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“COMMODITIES, ENERGY AND FINANCE”

*Edited by
Ernest Gnan and Már Gudmundsson*

*A joint publication with the
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CIP

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Edited by Ernest Gnan and Már Gudmundsson

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TABLE OF CONTENTS

Introduction, main findings, and some conclusions (Ernest Gnan and Már Gudmundsson)	5
Opening Remarks (Klaus Liebscher)	15
Financial investors and commodity markets (Dietrich Domanski and Alexandra Heath)	19
1. Introduction	20
2. The presence of financial investors in commodity markets	22
3. Financial investors and market dynamics	29
3.1. The relationship with physical commodity markets	29
3.2. Market depth	32
4. Conclusion	35
5. References	36
European Energy Markets: Moving in a Common Direction? (Juan Delgado)	41
1. Introduction	41
2. A Common Market for Energy?	42
3. Obstacles to a Common Energy Market	44
4. What Do the Latest Proposals for Energy Regulation Mean for Market Integration?	47
5. Conclusions	50
Energy Markets in Europe: The State of Play and Future Prospects (Walter Boltz)	53
1. Introduction	53
2. Where do we come from?	54
3. Questioning of the current market framework	55
4. Where are we now?	56
5. Where do we go?	59
5.1. The Regional Initiatives	59
5.2. The 3 rd EU legislative package	61
6. Conclusion	64
Norges Bank's Experiences with the Organisation of the Government Pension Fund – Global (Birger Vikøren)	67
1. Introduction	67
2. Importance of petroleum for the Norwegian economy	68

3. Objectives of the fund	70
4. How the fund works	71
5. Division of responsibility	72
6. Investment strategy	73
7. Concluding remarks	74
The Russian Oil Fund(s): past performance and policy options (Vasily Astrov)	77
1. Introduction	77
2. Features of the OSF	79
3. Sterilization Function	81
4. Stabilization Function	83
5. Recent reforms and policy challenges	85
6. References	89
The Russian Non-Fuel Sector: Signs of Dutch Disease? Evidence from EU–25 Import Competition (Stephan Barisitz and Simon-Erik Ollus)	93
1. Introduction	95
2. Statistical Limitations	100
3. Results: EU-25 Import Competition	103
4. Conclusions: Russia Shows Symptoms of the Dutch Disease	112
5. References	115
Energy prices, inflation, and monetary policy (Ulrich Kohli)	119
1. Energy prices and inflation	119
2. The monetary policy response	121
3. The measurement of inflation	123
4. Commodities and energy as an asset class	124
5. Back to price stability	125
6. References	126
Monetary policy and commodity and energy prices (Irma Rosenberg)	129
How should monetary policy take commodity and energy prices into account? (Frank Smets)	135
References	144
 SUERF – Société Universitaire Européenne de Recherches Financières	145
SUERF STUDIES	146
SUERF COLLOQUIUM VOLUME	148

COMMODITIES, ENERGY AND FINANCE: INTRODUCTION, MAIN FINDINGS, AND SOME CONCLUSIONS

By Ernest Gnan and Már Gudmundsson

This SUERF study summarizes the main findings and features most of the contributions from a workshop on “Commodities, Energy and Finance”, which was jointly organised by SUERF, the Oesterreichische Nationalbank and the Bankwissenschaftliche Gesellschaft at the OeNB’s premises in Vienna, on 3 March 2008. Over 100 participants from 16 countries followed a day of discussions on the nature and dynamics of commodity markets, on the relationships between financial, commodity and energy markets in Europe, on the challenges of oil wealth and on how monetary policy should take commodity and energy prices into account. The workshop brought together both professional and academic perspectives as well as financial, microeconomic and central banking views on the channels of mutual influence between commodities and energy markets as well as financial markets.

In his **opening remarks**, **Klaus Liebscher** (Governor, Oesterreichische Nationalbank) set the scene by identifying some of the key issues: first, ongoing and probably lasting shifts in the global supply of and demand for energy and commodities; second, massive increases in energy and commodity prices and their consequences for the economy; third, the search for yield and risk diversification in international portfolios and the resulting heightened role of financial motives in markets for commodities and energy. Despite the huge increase in commodities and energy prices, demand has so far not abated. Most of the additional demand will be supplied by countries in the Middle East, historically prone to political crises. In this situation of a continuing tight balance between the supply and the demand for oil, even small supply disruptions – be they of a technical or a political nature – trigger disproportionate price hikes. Europe is particularly dependent on imported gas.

Up to now, the macroeconomic effect of oil price shocks has been different from the 1970s, due to the absence of adverse concurrent shocks, a smaller share of oil in production, more flexible labour markets and improvements in monetary policy. In the euro area, the strong exchange rate of the euro has also dampened the effects of increased oil prices in terms of US dollars. Higher

oil prices can be seen as a wealth transfer from consumers in oil-importing countries to oil-exporting countries. A big part of commodity and oil revenues have been recycled into global financial markets, among others, by sovereign wealth funds. This has added to global demand for financial assets, dampening interest rates and credit spreads. Where petrodollars have gone into real estate investment, they may also have contributed to unsustainable price developments. Financial investors have re-discovered commodities as an asset class.

Liebscher concluded by raising a number of questions: Should monetary policy pay more attention to energy and commodity price developments? Should one try to separate fundamental from speculative price moves? Are petrodollars making monetary policy more difficult due to their dampening effect on interest rates? Is the world economy headed for a prolonged period of low growth combined with inflationary pressures, reminiscent of the 1970s?

The first two sessions of the workshop dealt with the various interactions of physical commodity markets and financial markets. **Session 1**, which was chaired by Professor **Beat Bernet** (Swiss Institute of Banking and Finance, University of St. Gallen), explored the role of commodities as an asset class and explained why investors increasingly regard commodities as a useful addition to investment portfolios.

Geert Rouwenhorst (Professor of Finance, Deputy Director of the International Center for Finance, Yale University) has done pioneering work on commodity futures as an asset class. In his presentation on “Facts and Fantasies about Commodity Futures”¹ he made the important, and sometimes forgotten, distinction between taking direct exposure to actual commodities and investing in commodity futures. The commodity futures contract is an insurance contract where the investor receives compensation for bearing the risk of short-term commodity price fluctuations.² The expected return to the investor is the difference between the current futures price and expected future spot price, which can be seen as a risk premium. In addition, the

¹ No paper of this presentation is included in this volume. The presentation was based on two papers: Gorton, Gary B. and Rouwenhorst, K. Geert, “Facts and Fantasies about Commodity Futures” (February 28, 2005). Yale ICF Working Paper No. 04-20. Available at SSRN: <http://ssrn.com/abstract=560042>; and Gorton, Gary B., Hayashi, Fumio and Rouwenhorst, K. Geert, “The Fundamentals of Commodity Futures Returns” (June 2007). Yale ICF Working Paper No. 07-08. Available at SSRN: <http://ssrn.com/abstract=996930>.

² The investor in commodity futures does not have direct exposure to the commodity and generally does not take delivery of it.

investor can have unexpected gains or losses in as so much as the actual future spot price turns out to diverge from the expected future spot price. Professor Rouwenhorst showed that the average return of commodity futures between 1959 and 2006 at 11% was almost equal to that of stocks. At the same time, commodity futures have historically been less risky than stocks, both in terms of volatility and downside risk. Long-term analysis has also shown that the returns on commodities futures are negatively correlated with the returns of stocks and bonds. The negative correlation is stronger over longer holding periods. Furthermore, commodity futures have performed better in periods of inflation, especially unexpected inflation, when stock and bond returns have generally disappointed. These features predestine investment in commodities futures as a means of portfolio diversification, especially in times of unexpected inflation. Professor Rouwenhorst then proceeded to explain the fundamentals of commodity futures. He showed that inventory levels are a fundamental driver of commodity futures risk premiums as low inventories increase the (expected) volatility of future spot prices. Investors in commodity futures should thus expect to earn more to accept the risk of increased price volatility. As a result, high spot prices, caused by demand or supply shocks, should increase the difference between spot and futures prices. Since inventories cannot be replenished instantaneously, low inventories, and consequently higher risk premia, should persist.

John Cavalieri (Vice President and Real Return Product Manager, PIMCO), in his presentation on “Why Commodities? Why Now? How? How Much?”³ took the perspective of a practitioner in commodity investments. He emphasized the continued potential of commodities to enhance returns and diversify risks in an environment of increasing world commodity demand, supply constraints and a secularly weak US dollar. Specifically, he addressed issues such as how much to invest in commodities and how investors actually implement their exposures. In particular, he advocated using commodity indexes, since they allow the most systematic approach to this asset class by capturing the inherent returns on commodities as reflected by economic factors specific to the asset class. By contrast, according to him, various alternatives to commodity indexes suffer from the following drawbacks: owning actual commodities is impractical; the return on shares in commodity producers is affected by factors other than commodity prices; and traditional active commodity trading (“managed futures”) loses the inherent return of the asset class. The return on commodity indexes is driven by the T-bill

³ No paper of this presentation is included in this volume. For further details on some contents of the presentation see Chapters 5 and 6 of Greer, Robert, *The Handbook of Inflation Hedging Investments*, McGraw-Hill, 2006.

rate (which reflects inflation expectations and the real interest rate), the risk premium due to price uncertainty, a rebalancing component, the convenience yield (resulting from low inventories relative to demand) and “surprises”. According to PIMCO’s estimates, to achieve minimum portfolio volatility, commodities should make up a share of 7%, with another 5% being invested in stocks, 87% in TIPS and no conventional bonds.

Session 2, chaired by **Ernest Gnan** (Secretary General, SUERF, Senior Advisor and Head of Economic Analysis, OeNB) looked at how the activity of financial investors may affect commodity markets. That in turn raises two issues. First, how financial activity in commodity markets affects price dynamics, in particular the degree to which it drives commodities and energy prices away from fundamentals. Second, whether commodity markets become more complete and liquid through derivatives markets. **Alexandra Heath** (Senior Economist, Bank for International Settlements) in her presentation on “Financial Investors and Commodity Markets” showed that the presence of financial investors in commodity markets has increased considerably over the past few years. To take an example, in addition to investing in traditional commodity futures (cf. the paper of Rouwenhorst) financial investors have the option of investing in exchange-traded funds, which allow them to purchase shares in a stock of a physical commodity. The range of instruments and strategies employed in commodity trading, has thus broadened substantially and financial investors have improved the depth of commodity markets. Commodity markets have for these reasons partly become more like financial markets regarding motivations and strategies of market participants. However, fundamentals such as inventory levels and the marginal cost of production still provide strong anchors for commodity prices. But a lack of liquidity and physical limits to short selling in the spot market may at times significantly affect short-term market dynamics.

Michael Lewis (Global Head of Commodities Research at Deutsche Bank, London) in his talk on “The Battle between Commodity Fundamentals and Speculative Activity”⁴ provided insights into the practice of commodities trading and price dynamics. He explained the factors which drive the forward prices of commodities, which are determined as the sum of the spot price and the interest rate, reduced by the difference between the convenience yield and storage cost. By storing, rather than selling a commodity, one surrenders the spot price and incurs interest and warehousing costs. Offsetting these costs are the benefits of holding inventory, the so-called convenience

⁴ No paper on this presentation is included in this volume.

yield. The latter is the flow of services and benefits accruing to an owner of a physical commodity but not an owner of a contract for future delivery of the commodity, such as a secure supply of raw materials and hence the avoidance of costs from stock-outs. Thus, when inventories in a certain commodity decline, the convenience yield will rise and push the forward curve into backwardation, which is a situation where the forward price is below the spot price. Comparing various commodities, one finds that convenience yields are higher, the higher the ratio of daily consumption over stocks is (which is a measure of precariousness). For example, if gold production ceased completely, it would take 40 years for the world to exhaust available gold reserves on the basis of current consumption patterns. At the other extreme, if oil production ceased today, the consequences would be felt within days if not hours.

The availability of commodity-linked financial instruments can affect the value of firms that use these instruments. For example, US airline firm value and credit ratings have been shown to be positively related to their use of hedging against fuel price changes. Conversely, consumer hedging activity has flattened commodity forward curves over the past few years. Speculative activity has increased across all commodity sectors over the past few years. Funds tracking commodity indexes have surged since 2003. Contrary to the often made assertion that this has inflated commodity prices, distorted the shape of the commodity forward curves and elevated levels of implied volatility, an IMF study found that there is little to support the notion that speculative activity affects either price levels over the long run or price swings in the short term; speculators tend to be price followers rather than price setters – so, causality runs from spot and futures prices to speculation, and not vice versa. Financial markets have been particularly fond of trend following trading rules such as the Moving Average Crossover Trading (MACT) model, which recommends to buy when the short run moving average of a commodity moves above the long run moving average, and to sell in the opposite case. The profitability of technically-based momentum trading strategies in commodity markets has improved significantly over the past few years, reflecting trending markets. Problems with such strategies arise, though, in markets with little price variation.

Regarding future oil price trends, Lewis estimated that finding and development costs in the oil industry have risen by 15% p.a. in real terms between 2005 and 2007. Assuming a further rise of at least 10% p.a. over the years to come implies R&D costs of USD 25/bbl in 2010 and USD 30/bbl in 2015. Since 1995 the oil price tended to equal approximately 3.5 times the R&D cost.

This would, according to Lewis and taking into account some margin of error, imply a “fair value” for crude oil in 2010 of USD 65-88/bbl. In mid- 2007, the crude oil term structure had moved from steep contango (spot price below forward price) to backwardation (spot price above forward price). This was attributable to a reduction in OPEC and specifically Saudi Arabian oil production.

In conclusion, Lewis agreed with the other speakers that physical rather than financial factors are the ultimate drivers of commodity prices. However, financial flows can overpower fundamentals at certain points in time. This may distort spot prices and forward curves and increase volatility. At the current juncture, he saw a serious risk of price overshooting, particularly in precious metals markets, given that financial market turbulences have lured more investors into commodities and given the historically observed relation between USD exchange rate overshooting and precious metals price movements.

Session 3, chaired by **Doris Ritzberger-Gruenwald** (Head of Foreign Research, OeNB) had a closer look at the state of play of energy markets in Europe. It investigated how well the markets for trading energy across Europe have been developed so far and to what extent liberalisation and privatisation have enhanced competition and lowered prices for consumers and businesses. A number of remaining challenges to build a true integrated energy market for Europe were identified. Many economic and political developments depend partly on them, such as productivity growth, inflation or energy security. **Juan Delgado** (Research Fellow, BRUEGEL, Brussels) highlighted the constraints of the common EU energy market by technical and political factors as well as the growing prominence of energy efficiency and climate considerations. The road to a full liberalisation of EU energy markets has still a long way to go. More than a decade after liberalisation began, the European energy sector is still highly concentrated, cross-border energy trade is limited and price levels differ substantially across countries. The dependence of gas and electricity on physical networks for distribution and the difficulties to store them support market fragmentation. The heterogeneity of market designs and the lack of coordination of system operators are further obstacles to market integration. At the political level, the protection of cheap domestic energy sources, the promotion of national champions and of bilateral supply agreements to guarantee national supply and national climate change policies add to market fragmentation. The adoption of the recently proposed Third Liberalisation Package would facilitate market entry and cross-border interconnection. However, political opposition by some governments to some

crucial provisions such as network unbundling might severely water down its impact. A proposed reform of the EU's emissions trading scheme (ETS) after 2012 would, however, remove obstacles to the common energy market. Further progress towards an integrated EU energy market will require resolution of conflicts of interest between global efficiency and national interests, since the distribution of benefits from integration may not be evenly distributed. A single market for energy is also the basis for a common, efficient approach to the EU's measures against climate change.

