.8
	… of the change in oil prices	0.0	0.2	0.2	0.3	0.4	0.4
	Total impact	0.3	0.7	0.8	1.0	1.2	1.3
France	*… of the speed of productivity adjustment*	0.0	0.0	0.0	0.1	0.1	0.1
	… of the change in oil prices	0.2	0.4	0.2	0.3	0.5	0.6
	Total impact	0.2	0.4	0.2	0.4	0.6	0.7
Italy	*… of the speed of productivity adjustment*	0.3	0.3	0.3	0.3	0.2	0.1
	… of the change in oil prices	0.6	0.8	0.6	0.5	0.6	0.6
	Total impact	0.8	1.2	1.0	0.8	0.8	0.8
Spain	*… of the speed of productivity adjustment*	0.0	-0.1	-0.2	-0.2	-0.3	-0.4
	… of the change in oil prices	0.0	0.3	0.3	0.3	0.4	0.5
	Total impact	0.0	0.2	0.1	0.0	0.1	0.1
UK	*… of the speed of productivity adjustment*	0.7	1.3	1.8	2.2	2.8	3.1
	… of the change in oil prices	0.1	0.1	-0.1	-0.1	0.1	0.3
	Total impact	0.8	1.4	1.7	2.2	2.9	3.4
USA	*… of the speed of productivity adjustment*	0.0	0.0	0.0	0.0	0.0	0.0
	… of the change in oil prices	0.5	0.4	0.1	0.0	0.2	0.4
	Total impact	0.5	0.4	0.1	0.0	0.2	0.4
Japan	*… of the speed of productivity adjustment*	0.6	0.8	0.9	1.0	1.1	1.2
	… of the change in oil prices	0.0	0.2	0.2	0.2	0.3	0.4
	Total impact	0.6	1.0	1.1	1.2	1.3	1.6

Source : National data, OFCE calculations.