Walter Boltz (Managing Director, Energie Control, Vienna) explained how wholesale energy markets in Europe work in practice. Markets continue to be fragmented and to be mostly national in scope. The level of development differs strongly across EU countries. Congested long-distance transmission lines also hamper market integration. Lack of investment in this infrastructure is also due to incumbents' interest to keep competitors out of their traditional markets. With increasing energy trading activity, prices established on energy marketplaces become of crucial importance for energy traders and for retail energy suppliers. Higher electricity and natural gas prices have put energy wholesale markets in the public limelight. Initiatives for regional energy market integration, while useful, are only voluntary and cannot solve structural market barriers. The EU Commission's 3rd Energy Liberalization Package bears large potential for consumer gains. Its central elements are the ownership unbundling of the transmission networks and an enhanced regulatory framework including the establishment of an EU regulatory agency. The success of this package and of the EU's internal energy market crucially depends on the courage and commitment of EU Member State governments. The proper functioning of the EU energy market is crucial for industry, small businesses and household consumers alike.

Session 4, chaired by **Peter Mooslechner** (Director for Economics and Research, OeNB) addressed the role and management of sovereign wealth funds, and the possible challenge posed to oil exporting countries by the risk of two track parts of the domestic economy or Dutch disease. **Birger Vikøren** (Director, Financial Market Department, Norges Bank) discussed important features of the Norwegian Government Pension Fund—Global. One of the largest oil and gas exporters in the world, petroleum makes up 25% of total Norwegian production, nearly 40% of state revenues, and half of Norwegian exports. The country's oil production has already passed its peak. High petroleum production and oil prices have contributed to the strong growth of the Fund that has existed since the mid 1990s and reached a total size of USD 400 billion by end-2007. It is projected to reach USD 800 billion by

2014. The objectives of the Fund are intergenerational justice and economic stabilization. Contrary to what might be surmised from its name, the Fund is not earmarked for future pension expenditure. However, its return is designed to continually support the budget and pension expenditures will make up a considerable part of fiscal expenditure in the future. Oil revenues as well as the returns on financial investments flow into the Government Pension Fund; in turn, the non-oil fiscal deficit is financed out of the Fund. A guideline approved by Parliament in 2001 implies that the fiscal deficit financed out of the Fund should on average not exceed 4% of the Fund (which is roughly the expected real return on the Fund). Formally owned by the Ministry of Finance, operational management of the Fund is delegated to the Norges Bank. Thus, the Ministry decides on the strategic benchmark and Norges Bank maximizes returns relative to the benchmark. Parliament is regularly informed on the outcome. In its 10-year history the Fund has yielded an average real return of 4½%. Governance of the Fund is highly transparent, creating strong confidence among the general public, a vital condition for lasting public acceptance. The Fund's investment strategy aims at maximizing the international purchasing power in the long run. The aim of high return at moderate risk entails a strong weight for equity and broad international portfolio diversification; the Fund holds no large or strategic ownership stakes in individual companies. The Fund has issued its own Ethical Guideline, which for instance excludes investment in companies producing weapons, companies contributing to serious violations in human rights or severe environmental damage.

Vasily Astrov (Economist at the Vienna Institute for International Economic Studies) described the Russian Oil Stabilization Fund (OSF), which was established in 2004, as a tool of fiscal stabilisation and monetary sterilization. By the end of 2007, the Fund had reached nearly 12% of Russia's GDP. The OSF accumulates funds as long as the world oil price exceeds a cut-off price (initially USD 20 but increased to USD 27 from 2006). The Fund collected revenues from a portion of the export duty on crude oil and from a mineral resources extraction tax on oil, and also parts of the recently strongly increasing federal budget surplus (which resulted from deliberately conservative oil price assumptions) were transferred to the Fund. Initially held entirely in Russian rubles, the Fund was recently converted into foreign currency sovereign bonds of 14 developed countries (45% EUR, 45% USD, 10% GBP), held indirectly via deposits at the Central Bank of Russia. A recent reform implemented as of February 2008, split the original OSF into two Funds, one continuing the roles and functions of the OSF (fiscal stabilisation and monetary sterilization), the other having the aim of saving wealth for

future generations. The concrete accumulation and investment strategy for the latter fund (“National Welfare Fund”) is currently under development. In this context, Astrov pointed to risks, as more spending could fuel overheating and corruption.

In a similar vein, **Simon-Erik Ollus** (Economist at the Bank of Finland Institute for Economies in Transition, Helsinki), in a presentation of his paper co-authored by Stephan Barisitz (Economist, OeNB), discussed signs of Dutch disease in the Russian economy, as oil and gas revenues contribute substantially to GDP and dominate export revenues.⁵ Comparing Russian industrial import growth with domestic industrial production growth between 2002 and 2006, he found for most manufacturing sectors that Russian imports expanded faster than domestic output. In some sectors, imports have even exceeded domestic production. The paper concludes that Russia may be facing incipient deindustrialization at least in some parts of the manufacturing sector. Russia might therefore be showing some signs of a Dutch disease.

Session 5, chaired by **Már Gudmundsson** (Deputy Head, Monetary and Economic Department, Bank for International Settlements) discussed implications for monetary policy. The panel consisted of **Irma Rosenberg** (First Deputy Governor, Sveriges Riksbank), **Ulrich Kohli** (Alternate Member, Governing Board, Swiss National Bank) and **Frank Smets** (Deputy Director General Research, European Central Bank). The panel addressed several issues facing monetary policy makers associated with commodity and energy prices: How should monetary policy react to changes in commodity and energy prices? What is a better indicator of underlying inflation, core inflation measures excluding commodity and energy prices or headline inflation that includes them? How should commodity and energy prices be taken into account in measuring core inflation? Are commodity and energy prices leading indicators of economic activity and inflation developments? The panel broadly agreed on a number of issues. First, the goal of monetary policy should be price stability, which means that monetary policy should target headline inflation. However, as commodity price increases are relative price changes it depends on the nature of the shock driving these changes what the appropriate monetary policy response should be. Are these supply shock or demand shocks, are they temporary or likely to be long lasting? The answers to questions would also determine whether core or headline measures of inflation were better indicators for future inflation and thus for

⁵ A Dutch disease is a term used for a situation where a resource enhancement or a rise in commodity prices produced by a country leads to a real exchange rate appreciation, undermining the competitiveness of manufacturing and other trading goods sectors.

the setting of monetary policy. In all cases monetary policy has to prevent the transmission of relative price changes from affecting longer term inflation expectations and thus giving rise to so-called second round effects where wages and other input costs would start to rise in order to compensate for higher relative prices of commodities and energy. Interestingly, the point was made that the magnitude and likelihood of second round effects depends on the credibility of low inflation targets, which in turn might depend on the response to the first round effects. Thus the distinction between first and second round effects is no longer clear cut. At the time of the workshop the inflationary impact from higher oil and other commodity prices had been mild, possibly due to higher central bank credibility and lower real wage rigidity than in the past. However, it could be that central banks' low inflation policy is only now being put to the test.

* * *

The workshop produced many interesting insights, although challenges remain. In particular, it highlighted the multiple relations between commodity and energy markets, on the one hand, and financial markets, on the other. However, it is still difficult to determine in real time whether commodity price developments are driven by fundamentals or financial activity, in other words, speculation. The optimal monetary response is also an issue for further investigation.

Higher and more volatile energy and commodity prices pose multiple challenges for producers, consumers, financial intermediaries and policy makers. Careful evaluation is required to draw appropriate conclusions and devise adequate strategies in reply to these developments. In a longer term perspective, the analysis has to go beyond the traditional confines of economic analysis to produce wise and sustainable decisions. To fully capture the problems at hand, and provide lasting solutions e.g. to ensure long-term sustainable growth in a world of limited natural resources, a much broader, interdisciplinary approach is required.

As usual, SUERF's approach of bringing together academics researchers, financial practitioners and policy makers, proved useful in exposing the many facets of a complex topic and in providing synthesis of possible routes to follow in the future.

OPENING REMARKS

By Governor Klaus Liebscher

Ladies and Gentlemen,

I am very pleased to welcome you to this workshop jointly organised by SUERF – The European Money and Finance Forum – and the Oesterreichische Nationalbank. As many of you may know, SUERF and the Oesterreichische Nationalbank have cultivated close ties for many years, with the OeNB hosting the SUERF General Secretariat. It is therefore a great pleasure for me to see that this close cooperation again takes concrete shape in today's conference.

I would like to thank the organisers for having put together a very interesting set of sessions around a highly topical issue: the link between commodities, energy and finance, which has come to the forefront in recent years.

My special thanks, of course, goes to the distinguished speakers and panellists who have come to Vienna – in some cases even over the Atlantic! Thank you in advance for your contributions, which certainly will provide valuable insights and food for thought!

Drivers of the debate are, first, ongoing and probably lasting shifts in the global supply and demand of energy and commodities; second, massive hikes in energy and commodity prices and their consequences for the economy; third, the search for yield and risk diversification in international portfolios and the resulting financialisation of the markets for commodities and energy. It goes without saying that for me as a policy-maker who is primarily concerned with price stability, the link between monetary policy and today's topics is crucial.

Recent developments in commodities and energy prices are indeed staggering. The average market price of oil for the year 2007 was USD 73 per barrel, as compared to USD 25 in 2002, a tripling in 5 years. In spite of this, oil demand is not falling. On the contrary, the International Energy Agency projects a further growth in demand by 2.3% for 2008, mostly driven by India and China. Most of this incremental demand will be supplied by countries in the Middle East, historically prone to political crises. In this situation of a continuing tight balance between the supply and the demand for oil, even small supply disruptions – be they of a technical or a political nature – cause disproportionate price hikes. Europe is particularly dependent on imported gas, which is projected to reach 67% of total gas consumption

by 2030. Concerning commodities, over the last three years, the price of gold has doubled; over the last four years, the price of platinum has also doubled. World market prices of agricultural commodities such as wheat have increased considerably since early 2006.

Which financial and economic consequences should we expect? In principle, higher raw material prices dampen world growth and raise inflation. Up to now, the macroeconomic effect of oil price shocks has been different from the 1970s, due to a combination of factors such as a lack of adverse concurrent shocks, a smaller share of oil in production, more flexible labour markets and improvements in monetary policy.

In the euro area, the strong exchange rate of the euro has also considerably dampened the dollar price hike of oil. Higher oil prices can be seen as a wealth transfer from consumers in oil-importing countries to oil-exporting countries, as the elasticity of substitution is low in the short term.

The majority of these revenues have been recycled into global financial markets, among others, by so-called sovereign wealth funds. At a price of USD 70 per barrel, it is projected that the total stock of petrodollar foreign assets would grow to almost USD 7 trillion by 2012. This has for some time added to global demand for financial assets, dampening interest rates and credit spreads. Where petrodollars have gone into real estate investment, they may also have contributed to unsustainable asset price developments in certain real estate segments. Financial investors have re-discovered commodities as an asset class. What does all of this mean for monetary policy? Should we pay more attention to energy and commodity price developments? Should we try to separate fundamental from speculative price moves? Are petrodollars making monetary policy more difficult due to their dampening effect on interest rates? Are we headed for a prolonged period of low growth combined with inflationary pressures, reminiscent of the 1970s? Many questions need further research, but I hope that today's workshop will shed light on some of the issues raised.

I wish you interesting discussions and useful insights, both from an academic point of view and from a practitioners' angle. It is the combination of those two perspectives that allows progress in our understanding of the economy and of the appropriate policy responses.

SUERF has a long-standing tradition of combining the two aspects in a most fruitful and useful manner. I am certain that also today's workshop will continue in this tradition

FINANCIAL INVESTORS AND COMMODITY MARKETS

By Dietrich Domanski and Alexandra Heath¹

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Abstract

Commodities have attracted considerable interest as a financial investment in recent years. This article discusses the factors behind their growing appeal and assesses the extent to which market characteristics, such as price volatility, have changed as a result. The feature concludes that commodity markets have become more like financial markets in terms of the motivations and strategies of participants, but that the physical characteristics of commodity markets are still important.

¹ The views expressed in this article are those of the authors and do not necessarily reflect those of the BIS. We are grateful to Clara Garcia for her assistance with updating a previous version of this paper that was published in the March 2007 BIS Quarterly Review.

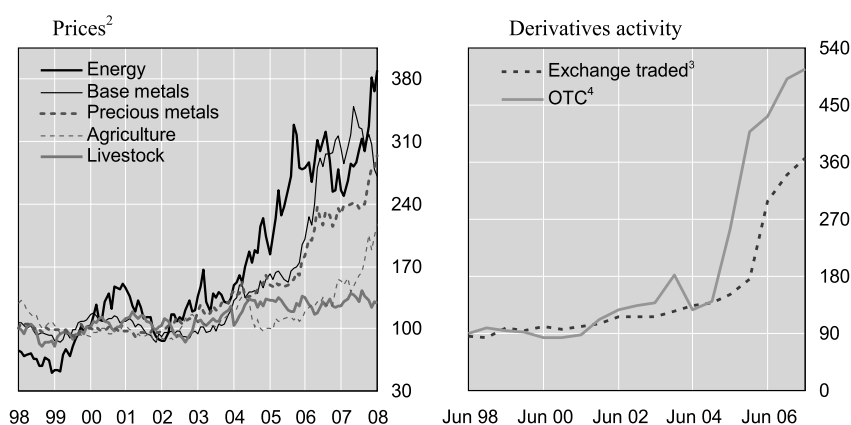
1. Introduction

The sharp increase in commodity prices, especially for energy and base metals since 2002, has gone hand in hand with growing derivatives market activity (Graph 1). The number of contracts outstanding in exchange-traded commodity derivatives almost tripled from the end of 2002 to mid-2007. Over-the-counter (OTC) trading of commodity derivatives also grew rapidly. According to BIS statistics, the notional value of commodity OTC derivatives contracts outstanding reached USD 7.5 trillion in mid-2007, more than 18 times the value in 1998 (BIS (2007)). At the same time, the share of commodities in overall OTC derivatives trading grew from 0.5% to 1.6%.

Along with the strong growth in commodity derivatives trading, the presence of financial investors in commodity markets has become more significant over the past few years. While commodity market investment is still small relative to overall managed funds, it is large relative to commodity production. In addition, there are indications that the types of financial investors and the strategies they employ have changed.

These developments raise the question of whether growing investor presence has altered the character of markets that are of key importance for the global

Graph 1: Commodity prices and derivatives activity¹



¹ 1998–2002 average = 100. ² Goldman Sachs Commodity Index (GSCI) sub-indices, monthly averages.

³ Number of contracts outstanding, in millions. ⁴ Notional amounts deflated by the GSCI.

economy. Understanding the nature of the changes in investor types and strategies is an important step in this regard. The first part of this article documents the increasing role of financial investors in commodity markets, while the second looks at the effect these changes may have had on the dynamics of commodity prices. Although commodity markets have become more like financial markets in terms of the motivations and strategies of participants, physical characteristics, such as inventory levels and the marginal cost of production, remain important anchors for prices.

2. The presence of financial investors in commodity markets

Financial activity in commodity markets is large compared with the size of physical production and has grown much faster in recent years. For copper, the volume of exchange-traded derivatives was around 50 times larger than physical production in 2006 – a significant increase in this ratio from 2002 (Table 1). For gold and aluminium, this ratio also increased, albeit more modestly from around 20 in 2002 to around 30 in 2006. The lower ratio for crude oil may understate the relative size of financial activity, given that OTC markets are particularly important for this commodity. Bank of England market contacts suggest that up to 90% of swaps and options trading in oil are done over

Table 1: Indicators of financial and physical activity in selected commodity markets in 2006

	Financial activity				World production ²		Ratio ³	
	Futures		Options		2002	2006	2002	2006
	Volume ¹	% chg since 2002	Volume ¹	% chg since 2002				
Crude Oil: NYMEX	71.1	55.4	21.0	83.4	67.0	73.5	3.2	13.9
ICE	44.3	106.3	0.0	-77.4				
Gold: TOCOM	22.2	8.4	0.0	-	2.6	2.5	21.8	25.6
COMEX	15.9	76.5	3.7	90.3				
Aluminium: LME	36.4	63.1	4.7	434.6	26.1	33.7	22.7	32.6
SME	13.9	491.4	-	-				
Copper: LME	18.9	13.8	1.9	108.4	15.3	15.1	30.5	52.2
SME	5.4	-7.0	-	-				

Note: NYMEX = New York Mercantile Exchange; ICE = Intercontinental Exchange, United Kingdom; TOCOM = Tokyo Commodity Exchange; COMEX = New York Commodities Exchange; LME = London Metal Exchange; SME = Shanghai Metal Exchange.

¹ Number of contracts, in millions. ² Oil: thousands of barrels per day; gold: millions of kilograms; aluminium and copper: millions of tonnes. ³ Defined as financial activity in the two largest contracts converted to units of physical production, divided by production.

Sources: Commodity Research Bureau, The CRB Commodity Yearbook; US Geological Survey.

the counter, reflecting the need for tailored contracts and a lack of organised derivatives markets for certain types of crude oil (Campbell et al (2006)).

Traditionally, specialised financial traders in commodity markets focused on exploiting arbitrage opportunities (Kolb (1997)). Typically, such opportunities arise as the consequence of commercial investors seeking to hedge their production or consumption in futures markets. These arbitrage trades, usually conducted by specialised commodity traders, typically involve taking long or short positions in forward markets for specific commodities and offsetting positions in spot markets. In doing so, financial investors provide liquidity in commodity derivatives markets.

Normally in financial markets, opportunities for (risk-free) arbitrage exist when the futures price deviates from the relevant spot price plus the cost of carry, e.g. the cost of financing a position in the spot market. However, the scope for arbitrage in commodity markets may be limited by constraints on short selling. In particular, the stock of commodities available for lending is generally small for energy and base metals. This limitation allows the futures price to fall below the spot price – a situation known as backwardation (Duffie (1989)).

The current upturn in commodity prices has been accompanied by greater variety in the types of financial investors and investment strategies in commodity markets (Holmes (2006)). One rapidly growing area is passively managed investment and portfolio products, which is consistent with investors now viewing commodities as an attractive separate asset class. By mid-2006, around USD 85 billion of funds were tracking the Goldman Sachs Commodity Index (GSCI) and the Dow Jones/AIG Index, two important commodity indices (Holmes (2006)).

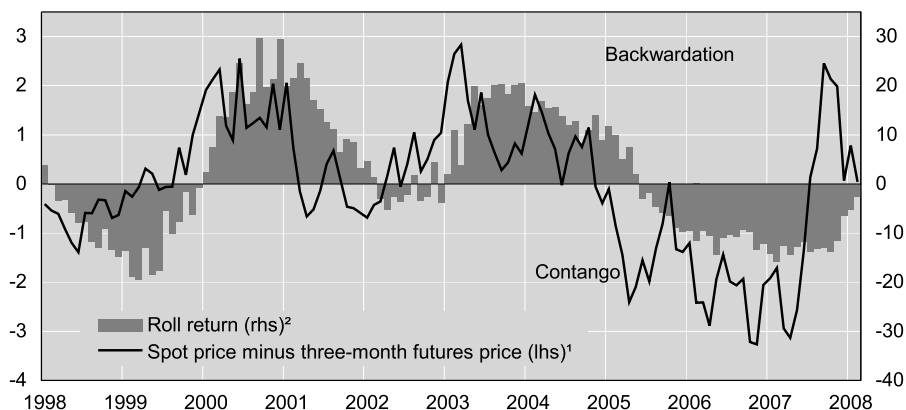
Passively managed investments often pursue a fully collateralised long-only futures strategy. This can be attractive to institutional investors with a longer-term investment horizon, such as pension funds, for several reasons (Beenen (2000)). First, this strategy allows diversification into commodities at a relatively low cost. Historically, commodity prices have had a relatively low correlation with prices in other asset classes and a high correlation with inflation (Gorton and Rouwenhorst (2004)).² Second, these authors also

² It is important to note that these calculations are all in US dollars and therefore the correlation between commodity prices and exchange rate movements is not a consideration. To the extent that commodity prices are in US dollars and other assets in the portfolio under consideration are not, currency hedging may be important for obtaining diversification benefits.

provide evidence that, historically, the return on a diversified basket of long commodity futures has been comparable with the return on other asset classes with similar risk features, such as equities.

Several authors have emphasised the importance of the so-called roll return from a long position in commodity futures as a component of total returns (Erb and Harvey (2005), Feldman and Till (2006)). Indeed, roll returns are an important explanation for why the average return on commodity futures has exceeded the average return from holding spot commodities (Gorton and Rouwenhorst (2004)). Investors earn a positive roll return if they can roll over a futures contract that is close to expiry into a new contract at a lower price. This occurs when the spot price (to which the price of the original futures contract converges over time) is higher than the price of the new futures contract, i.e. in a backwardated market.

Graph 2: Crude oil prices and roll returns



¹ In US dollars per barrel. ² Annual returns from rolling over consecutive three-month futures at maturity in excess of spot price returns.

Sources: Bloomberg; BIS calculations.

Roll returns can be considerable. For example, in the crude oil market, the roll yield from purchasing three-month futures was about 14% per annum over 2003–04 (Graph 2). However, roll returns became negative when the price of the futures contract rose above the spot price, i.e. the market moved into contango, in 2005. Essentially, the profitability of strategies aimed at generating positive roll returns depends on the persistence of the factors that cause markets to backwardate, including low levels of commodity stocks

available for short selling and positive returns received by owners from holding the physical commodity (the so-called convenience yield).

The presence of investors with a shorter-term focus, such as hedge funds, has also increased considerably during the past three years. The number of hedge funds active in energy markets has reportedly tripled to more than 500 since the end of 2004, with an estimated USD 60 billion in assets under management (Fusaro and Vasey (2006)). The USD 6 billion loss on natural gas derivatives that the hedge fund Amaranth reportedly incurred in September 2006 is a further indication of the size of positions that hedge funds take in commodity markets. Another group of investors that has become increasingly important are managed money traders (MMTs). This group includes specialised investors such as commodity pool operators and funds advised or operated by commodity trading advisers. Data available for the crude oil and natural gas markets show that the average number of MMTs trading roughly doubled between 1994 and 2003–04, and their share of total open interest in each of these markets has increased (Table 2). In addition, assets under management by commodity trading advisers are significant and rose from about USD 20 billion in 2002 to about USD 75 billion by end-2005 (IMF (2006)).

Table 2: Activity of managed money traders in selected commodity markets

Market	Number of MMTs holding positions ¹			MMT open interest as % of total open interest ²		
		1994 ³	2003–4 ⁴		1994 ³	2003–4 ⁴
Crude oil	Average	40	80	Long	6.4	14.0
	Maximum	48	100	Short	2.2	6.9
Natural gas	Average	33	66	Long	2.3	11.9
	Maximum	44	81	Short	7.0	15.4

¹ Daily averages and maximums. ² In futures and options markets. ³ April–September 1994.

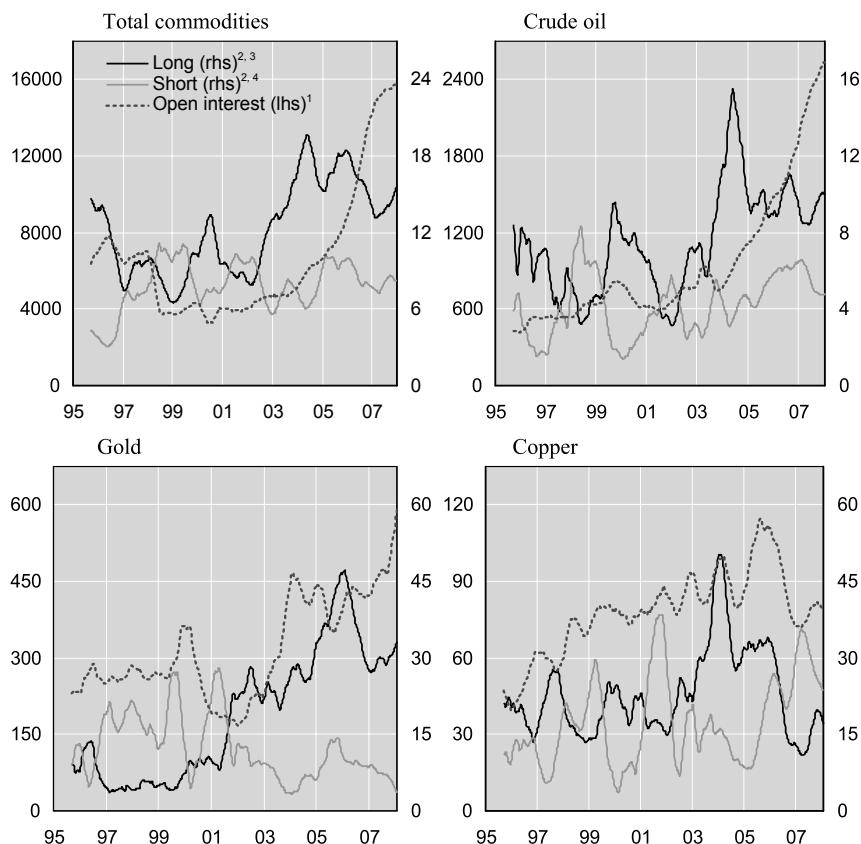
⁴ August 2003–August 2004.

Sources: CFTC (1996) ; Haigh et al (2005).

The variety of investment instruments has increased over time, partly as a result of increased demand from a more diverse investor base. For example, the number of exchange-traded funds (ETF), which allow investors to purchase shares in a stock of a physical commodity, has increased significantly since the first ETF for gold was opened in 2003. GFMS estimate that in 2006 around 40% of gold held for investment was held in ETFs (Koh (2007)). Because

ETFs allow investors to effectively purchase the physical commodity, they can potentially have a direct impact on market fundamentals in a way that is not possible through instruments such as exchange traded structured notes, which are pure derivatives. The introduction of a silver ETF in 2006 is widely

**Graph 3: Total open interest and shares of non-commercial holdings
(Futures and options combined; six-month moving averages)**



¹ Number of contracts, in thousands. ² Ratio to total open interest, in per cent. ³ Non-commercial long positions. ⁴ Non-commercial short positions.

Source: CFTC.

regarded as being an important factor behind a doubling of silver prices (Koh (2007)). A related area of growth is the development of instruments that facilitate the implementation of more complex strategies, including cross-market arbitrage or taking positions on volatility (McNee (2006)).

An important source of quantitative information on trading activities in commodity markets is the Commodity Futures Trading Commission (CFTC), which publishes weekly data on the open positions in US futures markets of commercial and non-commercial traders (Graph 3). The non-commercial trader group includes participants who are not primarily using the market for hedging, and encompasses a variety of subgroups. In 2003–04, the non-commercial trading category for both natural gas and oil was dominated by MMTs, and therefore is likely to capture most financial investors who are operating in centralised commodity markets (Haigh et al (2005)). The share of non-commercial traders across all US commodity futures markets has gone up from about 17% in the second half of the 1990s to almost 25% in 2005–07. This increase is mainly attributable to an upward trend in the share of long positions held by non-commercial investors over 2002 and 2003.

While this broad pattern holds across markets, the share of non-commercial positions varies considerably: this share is reported to be particularly high in metals markets. In addition to the evidence provided by the CFTC data, index funds and hedge funds account for 85% of trading volumes on the London Metal Exchange (Koh (2007)). Between March 2006 and the beginning of 2007, the share of open interest attributed to non-commercial traders fell by almost 3 percentage points. This is consistent with a withdrawal of investors during a period of falling commodity prices, but also with an increase in the hedging activity of commercial producers (JPMorgan (2007)).

Table 3: Participants in OTC trading on the ICE

OTC participants' trading (as % of total commissions)	2003	2004	2005
Commercial companies	64.1	56.5	48.8
Banks and financial institutions	31.3	22.4	20.5
Hedge funds, locals and proprietary trading shops	4.6	21.1	30.7

Source: ICE (2006).

The available evidence also supports the notion of a rapidly growing presence of financial investors in OTC derivatives markets. IntercontinentalExchange (ICE) reports that hedge funds, locals and proprietary trading shops accounted for almost one third of trading commissions paid on OTC transactions conducted through ICE in 2005, compared to less than 5% in 2003 (Table 3). However, this increase might in part reflect the higher propensity

of institutional investors, in particular hedge funds, to use electronic trading platforms such as ICE (Davidson (2006)). These numbers may therefore overstate the increase in financial investor participation in commodity markets as a whole.

The results from a simple empirical exercise are broadly consistent with the view that the motivations for investing in commodity markets have changed along with growing presence of financial investors (Domanski and Heath (2007)). Based on regressions seeking to explain movements in CFTC open interest data for the crude oil, natural gas, gold and copper markets, this exercise comes to four broad conclusions. First, shorter-term factors reflecting return considerations appear to have become, on balance, more important over time. Second, the volatility of futures returns has had a negative effect across markets, which is consistent with a growing importance of leveraged investors speculating on short-term price trends, as this group is particularly sensitive to short-term price fluctuations. Third, the share of non-commercial net long positions appears to have been less influenced by perceived diversification benefits than in the past. Finally, there are indications that the size and character of financial investor activity differs considerably across markets.

3. Financial investors and market dynamics

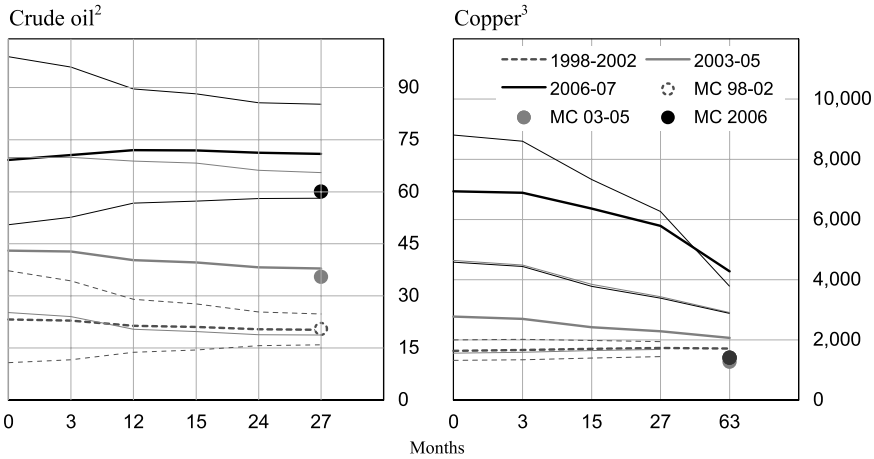
Changes in the scale and character of involvement of financial investors in commodity derivatives markets may have affected the price dynamics of these markets. The first question in this regard is whether the exploitation of perceived profit opportunities by financial investors has fundamentally changed the relationship between prices and the physical characteristics of commodity markets. The second issue is whether the broadening of the investor base has led to significant market deepening and hence affected features such as short-term price fluctuations.

3.1. The relationship with physical commodity markets

Intuitively, one might expect large inflows of funds into commodity markets to cause prices to rise sharply, possibly to higher levels than are justified by economic fundamentals. The *prima facie* evidence seems to support this view, as financial activity has broadly increased in parallel with prices during the past four years. However, the results of empirical work on the impact of the growing presence of financial investors on commodity prices are less clear-cut. Several recent studies, which explore the relationship between investor activity and commodity prices, indicate that price changes have led to changes in investor interest rather than the other way around (Haigh et al (2005), IMF (2006)).

This section uses the physical characteristics of specific commodities as a rough benchmark for assessing whether the increased presence of financial investors has altered price dynamics. Constraints on supply and storability affect the prices of commodity derivatives. In the longer run, production can be changed and the elasticity of commodity supply depends on the marginal costs of production. In the short run, supply from production is relatively inelastic and depends more on above-ground stocks. With the exception of gold, above-ground commodity stocks are small relative to demand. For example, it is usual for four to six weeks of demand to be held in inventories for base metals. For gold, in contrast, stocks either available for production or for lease represent close to 45 years worth of demand, depending on how this is measured (O'Connell (2005)).

Graph 4: Prices and marginal costs¹ (Daily data, 1998–2007)



¹ The bold lines have been constructed by averaging the prices at each tenor within each time period. The thin lines represent the futures curves associated with the minimum and maximum spot prices within each time period. ² In US dollars per barrel. ³ In US dollars per tonne.

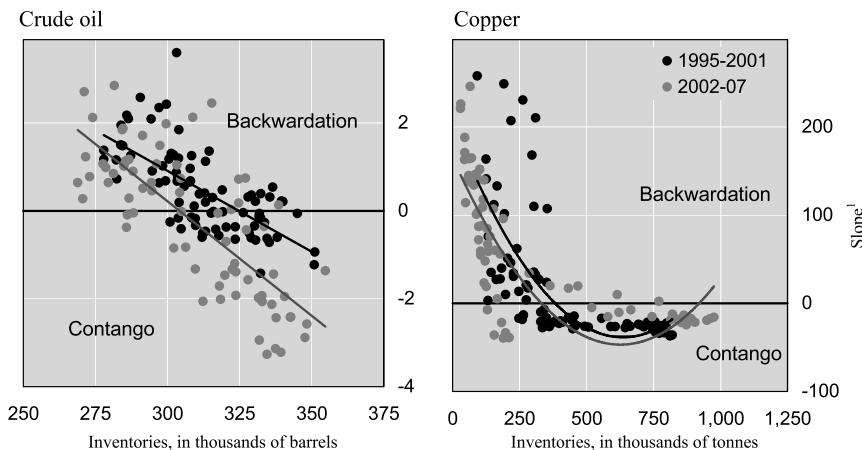
Sources: Bloomberg; Goldman Sachs Research; JPMorgan Chase; BIS calculations.

In efficient markets, the expected marginal costs of commodity production should act as an anchor for longer-run futures prices. Consistent with this, the long ends of oil and copper futures curves have overall tended to fluctuate much less than spot and short-dated futures prices (Graph 4). The tenors that are affected by this “anchoring” may vary, depending on the time needed to adjust production. For instance, from 1998 to 2002, a period of ample spare capacity, marginal costs were steady and production could be expanded at relatively short notice. Indeed, futures prices at tenors from about one year were quite closely aligned with estimates of marginal costs of production in both oil and copper markets over this period.

Since 2003, however, long-dated futures prices have increasingly diverged from estimates of current marginal costs. In 2006, prices for two-year oil futures were on average about 20% higher than the measure of marginal costs shown in Graph 4. In the case of copper, the deviation was much larger. Several factors related to economic fundamentals could cause such a deviation. For example, a sharp increase in expected marginal costs owing to buoyant demand growth and uncertainty about the costs of further expansion of production in the face of capacity constraints may have been a factor in the oil market. Moreover, the need to explore and develop new sources has probably lengthened the time required to extend production.

In addition, futures prices are likely to embody risk premia, not least because long-dated futures markets are typically relatively thinly traded. Reluctance by producers to forego upside opportunities through hedging in an environment of rising prices might have further reduced liquidity. In contrast, there is some tentative evidence that the size of the risk premium in oil futures markets is positively related to the share of net non-commercial long positions in the oil market, controlling for other factors (Micu (2005)). Notwithstanding all these factors, it still appears difficult to reconcile the increases in futures prices until mid-2006 with economic fundamentals, especially in the case of copper.

Graph 5: Inventories and the slope of the futures curve



¹ Spot price minus three-month futures price; for oil, in US dollars per barrel; for copper, in US dollars per tonne.

Sources: Bloomberg; London Metal Exchange; BIS calculations.

A second physical anchor is inventories, which link current and future supply and consequently connect the spot price and expected spot prices in the future (Gorton and Rouwenhorst (2004)). It is not clear that growing investor activity can have a systematic direct effect on inventory decisions: the convenience producers derive from holding stock depends on factors related to real activity such as production smoothing. Indeed, the strong historical relationship between the slope of the futures curve for non-gold commodities and the level of physical inventories has remained intact (Graph 5).

It is more likely that financial investors could indirectly affect inventory decisions through futures prices. To the extent that taking long positions in futures markets increases futures prices, the value of holding inventories for

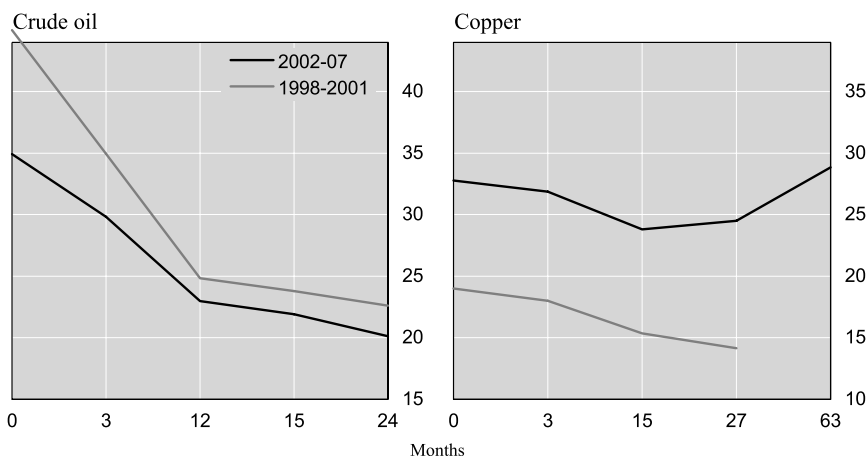
future delivery increases. The effect on the slope of the yield curve remains open, depending on how spot prices respond to possible inventory decisions.

3.2. Market depth

The second question is whether the increase in the size and diversity of financial investors has increased market depth. Greater market depth would imply that transactions of a given size cause smaller fluctuations and, other things equal, that short-term price volatility should decline. The prima facie evidence on changes in commodity price volatility is mixed. Price volatility has declined in the oil market, especially in the shorter maturities of futures contracts where trading is particularly active (Graph 6). In contrast, it has increased in the copper market.

Graph 6: Volatility of commodity futures prices

Annualised standard deviation of daily changes in the log of prices



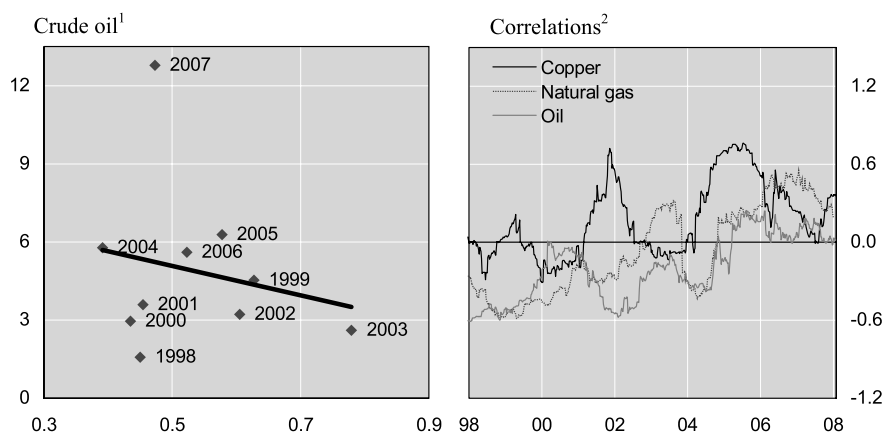
Sources: Bloomberg; BIS calculations.

Another approach is to look at the interaction of the trading behaviour of commercial and non-commercial traders. Non-commercial traders will add to market depth if they contribute to a two-sided market. This is the case if they act as counterparties to commercial traders' hedging transactions or if they take positions offsetting other financial investors.

The pattern of changes in the open positions of commercial and non-commercial traders supports the view that financial investors have, overall,

contributed to deeper markets.³ First, a higher correlation between changes in non-commercial long and commercial short positions has been associated with lower volatility in oil markets (Graph 7, left-hand panel). However, the correlation has not significantly increased since 2002, suggesting that a growing presence of financial investors may have accommodated increased hedging needs, but not fundamentally altered the character of the market.

Graph 7: Volatility and correlation



¹ The x-axis is the correlation between the changes non-commercial long positions and commercial short positions; the y-axis is the standard deviation of the spot oil prices. ² Correlation between the changes in non-commercial long positions and non-commercial short positions; 12-month moving average.

Sources: Bloomberg; CFTC; BIS calculations.

Second, there is also some evidence that non-commercial traders have, as a group, increasingly taken positions on both sides of commodity markets. Prior to 2002, changes in long and short positions of non-commercial traders were negatively correlated on average for copper, oil and natural gas: an increase in long positions typically went hand in hand with a reduction of short positions and vice versa. There is also some evidence that MMTs tended to act on the same side of the market at similar times in the past (CFTC (1996)). In the past few years, however, the correlation between changes in long and short positions of non-commercial traders has increased and become positive (Graph 7, right-hand panel). Evidence that non-commercial players

³ In order to gauge the position-taking of the investor groups on both sides of the market, we consider correlations of long and short positions separately (i.e. we do not calculate net long or short positions).

are increasingly trading between each other is also provided by the growing share of spread positions, which arise when a trader takes long and short positions in the same commodity at different tenors of the futures curve.

The emergence of trading among financial investors in commodity markets on a substantial scale suggests that the determinants of market liquidity may become more similar to those in traditional financial markets. These determinants include, for instance, the amount of risk capital that financial investors allocate to commodities trading and the heterogeneity of opinions of market participants. One key risk in both regards is a high concentration of trading activity. The demise of Amaranth, which led to a sharp deterioration in liquidity conditions in those tenors of the natural gas futures market where the firm held extensive positions, provides a clear indication of these challenges.

4. Conclusion

The presence of financial investors in commodity markets has increased considerably during the past four years or so. While it is difficult to be precise about the exact magnitude and composition of inflows, there is much evidence that the investor base, and with it the range of instruments and strategies employed in commodity trading, has broadened substantially. It is not clear to what extent these changes reflect structural shifts in investor behaviour or a temporary boom supported by a “search for yield”. In any case, a full reversal of the trend towards a greater role of financial investors appears unlikely against the backdrop of greater investor sophistication and a broadening range of commodity-related financial instruments.

Commodity markets have become more like financial markets in some respects. Financial investors are increasingly active on both sides of trades, creating a kind of financial trading sphere. Yet the characteristics of physical markets, such as inventory levels and the marginal cost of production, are still important. A lack of liquidity especially in the long tenors of commodity derivatives markets and physical limits to short selling in the spot market may at times significantly affect market dynamics. These effects require further investigation.

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EUROPEAN ENERGY MARKETS: MOVING IN A COMMON DIRECTION?¹

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1. Introduction

The road to full liberalisation of EU energy markets has still a long way to go. More than ten years after the process started, the energy sector in Europe is still highly concentrated, cross-border trade in energy is limited and prices differ substantially from country to country. European energy markets are poorly integrated not only because of the technical difficulties attached to energy markets but also because of the weak political support to the process of integration.

This paper highlights the main obstacles to integration of EU energy markets and analyses briefly the potential impact on market integration of the new legislation recently proposed by the European Commission in the fields of energy and climate change.

The existing conflicts between, on the one hand, increasing global efficiency derived from further integration and, on the other, national interests have to be addressed explicitly if the EU wants to continue making progress in the process of liberalisation.

¹ This note is an update version of the presentation made at the SUERF / OeNB Workshop on “Commodities, Energy and Finance” in Vienna on 3 March 2008.

2. A Common Market for Energy?

Despite the process of liberalisation and regulatory harmonisation started by the European Commission in the mid-1990s, energy policy in the EU has traditionally remained a national issue. The European energy sector has remained fragmented not only due to the technical complexity of energy markets and to the geography of Europe but also due to the lack of political initiative at national level to eliminate obstacles to market integration. Despite the technical difficulties of establishing and managing large energy markets, there is still scope for further regional integration and overall price convergence.

The current picture of the EU energy sector is very fragmented. The energy mix differs substantially from country to country which stems from different policy priorities and concerns. Prices for gas and electricity also differ greatly.

The European energy mix is composed of sixty percent oil and gas, twenty percent coal, fourteen percent nuclear and six percent hydro, renewable and other sources of energy. The energy mix however varies substantially across EU states. For example, forty percent of France's energy consumption is nuclear energy while gas only represents fifteen percent of the primary energy consumption. By contrast, in Germany, gas and coal constitute almost fifty percent of the total primary energy consumption and nuclear energy represents slightly above ten percent. This means that the concerns and priorities of France and Germany differ. While France is keen on expanding its nuclear base, Germany has a phase-out plan for nuclear energy and is looking to secure its gas supplies and promote the use of its domestic coal reserves and its renewable resources. Energy mix differs from country to country and so do each country's policies and priorities.

In addition, energy dependence on non-EU countries also differs as well as the origin of energy imports. For example, eighty percent of the energy consumed in Spain is imported (mostly gas and oil) while for Germany this figure is slightly above sixty percent. The origin of such imports is diverse. Germany obtains half of its gas imports from Russia while Spain's gas imports come mostly from Algeria and Nigeria. The lack of interconnection between the German and the Spanish gas markets implies that the external policy priorities of both countries regarding gas differ. Given the different degree of import dependence and the diversity in the origin of imports, it is difficult to find common interests amongst EU countries for their external energy policies.

What determines the energy mix? The energy mix is primarily determined by geographical factors and the availability of natural resources (e.g. the abundance of lignite in Germany and Poland, hydro resources in Nordic countries and Austria and biomass in Sweden and Finland) but also by political decisions. For example, the reaction of EU countries to the 1970s and 80s oil crisis or to the Chernobyl accident varied substantially. Sweden, for example, promoted heavily the investment in renewable energy after the first oil crisis. In 1980, after a national referendum, Sweden decided to phase out nuclear power. Italy decided, after the Chernobyl disaster, to shut down its four nuclear power plants. Other European countries such as Spain, Germany, Austria, the Netherlands and Belgium have decided to phase-out their nuclear programmes. On the other hand, France, Finland and several new member states have active nuclear programmes. Also, the share of renewables in the energy mix does not only depend on the availability of resources but also on the existence of specific policies to support the deployment of renewable technologies. Germany, for example, has in place generous policies to support renewables which have resulted in a rapid deployment of wind mills and solar panels. The level of commitment of different governments to implement climate change policies also contributes to determine the energy mix.

A common price for energy would indicate the existence of a common market for energy. Prices for gas and electricity differ however substantially across Europe. Wholesale gas prices are in most European markets determined by indexation mechanisms (mainly to oil and oil derivatives). Only a small share of gas is traded in the three main trading hubs NBP, Zeebrugge and the TTF. As reported by the European Commission's recent sector inquiry on energy², prices determined by indexation mechanisms differ from hub prices. In general, long-term contracts indexed to oil are much less volatile than those indexed to hub gas prices. There are no signs of price convergence, which shows the limited arbitration possibilities between different markets due to the lack of interconnection.

In the case of electricity, prices also diverge across the EU both at wholesale level³ but mostly at consumer level. Retail prices for different countries differ substantially even where wholesale prices are similar as is the case for France and Germany.

² DG Competition report on the energy sector inquiry, 10 January 2007, paragraph 310. Available at <http://ec.europa.eu/comm/competition/sectors/energy/inquiry/index.html>

³ See Figure 38 in page 11 of the sector inquiry.

3. Obstacles to a Common Energy Market

The obstacles to a common market for energy can be either of a technical or of a political/economic nature.

The technical barriers have to do mainly with the characteristics of energy. First, energy relies on a physical network which makes markets less liquid and adds technical complexity in the operation of markets. This implies some inherent tendency of energy markets – mainly gas and electricity markets – towards regional fragmentation. Electricity is non-storable and transportation is economically feasible only over limited distances. Non-storability of electricity strengthens the above-described tendency towards regional fragmentation. More importantly, it even creates strong interdependence between regions with respect to the operation of the grid: network operators have to be closely coordinated in order to make trade possible.

The reliance on a network and the existence of geographical barriers do not always permit trade between different regions. This is for example the case of the UK or Ireland whose insular situation limits their interconnection with the rest of Europe. The Iberian Peninsula is also to a certain extent isolated from the rest of Europe.

However, not only is physical interconnection scarce but it is also, in many cases, underutilised. For example, some cross border interconnections in Europe are not governed by market mechanisms such as auctioning of capacity and market splitting which makes the operation of such interconnections suboptimal.⁴ In many instances, existing cross-border interconnections do not respond to economic criteria but to arbitrary reliability criteria defined by system operators on each side of the border. Even in the cases where market mechanisms are in place, different market designs at each side of the interconnector mean that the result is not always efficient. For example, the sector inquiry reports that in 2004 for 40 percent of the hours the interconnection capacity between Germany and the Netherlands was allocated in the direction Germany-to-Netherlands even if prices in Germany were higher than in the Netherlands.⁵

⁴ See pages 184-185 of the sector inquiry.

⁵ See sector inquiry, paragraph 552.

The existence of multiple uncoordinated Transmission System Operators (TSOs) and the existence of different market designs in different countries also make cross-border trade difficult. For instance, the different imbalance settlement periods (for TSOs to balance the market) across EU countries limit the possibility to trade across different regions.

But perhaps the most important obstacles are of a political and economic nature⁶. The degree of implementation of the liberalisation directives and of competition law differs from country to country. Some governments have favoured the emergence of national champions arguing that they help to secure their energy supplies. There are several recent examples throughout Europe (e.g. E.ON/Ruhrgas in Germany in 2003, the failed acquisition of Endesa by Gas Natural in Spain in 2006 and the ongoing merger between Gaz de France and Suez in France/Belgium) where governments have promoted the creation of large national champions, thereby reducing competition, arguing that such mergers and takeovers promote supply security and investment. In many cases, governments also keep substantial economic interests in energy companies which might constrain business decisions and might be an impediment to the acquisition of such firms by private investors. The French EDF and GDF, the Italian ENEL, the Swedish Vattenfall and the Hungarian MVM are examples of dominant players where the respective states hold substantial stakes.

The integration of markets might also not be politically desirable for some governments especially in those countries that have relatively cheap energy sources. In a market where prices are determined by the marginal technology, market integration might cause a price increase in the country with the lowest cost marginal technology. Even if the global outcome of integration is more efficient, the uneven distribution of the gains might discourage some governments from pursuing further integration. This could be the case of France, where full integration with neighbouring countries might cause an increase in the price of electricity since most technologies have higher marginal costs than nuclear energy which is predominant in France.

With the argument of securing national supply, governments might favour bilateral agreements between their energy companies and foreign suppliers and limit the interconnection with other countries in order to make sure that gas remains within the national borders. An example of this strategy

⁶ See Röllner, Lars-Hendrik, Juan Delgado and Hans Friederiszick. *Energy: Choices for Europe*. Bruegel Blueprint Series. March 2007. Available at www.bruegel.org

is the Baltic Sea Nordstream gas pipeline that links Russia with Germany, bypassing other European countries.

Finally, some of the current measures to fight climate change such as the policies to support the deployment of renewable energies have a national character and might contribute to the fragmentation of energy markets. For example, higher subsidies for renewable energy in a specific country might increase the cost of electricity and might cause prices to differ from country to country. Equally, investment decisions can be distorted by the existence of different mechanisms to support renewable energies and by the different allocation of emission permits in the context of the European Emissions Trading Scheme.

4. What Do the Latest Proposals for Energy Regulation Mean for Market Integration?

With the aim of increasing the efficiency of energy markets, fighting climate change and securing Europe's energy supply, the European Commission published in March 2006 a Green Paper on energy⁷. After the 2007 Spring Council gave its green light to the proposals made by the Commission on the basis of the Green Paper,⁸ the European Commission released on 19 September 2007 the so-called 'Third Liberalisation Package'⁹ and on 23 January 2008 the so-called 'Climate Action' package.¹⁰

The Third Liberalisation Package aimed to further liberalise the energy sector in Europe and to increase the interconnection between EU energy markets in order to promote further market integration. The Climate Action package aimed to implement in Europe a comprehensive policy architecture to fight climate change.

The third package proposed the structural separation of the activities of transmission and generation (in the case of electricity) and supply (in the case of gas) in order to guarantee non-discriminatory access to networks. The package grants more powers to national regulators, increases cooperation between regulators and establishes coordination mechanisms for system operators.

The adoption of the third package would imply a step forward in the process of liberalisation by deepening the opening of markets at domestic level, by facilitating cross-border interconnection and by improving the conditions of access to networks. However, the political consensus to push it forward does not seem to exist. The proposals of the Commission are not new but the momentum did not exist when the first and second liberalisation packages were adopted.

Does the momentum exist now? The main controversy around the third package is the network unbundling proposal. Eight countries (France and

⁷ Green paper on "A European Strategy for Sustainable, Competitive and Secure Energy", March 2006. Available at http://ec.europa.eu/energy/green-paper-energy/index_en.htm

⁸ See http://www.consilium.europa.eu/ueDocs/cms_Data/docs/pressData/en/ec/93135.pdf

⁹ See http://ec.europa.eu/energy/electricity/package_2007/index_en.htm

¹⁰ See http://ec.europa.eu/energy/climate_actions/index_en.htm

Germany amongst them) presented recently a ‘third way’ to proceed with the liberalisation process.¹¹ The so-called third way does not go beyond a proper implementation of the previous liberalisation package and excludes unbundling as a remedy.

The prospects of reaching a political agreement on this issue were poor. In fact, on 6 June 2008, the EU energy ministers accepted the “third way”, allowing electricity companies to be vertically integrated with separate management for generation and transmission activities. However, new policy developments have created new expectations for the progress of liberalisation: the German power company E.ON has recently proposed to commit to sell its electricity transmission system network to an operator which would have no interest in the electricity generation structural remedies to settle ongoing antitrust cases in the electricity sector.¹² The Commission has a number of ongoing cases in the energy sector that might result in new settlements contributing to the further opening of the energy sector despite the opposition of some governments.

On the climate change policy side, the European Commission has recently proposed a directive reforming the ETS after 2012¹³ and a directive on the promotion of the use of energy from renewable sources.¹⁴ The proposed reform of the ETS emphasises its European character by replacing national allocation plans by a European plan which reduces the distortions created by the existence of different permits allocation criteria. In addition, by increasing the share of permits that are auctioned, the efficiency of the allocation mechanism is improved. However, the mechanisms to promote the deployment of renewable energies continue to be mostly national in scope. The directive foresees a system of trade by which states can meet their targets by acquiring renewable certificates in other countries. Although trade in targets in theory favours efficient investment and guarantees the implementation of the least costly alternative, in practice, there are many restrictions to trade in the current proposal (e.g. trade is conditional on countries having met a share of their targets and trade should be authorised by the governments of the exporting and importing countries) which make the scheme not very flexible and do not guarantee an efficient outcome.

¹¹ <http://www.euractiv.com/ndbtext/press/3rdoptionletter.pdf>

¹² See <http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/08/132&format=HTML&aged=0&language=EN&guiLanguage=en>

¹³ http://ec.europa.eu/environment/climat/climate_action.htm

¹⁴ Proposal for a Directive of the European Parliament and of the Council on the promotion of the use of energy from renewable sources. Available at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2008:0019:FIN:EN:PDF>

Technological progress and other market developments can affect the process of market integration. For example, increasing scarcity and world competition for resources may trigger the adoption of protectionist measures in order to guarantee domestic supply. The turn to nuclear may loosen the dependence on fossil fuels and then reduce the incentives for protectionism. Investment in LNG terminals may increase the entry gates for gas in Europe, increasing the number of suppliers and making the European gas market more liquid. Also, the decrease in the cost of renewable energy might make subsidies unnecessary and therefore might reduce the fragmentation of policies.

5. Conclusions

The progress towards a common energy market is constrained by the physical characteristics of energy and by political and economic factors. The reliance of gas and electricity on physical networks and the difficulties of storing them create a tendency to market fragmentation. The technical complexity of operating networks and managing markets limits the expansion of markets. Also, the heterogeneity of market designs and the lack of coordination of system operators constitute obstacles to cross-border trade of energy.

In addition to the technical issues, there are also political and economic factors that prevent the integration of European energy markets. The protection of cheap domestic sources of energy, the promotion of national champions and of bilateral agreements in order to guarantee domestic supply and the national scope of some climate change policies contribute to the fragmentation of European energy markets.

The adoption of the recently proposed Third Liberalisation Package would contribute to facilitating further market entry, cross-border interconnection and market integration. However, the political opposition by some governments to some of the crucial provisions of the proposal such as network unbundling has already severely watered down its ambitions. The climate change package also has implications for the common market for energy. While the reform of the ETS goes hand in hand with the removal of obstacles to the creation of a common energy market, the directive on renewable basically retains a national focus and, although it introduces some European instruments such as the possibility to trade targets, the way it is drafted does not seem sufficient to homogenise the different support mechanisms existing across Europe.

Making further progress in the process of integration will increasingly imply dealing with the conflict between national interests and global efficiency. Market integration increases global efficiency but the distribution of the total benefits might not be even. This might create incentives by less-favoured states to free-ride. New policy developments should consider how to bypass national incentives to guarantee domestic energy supply, to protect access to domestic sources of energy and to protect national industry from the impact of stricter environmental regulation. More crucially, the effective fight against climate change requires common action in order to make an effective use of the complementarities across states. A single market for energy is the basis for a common approach to EU climate policy. A common climate policy will not deliver if markets are fragmented and prices do not converge.

ENERGY MARKETS IN EUROPE: THE STATE OF PLAY AND FUTURE PROSPECTS

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1. Introduction

Electricity market reforms around the turn of this century opened up closed markets to competition in the EU. These changes brought about the opportunity not only for customers to shop around for the best deal, but also made possible for suppliers to source electricity at the lowest possible cost. At the same time generators got the chance to sell their product to those who pay the most for it. As a result a number of wholesale marketplaces emerged throughout Europe during the last couple of years.

Well functioning wholesale markets are – among others – prerequisites for competitive retail markets to develop. As such, they facilitate the entry of new market participants by removing the need to act as an integrated utility company. Prices on these markets give also important signals for market participants to decide on optimal investment strategies in new generation assets, in consequence facilitating continuous security of supply.

2. Where do we come from?

The level of development of wholesale markets differs greatly between European countries, to a large extent reflecting the historical structure of the industry and the regulatory framework they work in. There is a long list of indicators against which we can measure the functioning of wholesale markets. In general they should offer a large number of short and long term products with an appropriate market depth with high traded volumes, which would enable market participants to trade efficiently at lowest possible costs. In order for this to happen there should be a large amount of equally sized and well informed market participants with inherently different trading interests, such as generators, pure traders and suppliers.

By looking around in Europe we find that these criteria only partly apply for the majority of the markets. Some are large enough but dominated by a single (France) or a small number of large players (Germany), others have a potential to evolve but plagued by omnipresent long term contracts (Hungary) and some few lucky are small in size (though heavily concentrated) and relatively well connected to their larger neighbours (e.g. Austria and to some extent Belgium).

In general, markets have a fairly good track record in regions where traded commodity markets have a long history and market reforms also included structural measures (UK) or where countries have long learnt to think in regional instead of national terms (Nordic region).

3. Questioning of the current market framework

As long as markets offered acceptable prices imperfections did not seem to bother market participants and politicians. With strongly increasing prices since the mid of 2003 customers have started questioning some mechanisms and the prevailing market framework. They also alleged large generators of market wrongdoings and claimed that dominant players pushed up prices deliberately to cash in on customers.

These allegations mobilised decision makers and kicked off a debate on a number of issues. A solid input to this discussion was supplied by the European Commission's DG Competition carrying out the Energy Sector Inquiry, identifying serious market shortcomings. A good deal of problems highlighted concerns the functioning of wholesale markets, such as:

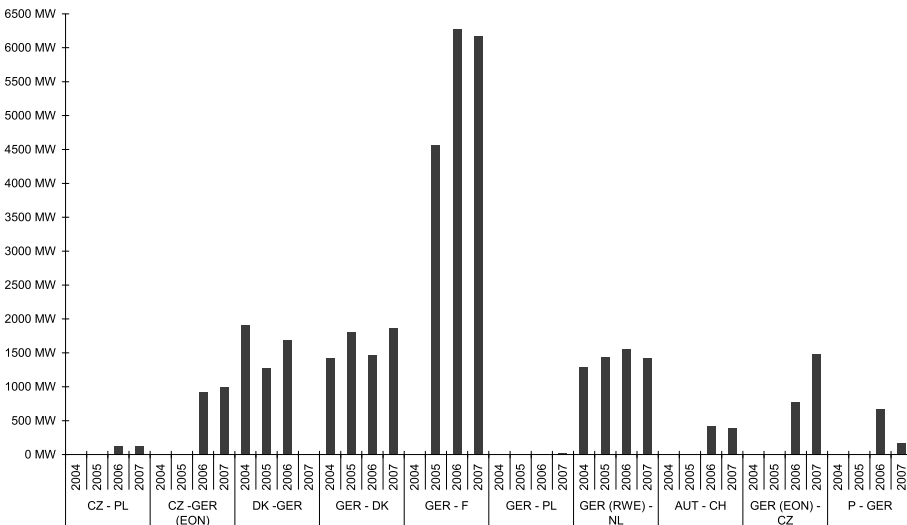
- High market concentration
- Insufficient market integration
- Lack of transparency

4. Where are we now?

It became apparent that on most of the markets few incumbent generators have dominant positions and, as a result, the potential to influence market prices. Whether such wrongdoings have really occurred is a subject of a number of ongoing investigations carried out by national competition authorities and the Commission itself.

Markets are also fragmented and mostly national in scope. Transmission lines connecting adjacent markets are often chronically congested preventing prices to even out between countries. Though scarce transmission capacities are now allocated mostly in a transparent manner to market participants, the level of available cross-border capacity has not changed much in recent years¹. This is inspite of significant congestion rents collected by transmission system operators (TSOs) which are supposed to be invested in the extension of the transport infrastructure. One reason for investment not taking place is, because it is not in the inherent interest of large incumbent players, who rather try to protect their vested generation interests by keeping potential competitors out their traditional markets. Since some of the major incumbent

Figure 1: Allocated cross-border transmission capacities stagnate



Source: TSOs' websites, E-Control

¹ Technical capacity increased only by 1.1% from 2004 to 2006

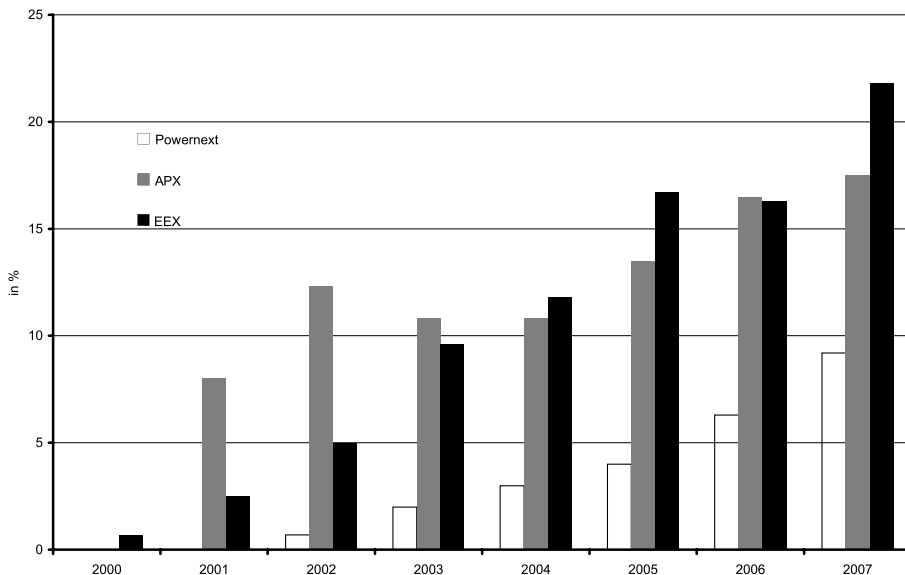
generators also happen to own the TSOs, progress on this issue can only be expected once this functional conflict of interest is relieved by effective structural measures.

Trust in the general functioning of the market has been weak also because in Continental wholesale markets a series of information is not made routinely available to all market participants. Especially generation related data are often kept as a business secret preventing asset light market participants from taking informed trading decisions. Thanks to mounting political pressure, the data release practice of incumbents has recently experienced some change. For example, formerly rather secretive German and Austrian generators started to post output related data on the European Energy Exchange's website.

Nevertheless most continental wholesale markets made a fairly good progress in the last couple of years. Especially on the Dutch and German markets, traded volumes are fairly high on both, spot and forward markets and activity have been increasing on exchanges and OTC markets alike.

Financial traders and smaller players continue to enter the wholesale marketplace; power exchanges add more and more regions to their portfolio

Figure 2: Development of day-ahead traded volumes in electricity on selected energy exchanges as a percentage of national consumption



Source: EU Commission - Energy Sector Inquiry, APX, EEX, Powernext

and offer an increasing number of services to their customers. A recent example of such activity is the planned merger of two important European energy exchanges, Germany's EEX and France's Powernext, creating a major Continental marketplace for power and gas transactions.

5. Where do we go?

In order for wholesale markets to further develop and the single European market to ever become a reality some essential steps need to be taken. The problem of market concentration cannot easily be tackled. Whereas the ongoing merger drive of large utilities could be managed by increasingly vigilant competition authorities, both, on national and EU level, prevailing market structures – often a legacy of the past – can hardly be addressed by competition tools². Such structural measures are left to respective national governments which have – apart from very few examples – shown little interest in breaking up their incumbent utility(ies). In the last couple of years one could observe rather the opposite: governments became supportive of the anachronistic idea of national champions (e.g. in Poland and Spain).

5.1. *The Regional Initiatives*

A realistic way forward is a joint effort to enlarge the boundaries of national markets and let the incumbents play on a regional field. This was the thinking behind the Commission's move to kick-off a discussion on the development of regional energy markets, which is now channelled by ERGEG³ and led to the Electricity and Gas Regional Initiatives. These Initiatives try to identify existing barriers to entry and obstacles that hinder the development of the regional markets. Based on the findings propositions of concrete and practical improvements will be made to remove those obstacles, which subsequently have to be implemented by the respective TSOs and market operators. The work of the Electricity Regional Initiatives is built around 7 regions.

The regional groups have already established concrete action plans and have been reported back on subjects, such as proper management of congestions, calculation and allocation of scarce interconnection capacities, improving market transparency and establishing of regional balancing markets. The focus of the work is currently on the co-ordination of the management of congestions and interconnection capacities by the TSOs of the regions. The goals already achieved within the regions reflect the historical differences between markets and their levels of development. Whereas in the Central-West

² An initiative to change this situation is currently underway in Germany, which would give the competition authority the power to take structural measures once it identifies major breaches of competition law.

³ European Regulators' Group for Electricity and Gas (www.energy-regulators.eu)

Figure 3: Groups of countries as defined by ERGEG's Regional Initiatives

Sources: ERGEG and E-Control

region (including Belgium, France, Germany, Luxembourg, Netherlands) a trilateral market coupling has already been established since November 2006 with the involvement of the respective power exchanges and TSOs of France, Belgium and Netherlands, the Central-South region (including Austria, France, Germany, Greece, Italy, Slovenia) could not yet go further than establishing co-ordinated explicit auctions, e.g. at 3 of the 4 Italian borders.

Steps towards the efficient management of transmission bottlenecks will certainly contribute to overall market efficiency but not solve the problem of chronically congested lines per se. Long administrative procedures as well as reluctance of insufficiently unbundled TSO have in the past seriously hampered the natural development of larger price regions. There is, however, slow progress, such as the development of connections between Norway and Netherlands and Norway and Germany or capacity developments between Germany and Netherlands or within the Nordic region itself.

Since the lack of transparency was an issue identified in the Commission's Sector Inquiry as a major barrier to competition, regional groups have been keen on improving this situation. Current discussion has focused around the implementation of the mandatory transparency requirements of the Congestion Management Guidelines. As a first result of this process the Northern regional group produced an agreement on specifics of data that will have to be released to market participants. A couple of month ago also the Central-Western and Central Eastern groups followed. Such data will in particular include timely and accurate information on load, transmission, interconnection, balancing and generation. Other regional groups have also taken this framework as a starting point for their respective transparency initiatives.

5.2. The 3rd EU legislative package

The Commission's yearly market assessments and in particular the findings of the Energy Sector Inquiry highlighted serious shortcomings of the internal energy market. Based on this the 2007 Spring European Council invited the Commission to propose further measures which are needed to speed up the process of market integration and are sufficient to bring about a true internal energy market. These measures include:

- The effective separation of supply and production activities from network operation;
- The further harmonisation of the powers and enhanced independence of the national energy regulators – Agency for the Cooperation of Energy Regulators (ACER)
- The establishment of an independent mechanism for co-operation among national regulators
- The creation of a mechanism for TSOs to improve the co-ordination of networks operation and grid security, cross-border trade and grid operation – European Network of TSOs (ENTSO); and
- Greater transparency in energy market operation

At the heart of this package are the measures proposed to effectively separate operation of the transmission network from other commercial activities of the incumbents. In this respect the Commission (and ERGEG) clearly spoke out for the so called Ownership Unbundling solution which they see as an ultimate structural measure to create a true level playing field for all market participants. This position has sparked a controversial debate between the stakeholders. Especially the governments of Germany and France have been strongly in support of the interests of their large incumbents, rejecting

proposals involving any change in ownership rights. Their position has recently suffered a major blow, when the Commission's Directorate General for Competition struck a deal with E.ON, whereby later agreed to sell of its transmission network to an undertaking not active in the generation and supply business and divest almost 5,000 MW of generation capacity in its home market. In exchange, the Commission would drop its running competition cases against the German major.

International examples show that ownership unbundling has proved itself as a reliable framework for efficient market functioning and enhanced security of supply by leaving room for independent and targeted infrastructure investment decisions.

Another central idea of the proposed package is the strengthening of the independence of the national regulatory authorities by giving them further powers, particularly in areas such as monitoring of TSOs' unbundling compliance, reviewing their investment plans, monitoring of the level of competition and transparency obligations. Regulators shall also receive a formal mandate to co-operate at European level which would improve the currently applied voluntary approach. Experience shows that countries with long liberalisation history also tend to give their regulators the sufficient means and a high degree of independence they need to perform their regulatory duties properly, while others have only recently established regulators with powers that are weaker or spread over different bodies. Therefore, the powers of regulators need to be further reinforced and harmonised.

Pursuing the internal market requires not only an enhanced co-operation of national regulators, but also European level regulatory action. Such work has been co-ordinated within the ERGEG framework, where the Commission could seek advice of energy regulators on policy issues. It has also served as a platform for discussion on and implementation of different initiatives. Whereas ERGEG proved itself as a credible driver of market convergence, it has lacked the formal powers to establish common binding standards to facilitate cross-border trade and, through that, the realisation of the internal energy market. The Commission therefore decided to propose the establishment of the Agency for the Cooperation of Energy Regulators (ACER). It is supposed to close the existing regulatory gap and be empowered to adopt individual and legally binding decisions concerning the cross-border sections of transport infrastructure. On top of that it would also exercise regulatory oversight of the co-operation between TSOs.

This TSO co-operation, currently of a voluntary nature, is also proposed to be formalised as a European Network of TSOs (ENTSO). It is expected to facilitate the development of detailed market and technical codes that are needed for the smooth and reliable operation of the interconnected energy networks. This also includes the enhancement of the efficient transfer of operational information and a co-ordinated effort to increase transparency on the usage of the transport infrastructure. ENTSO would also play an important role in the harmonised planning of the European network infrastructure by issuing forward looking network development plans.

Since transparency is one of the crucial prerequisites for the development of competitive energy markets, proposals brought forward within the 3rd package will also have to address key aspects of it. Particular importance has to be attached to the release of fundamental data which are indispensable for optimal dispatch and trading decisions and to understand the drivers of supply and demand. Today, such data are often only available for incumbents with generation and/or transmission assets who either do not release them at all or only do it in a time frame, format or aggregation they find appropriate. Although this situation, thanks to the regional implementation of relevant guidelines, has recently improved significantly, further, sufficiently detailed, harmonised and legally binding rules will be necessary to achieve the desired level. This has to be then complemented with a carefully defined set of transactional data to gain a more precise picture of the liquidity and evolution of traded wholesale markets.

6. Conclusion

With increasing trading activity, marketplaces established themselves as indispensable platforms for the whole energy community. As such they became natural benchmarks on which market participants are increasingly base their commercial decisions. This also implies that prices formed on these markets are of crucial importance not only for participants executing transactions directly, but also for any subsequent dealings, including the supply of final customers.

Ever increasing electricity and gas prices put wholesale markets in the focus of the energy discussion. Successive inquiries revealed serious shortcomings, blaming concentrated, intransparent and poorly integrated markets for the situation. These findings gave the final impetus to ERGEG's planned Regional Initiatives, seeking the implementation of workable frameworks for regional market integration. Whereas these initiatives delivered useful results, they are based on a voluntary approach of the stakeholders involved and cannot tackle any structural market barriers. To remedy this situation and to give a final boost to the process leading to an efficiently functioning internal energy market, the Commission put together a number of key legislative proposals, dubbed as the 3rd energy package. Its central elements are the ownership unbundling of the transmission networks and an enhanced regulatory framework including the establishment of an EU level regulatory agency.

The success of the internal energy market and that of the 3rd package, which is supposed to pave the way for it, greatly depends on the courage of member states whose governments hold the key to this process. Their decision will ultimately set the framework for a market, the proper functioning of which is essential for the overall European economy, be it the industry, small businesses or household customers.

NORGES BANK'S EXPERIENCES WITH THE ORGANISATION OF THE GOVERNMENT PENSION FUND – GLOBAL

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1. Introduction

This paper discusses some of the most important features of the Norwegian Government Pension Fund – Global. Focus will be on the underlying economics of the Fund, and on how the management model is structured.

2. Importance of petroleum for the Norwegian economy

Over the last 35 years Norway has become one of the largest oil and gas exporters in the World. Petroleum counts today for 25% of total production in Norway, close to 40 per cent of state revenues, and more than half of the total Norwegian export.

Figure 1 shows the petroleum production profile in Norway. So far oil has been most important. However, oil production has already started to decline while gas production is expected to continue to increase over the next years. We see from the figure that Norway is now close to the top of the petroleum production profile.

The combination of high petroleum production and high oil prices has led to strong growth of the Fund, see figure 2. The first allocation to the Fund came in 1996. At the end of 2007, the Fund had risen to USD 400 billion. We expect the Fund to grow rapidly also in coming years. It is projected to reach USD 800 billion in 2014.

Figure 1 The Norwegian petroleum production profile

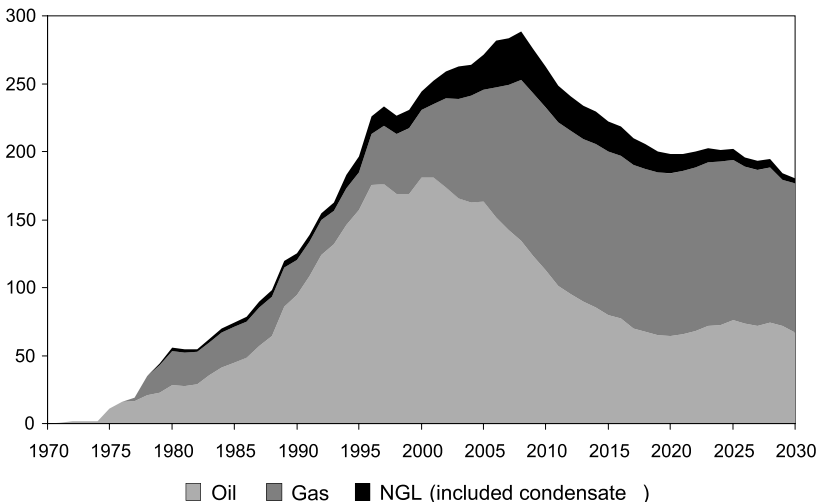
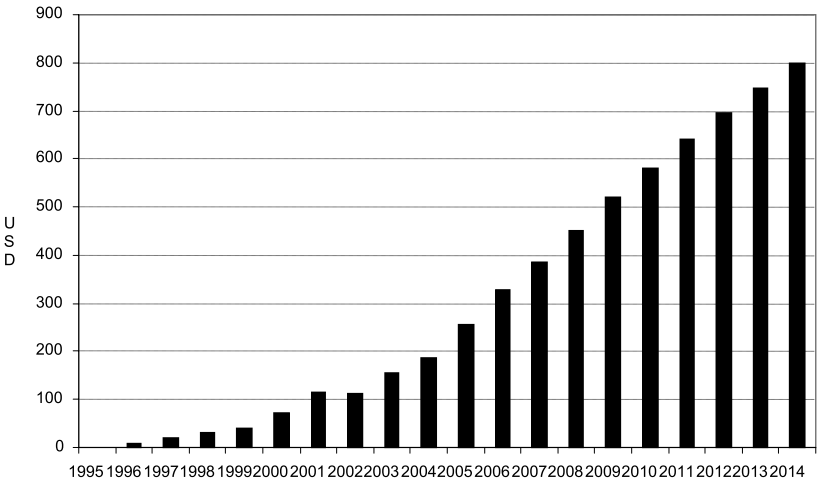


Figure 2 Size of Government Pension Fund – Global, 1995–2014



3. Objectives of the fund

The Government Pension Fund has two main objectives: One is to serve as a savings instrument with an aim to distribute petroleum revenues across generations. The petroleum resources are part of our national wealth and belong not only to the current generation but also to future generations.

The second objective is to shield the domestic economy from fluctuations in oil prices. Even though Norway has a fairly diversified tax-base, the large variability in the price of oil would have caused large demand fluctuations in the Norwegian economy, if petroleum revenues were to be used as they accrue. This could have a negative impact on the competitiveness of our internationally exposed industries. Thus, the Fund serves as a buffer between current petroleum revenues and the spending of these revenues in the Norwegian economy.

The alternative to setting up the Fund would have been to regulate the extraction path of oil and gas by putting a conservative upper limit on annual extraction. This is, to some extent, what we did in the 1970s and 1980s. By setting up the Fund, we have separated the extraction of oil and gas from the actual spending of the petroleum revenues. This has resulted in higher production of oil and gas over the last decade.

In 2006 the name was changed from Government Petroleum Fund to Government Pension Fund – Global. However, it is important to stress that the Fund is not ear-marked for future pension expenditure. The return of the fund should continue to be a general support to the Government budget. Pension expenditures will be a significant part of this budget in future due to demographic changes in Norway over the next decades.

4. How the fund works

The entire government petroleum revenues, as well as the return on the Fund, go into the Government Pension Fund – Global. Then, an amount equal to the non-oil budget deficit is transferred into the fiscal budget. This mechanism ensures three objectives: First, the variability in petroleum revenues is isolated to the growth rate of the Fund. Second, any use of the Fund is integrated into the ordinary budget routine and does not undermine the fiscal budget as a single instrument for assigning priority to different needs. And third, the amount of spending of petroleum revenues, that is the size of the non-oil budget deficit, can be aligned with the needs of fiscal policy as well as with the targeted intergenerational distribution.

Note that this setup for the Fund can work with different fiscal rules or guidelines for how large the non-oil budget deficit should be. In Norway, the parliament approved in 2001 a fiscal guideline that implies that the annual non-oil deficit should, on average over the business cycle, be limited to 4 per cent of the Fund. This is assumed to be the long-term expected real return on the Fund. Such a guideline provides predictability in the level of spending. Three successive governments have been loyal to this guideline and it still enjoys a substantial majority backing in the Norwegian parliament. Adherence to this policy is also scrutinized closely by the public who have developed a sense of ownership of the Fund.

There are two stabilizing mechanisms in this fiscal guideline. The first is in case of large changes in the value of the fund. The second is related to the economic cycle. So, for instance, if there is a sharp drop in the value of the fund or if there is a recession in the economy, the government could spend more than 4%. This mechanism is of course symmetrical. In 2007, a year where the Norwegian economy was booming, the use of petroleum revenues was less than 4 per cent of the Fund.

5. Division of responsibility

One key element of the Fund Management Model is accountability. The Fund is formally owned by the Ministry of Finance, while operational management is delegated to Norges Bank. Thus, there is a clear division of responsibilities between the Ministry and the Bank. This arrangement is formalised through a management mandate given to the Bank by the Ministry.

- *The Ministry of Finance* has the responsibility for the key long term strategic decisions affecting expected return and risk. The Ministry determines a benchmark portfolio and establishes risk limits and guidelines. This means that most of the variation in the return of the Fund is determined by decisions made by the Ministry.
- *The Bank's* main responsibility is to maximise expected return relative to the benchmark – within risk limits formulated in the mandate. Hence, Norges Bank has a mandate to engage in active portfolio management in addition to providing a cost-effective conversion of incoming petroleum wealth into financial assets. Since 1997, the Fund has averaged a real return of 4.3 per cent, of which the bank has delivered 0.40 per cent from active management.

The Ministry submits an annual White Paper to the Norwegian parliament where the management of the Fund is reviewed. Important strategic decisions are also presented to the Norwegian parliament before decisions are implemented. A recent example is the decision to increase the share allocated to equities from 40 per cent to 60 per cent.

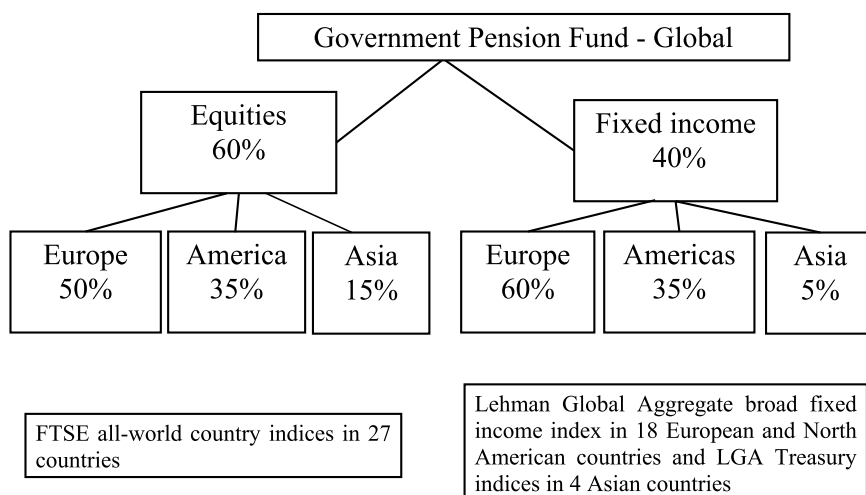
Another key feature of the Fund's management model is transparency and disclosure of information. This is emphasized as a key tool in building trust, both domestically and internationally. All investment principles and guidelines as well as strategic advice and second opinion reports are made public. Norges Bank publishes quarterly reports and holds press conferences. The annual reports disclose a list of every single investment held at the end of the year and the key elements of how we perform in our corporate governance work.

The combination of accountability and transparency has contributed to a high level of confidence in how Norway's national financial savings are managed. Confidence is vital in maintaining motivation among Norwegians for saving our wealth rather than limiting our oil production or immediately spending the petroleum revenues.

6. Investment strategy

The Fund's aim is to maximize the international purchasing power of the fund in the long run. The investment strategy seeks to achieve a high financial return with moderate risk. High return entails that the fund invest in equity, see figure 3. Moderate risk entails that the fund is well diversified across countries and asset classes. The benchmark portfolio consists of approx 18000 different equities and bonds from a large number of countries. Moreover, the Fund is a financial investor, with a diverse portfolio of non-strategic holdings in a large range of companies. The maximum ownership stake in an individual company is limited to 10 per cent, while the average ownership stake is approximately 0.5 per cent. The Fund holds no large or "strategic" ownership stakes.

Figure 3 Investment strategy of the Government Pension Fund – Global



The Norwegian government has issued Ethical Guideline for the Pension Fund Global. It is based on three pillars. The first is exercise of ownership rights to reflect internationally accepted principles such as the UN Global Compact and the OECD Guidelines on Corporate Governance. The second pillar is negative screening of companies that produce weapons that may violate fundamental humanitarian principles. The third pillar is exclusion of companies that are considered to be an unacceptable risk of contributing to serious violations of human rights or severe environmental damages.

7. Concluding remarks

There are three main insights we have gained in the decade the Fund has existed.

Perhaps most importantly, the Government Pension Fund and the fiscal guideline have helped to avoid the common pitfalls in resource rich economies, e.g. lack of fiscal discipline and loss of focus in structural policy. The Fund has shielded the mainland economy from excessive variability and has to a large extent reduced the oil-price dependency of the exchange rate.

Another important key to the success of the Fund so far has been the clear division of responsibility between the Ministry of Finance as the owner and Norges Bank as the manager. This entails that there is a separation between the economic policy role of the Fund and investment decisions made by professionals in a performance-oriented environment.

Finally, an essential insight is the importance of political support for the strategic asset allocation. There was a broad consensus in parliament behind the choice of investing in equities in 1997. This was important in order to navigate through the turbulent waters of equity markets in the beginning of this century – and such turbulence will certainly return.

The model we have chosen in Norway has evolved in a Norwegian setting and is not necessarily suited as a blueprint for other countries. But I believe it is important to understand the basic, and maybe universal, principles underlying the model and adapt them to the particular fiscal situation and the particular political tradition of the country in question.

THE RUSSIAN OIL FUND(S): PAST PERFORMANCE AND POLICY OPTIONS¹

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1. Introduction

Russia's recent economic performance has been impressive: during the past five years, the Russian economy grew by more than 40% in real terms. Initially, the recovery was triggered by the ruble devaluation in the aftermath of the 1998 financial crisis and its positive impact on the country's competitiveness. In parallel, it was increasingly driven by the soaring world prices of oil and natural gas, which account for over one-half of total exports and are thus the country's two main export commodities (see e.g. OECD, 2004). This high share indicates that the Russian economy is vulnerable to energy price volatility, which poses a challenge to fiscal management given the future revenue uncertainty.

Revenue uncertainty affects all countries that show a high degree of dependence on the exports of one particular commodity whose price is subject to sharp and unpredictable fluctuations. In many instances (including

¹ This paper is based on the author's presentation at the SUERF Workshop on 3 March 2008 and represents an update of an earlier study which was published in the Focus on European Economic Integration, Oesterreichische Nationalbank, Nr. 1, 2007.

the situation in Russia since 2004), the fiscal policy response has been to accumulate extra-budgetary funds (often explicitly referred to as stabilization funds) in times of favorable external developments, with the aim of tapping these funds in case the external conditions deteriorate. In fact, in setting up an oil fund, Russia followed the example of 16 other countries, including Norway, a number of Middle East, African and Latin American countries, but also Kazakhstan and Azerbaijan. The U.S. state Alaska operates two oil funds (one each for saving and stabilization purposes),² while Chile has established a copper stabilization fund.

The previous experience with stabilization funds has been mixed (see e. g. Bartsch, 2006; Kalyuzhnova, 2006; Vatansever, 2005; Davis et al., 2001; Fasano, 2000). In Kuwait, Norway and Alaska, for example, the funds have indeed been effective tools of asset-building aimed at counteracting a future projected decline in oil revenues or a projected increase in social outlays (as in Norway). However, in some other countries, e.g. Oman, Nigeria and Venezuela, the experience with oil funds has been less positive – arguably because of frequent changes to the fund rules and deviations from its intended purposes. Thus, Venezuela serves as an ironic example of a case in which the whole concept was perverted, as the moneys transferred to the stabilization fund over the 1990s were financed with growing government borrowing. Generally, commitment to fiscal discipline and sound macroeconomic management has been crucial in the successful creation of funds.

This paper deals with the institutional setup and the performance of the Russian Oil Stabilization Fund (OSF) in 2004–2007, and analyzes the available policy options for the two newly established funds – the Reserve Fund and the National Welfare Fund – which replaced the OSF in February 2008 in the wake of a comprehensive budgetary reform. Section 2 outlines the OSF's rules, while sections 3 and 4 analyze the OSF's performance as a tool of macroeconomic stabilization and monetary sterilization, respectively. Section 5 deals with the recent OSF reform and outlines future scenarios.

² The stabilization and saving functions are to be distinguished. In line with theory, stabilization is one of the three essential functions assigned to the state (stabilization, allocation and distribution) and consists of smoothing the path of economic growth in the short and medium run by means of countercyclical policy. While the task of stabilization is generally faced by a wide range of countries (which are not necessarily commodity exporters), the need for stabilization in commodity exporting countries typically results from commodity price volatility. In turn, the saving function applies in the long run and is confined only to countries whose natural resources are potentially depletable. In this case, after the country's available resources have run out, the accumulated savings are intended to maintain the living standards of future generations.

2. Features of the OSF

The OSF was established in January 2004³ with the purpose of (1) reducing the vulnerability of the state budget to the volatility of world oil prices (stabilization function), and (2) sterilizing the impact of oil-related foreign exchange inflows on the money supply and inflation (sterilization function). By the end of 2007, the OSF had built up assets worth more than RUB 3.8 trillion (no splitting into the next line if possible).

The OSF accumulated money as long as the world price for Russia's Urals oil exceeded the cutoff price (which was initially set at USD 20 per barrel, but was revised to USD 27 starting from January 2006). The OSF could be tapped for covering federal budget deficits when the Urals price fell below the cutoff price.

The OSF collected revenues from two taxes, (1) a portion of the export duty on crude oil, and (2) a portion of the mineral resources extraction tax on oil. Both referred only to that part of the tax that stemmed from the world price in excess of the cutoff price. Taxes on oil products and natural gas were not transferred to the OSF, even though their prices closely followed crude oil prices.⁴

In addition, parts of the federal budget surpluses (which were attained even though the additional tax revenues from high oil prices were absorbed by the OSF rather than by the current budget) were transferred to the OSF as well. The federal budget surpluses stood at 4.2% of GDP in 2004, 7.5% in 2005 and 7.4% in 2006. The surpluses were partly attributable to deliberate targeting, but they were also helped by the conservative oil price assumptions underlying the budgets.

The OSF was managed by the Ministry of Finance and until mid-2006 was held entirely in Russian ruble that were deposited interest-free at the Central Bank of Russia (CBR).⁵ However, in summer 2006, a strategic decision was

³ The bulk of regulations covering the operation of the OSF are contained in Ministerstvo Finansov Rossiyskoi Federatsii (2006a, 2006b).

⁴ This has changed since February 2008 (see section 5 for details).

⁵ The main consideration behind keeping the entire OSF in Russian ruble were the perceived fears of the Russian assets 'abroad' being frozen as a result of possible international legal disputes.

taken on converting the OSF into foreign-currency denominated assets, and the conversion had been completed by the end of the year. This was in line with the Budget Code provision stipulating that the OSF can be invested in foreign sovereign debt securities. The government guideline was that these should be high-quality⁶ sovereign bonds of 14 developed countries – the euro area countries, the United Kingdom and the U.S.A. Thus, the OSF was held in a currency basket with the following composition: 45% in U.S. dollars, 45% in euro and the remaining 10% in pound sterling. Technically, the government regulations provided for two theoretical options of the OSF's placement: Its funds could be used to directly purchase foreign bonds, and/or could be deposited in foreign currency-denominated accounts at the CBR, with the returns on these accounts being based on the performance of the underlying foreign debt securities. However, in reality only the second option was used.

⁶ With a AAA/Aaa credit rating from at least two of the three rating agencies Standard & Poor's, Moody's and Fitch IBCA.

3. Sterilization Function

Given the small size of the Russian banking and financial sector and its overall state of development, the CBR has only few instruments at its disposal to sterilize the oil-related (and, since 2006, also capital-related) foreign exchange inflows. Against this background, the role of the OSF as a sterilization instrument has been crucial. As table 1 shows, the CBR's foreign assets have been growing rapidly and now account for nearly all assets. Between January 2004 and January 2008, the value of foreign assets grew nearly five times in nominal terms, which represents an increase by some RUB 9.5 trillion. This increase was sterilized only slightly (to the effect of some RUB 0.3 trillion) by a reduction in already modest domestic assets, notably in claims on government and banks. Still, only about one-third of the increase in (net) foreign assets has actually translated into monetary expansion (i.e. monetary base growth), as the value of reserve money increased by only RUB 3.6 trillion over the same period. The reason is that another RUB 5.2 trillion was absorbed by an increase in government deposits, two-thirds of it representing the OSF and the rest accounted for by other deposits (including those of the regional and local governments). Thus, the sterilization function of the OSF arises from the fact that foreign exchange earned from oil exports largely stayed with the CBR, as it was held by the government in a CBR account. Alternatively, any use of OSF money for the purchase of domestic assets – whether physical or financial – would have increased the monetary base and could have led to inflationary and appreciation pressures.

Obviously, the CBR's sterilization efforts were also supported by the early repayment of the external debt Russia owed – particularly the International Monetary Fund (IMF), the Paris Club and Vneshekonombank (which serviced Russia's sovereign external debt following the financial crisis in the period from 1998 to 1999) in summer 2005 and summer 2006 (see table 2).⁷ On both occasions, the CBR's foreign assets contracted temporarily, mirrored by a reduction of government deposits on the liability side of the CBR's balance sheet.

In turn, the gradual conversion of the OSF from ruble into foreign currency, which took place in the second half of 2006, did not matter in macroeconomic terms. Also, it cannot be traced from the CBR's balance sheet, at least at the

⁷ Further early repayments of foreign debt, albeit on a much smaller scale, were undertaken in 2007.

aggregation level presented in table 1. The conversion presumably resulted in a mere substitution of ruble-denominated government deposits by foreign currency-denominated government deposits on the liability side of the CBR's balance sheet and a corresponding replacement of foreign exchange with foreign debt securities within the item "foreign assets" on the asset side of the CBR's balance sheet.

The sterilization policy by means of the OSF certainly contributed to macroeconomic stability – at least until recently. Despite the soaring oil prices, the Russian economy did not show signs of excess aggregate demand, despite buoyant private consumption and rather solid capital formation, while the recent pick-up in inflation (to 11.9% in 2007 on the end-year basis) is largely attributed to the soaring world food price and is essentially a global phenomenon.

Table 1: Balance Sheet of the Russian Monetary Authorities between 2004 and 2008

In RUB billion, as of 1 January	2004	2005	2006	2007	2008
Assets					
Foreign assets	2,391	3,610	5,555	8,087	11,887
Claims on government	477	426	276	247	354
Claims on credit organizations	198	178	28	43	50
Liabilities					
Reserve money	1,914	2,380	2,914	4,122	5,513
incl. money outside banks	1,147	1,535	2,009	2,785	3,702
Term deposits and foreign currency deposits	31	36	44	59	446
Foreign liabilities	220	215	299	79	176
Government deposits	446	1,048	2,146	3,688	5,671
incl. regional and local government	43	86	127	226	345
Capital accounts	298	188	210	84	102
Other (net)	159	350	248	347	386

Source: Central Bank of Russia

4. Stabilization Function

According to the government regulations, the OSF could be spent to cover the federal budget deficit when the oil price falls below the cutoff price. However, it could also be tapped for other purposes in case it had accumulated more than RUB 500 billion. Given the persistently high oil prices that hovered far above the cutoff price, the RUB 500 billion threshold had already been

Table 2: Dynamics of the Oil Stabilization Fund between 2004 and 2007

RUB billion	2004	2005	2006	2007
Inflows/revenues				
Unspent federal budget surplus from previous year	106	218	48	157
Oil revenues (export duty plus extraction tax)	416	1,175	1,641	1,587
Interest accrued			23	152
Outflows/withdrawals				
External debt repayment				
IMF		94		
Paris Club		430	605	
Vneshekonombank		124		
Kreditanstalt für Wiederaufbau				12
Portugal				2
United States				9
United Arab Emirates				11
Pension Fund		30		
Investment Fund & equity stakes in 'state corporations'				300
Net inflows	522	716	1,107	1,562
Balances, end of year*	522	1,238	2,347	3,849

*Note: Balances in a given year may deviate from the sum of balances in previous year and net inflows due to changes in valuation.

Source: Ministry of Finance, author's calculations.

surpassed by the end of 2004. As a result, the OSF funds were subsequently used to repay the country's foreign debt, to cover the public pension fund deficit, and – more recently – to finance the newly established Investment Fund and the equity stakes in the so-called 'state corporations', notably the one dealing with nanotechnologies (see table 2).

The nearly RUB 1.3 trillion worth of early settlement of public foreign debt, largely ahead of schedule, enabled the country to economize on interest payments and represented a net financial benefit to the state – even after allowing for the penalties charged to Russia for the premature contract withdrawal. Since the payments were financed from OSF funds, they had no macroeconomic impact within the country. Similarly, the RUB 300 billion worth allocation to the Investment Fund and the 'state corporations' in late 2007 has not had any sizeable impact so far, given that the decision on the final use of these moneys is still pending. The modest RUB 30 billion worth of allocations to the pension fund in 2005 had a similarly small, or virtually no impact at all.

Despite these expenditures, the OSF totaled USD 156 billion (corresponding to RUB 3.85 trillion) on January 1, 2008. The OSF's pivotal role as a tool of economic stabilization can be seen from the following estimations (Gurvich, 2006). In the period from 2004 to 2005, some 75% of the additional fiscal revenue from the high oil prices were saved (primarily in the OSF), amounting to some 60% of total additional income to the economy. Accordingly, the Russian federal budget would have shown only a minor deficit even if the oil price had fallen back to USD 20 per barrel. The recent economic performance suggests that the OSF, by building up reserves rather than spending extra revenues, has also helped decouple GDP growth from the oil price dynamics. Despite the soaring oil price since 2004, the country's economic growth has been fairly stable at 6% to 8%.

5. Recent reforms and policy challenges

By the end of 2007, the size of the OSF was nearly eight times the value of the RUB 500 billion threshold, above which the funds could be used for purposes other than budget deficit financing. Besides, the pressure to spend the OSF was all the more intense as most short- and medium-term oil price forecasts assumed values above USD 50 per barrel, and it seemed extremely unlikely that the price would fall below USD 27 (the cutoff price set for the OSF). This implied that stabilization in the sense in which it was meant at the time when the OSF was set up, i.e. as a buffer for federal fiscal balances, was unlikely to be required anytime soon.

Thus, the mounting OSF reserves were one of the major reasons behind the recent decision by the Russian government to implement a profound budgetary reform, the details of which are presented in the box below. Most notably, as of February 2008, the OSF was divided into the so-called 'Reserve Fund' (with essentially the same function and the same allocation strategy as the previously existing OSF) and the 'National Welfare Fund' (NWF), which is supposed to save the oil-related wealth for the future generations (based on the idea of intergenerational equity) and may be invested into riskier but potentially more profitable assets.⁸

Essentially, the present dilemma for the Russian authorities is to decide whether the NWF should be increasingly spent or saved. In case the government opts for saving, one possibility would be to invest into foreign equities.⁹ This would be in line with Norway's experience and might have the advantage of higher returns in the long run as compared to foreign sovereign bonds (as demonstrated by past performance). Besides, in terms of risk diversification, investing in foreign (rather than domestic) assets seems justified, since securities issued by countries which would benefit from falling oil prices – e.g., the United States or the EU – provide, to some extent, a hedge against excessive reliance on the oil revenues. However, in terms of profitability, such a decision appears rather ambiguous. In particular, it is questionable whether the return on foreign equities will match the combined

⁸ The final decision on the allocation strategy for the newly created National Welfare Fund is still pending.

⁹ Initially, this proposal was put forward by the Russian first deputy prime minister Alexander Zhukov (according to his announcement of May 2006, Russia could invest up to 10% of the OSF in equity - see Pryde, (2007)) and re-confirmed later by the finance minister Alexei Kudrin (International Monetary Fund, (2007)).

effects of the Russian ruble's (likely) nominal appreciation and of the return on ruble-denominated assets.

Box: Features of the Russian federal budgetary reform, as of 2008

- three-year budget planning (now for 2008–2010);
- division into 'oil' and 'non-oil' budget;
- 'oil budget' now also collects revenues from oil products and natural gas – unlike the OSF, which collected revenues only from oil;
- OSF ('oil budget') divided as of February 2008 into two funds: 'Reserve Fund' (RUB 3.1 trillion) and 'National Welfare Fund' (RUB 0.8 trillion);
- Reserve Fund serves the purpose of fiscal stabilization (in line with the original OSF goal), is maintained at 10% of GDP and invested in highly liquid and low-yielding foreign securities;
- annual transfers from Reserve Fund to 'non-oil' budget (in 2008 envisaged at some 6% of GDP);
- 'non-oil' budget deficit capped at 4.7% of GDP, and the maximum transfer from the Reserve Fund to the 'non-oil' budget at 3.7% of GDP – both effective starting from 2011 (in 2008–2010, 'oil transfer' is expected to be significantly higher at up to 6.1% of GDP in 2008);¹⁰
- National Welfare Fund preserves the oil-generated wealth in the long term – for the benefit of future generations.

The Norwegian model as it stands would also imply the so-called 'bird-in-hand' rule (implemented since 2001), whereby only newly accrued interest on fund assets is spent. However, there is good reason to believe that the Russian model should be less conservative than the Norwegian one. Given that the Russian economy is likely to grow much faster than the Norwegian one (in line with the hypothesis of beta convergence), concerns about intergenerational solidarity appear to be less relevant in the case of Russia, as future generations will presumably be much wealthier than the present generation of Russians (OECD, 2006).

Alternatively, the government could decide to spend at least part of the NWF money now, or else spend (part of) the future inflows into the NWF on a current basis. That would be a radical change to the previous strategy: the RUB 300 billion worth allocation to the Investment Fund and the 'state corporations' and the minor allocation to the pension fund apart, no major commitments to spend/invest the Fund moneys within Russia have been made so far. Two main arguments have been typically raised by Russian liberal-minded

¹⁰ See Deutsche Bank, (2007).

economic policymakers¹¹ against spending the Fund money already now or on a current basis. They maintained that (1) given the extensive corruption at all government levels, any spending within Russia would be inefficient, and that (2) any domestic spending would be inflationary.

At the same time, earlier estimates by the IMF (which usually advocates a cautious approach in fiscal issues) suggested that the volumes of federal government spending in Russia were not only far below levels that would be unsustainable in the long run, but were in fact suboptimal (IMF, 2006). In particular, according to the IMF findings, primary budget expenditures would have to be raised by some 5 percentage points of GDP in the medium term in order for the government to reach the so-called 'permanent consumption' rule, which maximizes consumption (expressed as a constant share of expenditures to GDP) over time.

The case for spending more becomes even stronger if we allow for the possibility that the money is not just used for consumption, but also invested. Such investment could, for instance, be directed to upgrading the country's infrastructure, thus encouraging private investment in the nonenergy branches of economy. In this way, if the government decided to use the NWF money domestically, it would contribute substantially to the diversification of the Russian economy, which is certainly one of its goals. This diversification would, in turn, contribute e.g. to the stability of public finances. Besides, any resulting productivity improvements in the nonenergy tradable sector would counteract the possible Dutch disease effects stemming from higher inflationary pressure and an additional ruble appreciation potentially associated with spending part of the NWF reserves.¹²

The government could also target e.g. education, health and ecological cleanup activities with these investments. Although the value of such investment might be difficult to quantify in economic terms, it is fairly obvious that it would raise the living standard of the population. In addition, it could also lay the foundation for long-term sustainable economic growth, e.g. thanks to human capital accumulation.

Provided that the (net) benefits are positive, additional spending could be advocated even if institutional weaknesses limit the effectiveness of public

¹¹ Including the finance minister Alexei Kudrin and the former presidential economic adviser Andrei Illarionov.

¹² See also Barisitz and Ollus (2007), who argue that, in the recent past, curtailment of domestic demand through the OSF has doubtlessly contributed to countering Dutch disease pressures.

expenditures. One might also argue that some additional spending, e.g. in the area of public sector wages, in combination with other measures, could even reduce the incentives for corruption in these areas, which in many cases reflect peoples' efforts to make ends meet.

Any sizeable domestic spending of the NWF money would pose a serious challenge to the country's macroeconomic management. In particular, it is essential that any major withdrawal of government foreign currency-denominated deposits at the CBR and their subsequent conversion into ruble be accompanied by corresponding policy coordination with the CBR.¹³ The aim of such an approach would be both to avoid unwelcome appreciation pressure (and the likely speculation on such appreciation) and to leave open the possibility for counteracting any unwarranted depreciation pressure in the future. At the same time, the appreciation pressure (and the inflationary pressure alike) is likely to be kept within limits as long as additional government spending is import intensive, e.g. made within the framework of infrastructure development programs involving large-scale imports of investment goods.

¹³ For instance, the ministries of finance in the Czech Republic and Poland had explicit agreements with the respective central banks on depositing privatization-related one-off foreign currency inflows in a special account and on converting funds from these accounts into national currency directly with the central bank, i.e. off market.

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THE RUSSIAN NON-FUEL SECTOR: SIGNS OF DUTCH DISEASE? EVIDENCE FROM EU-25 IMPORT COMPETITION

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Abstract:

It is evident that the Russian economy is largely based on the energy sector. This fact has raised concern in academic circles as to whether Russia is to some degree affected by the Dutch disease, i.e. whether a sharp rise of commodity prices might result in an appreciation of the real exchange rate, which would undermine the competitiveness of manufacturing and may lead to the deindustrialization of the economy. We focus on this possible final outcome, which has not been studied much in the literature so far: We compare Russian industrial import growth (based on EU-25 export volume figures to Russia) with domestic industrial production growth (disaggregated by branches) in the period from 2002 to 2006. In all manufacturing sectors except electrical, electronic and optical equipment and strongly protected foodstuffs, Russian imports are found to be expanding faster than domestic

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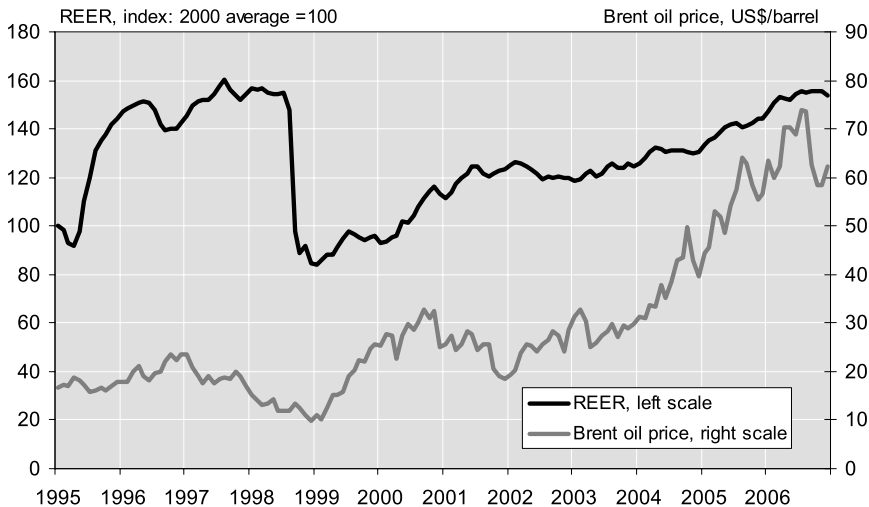
³ This study was jointly written during Simon-Erik Ollus' research visit at the OeNB in September and October 2006. The study was published earlier in BOFIT Online 2007 No. 2 and in OeNB Focus on European Economic Integration 1/2007. All the opinions expressed in this paper are those of the authors and do not necessarily reflect the views of BOFIT or the OeNB.

output. In some sectors, imports have even exceeded domestic production. Import competition is therefore strong and rising. We conclude that Russia may be facing incipient deindustrialization at least in some parts of the manufacturing sector. This could indicate that the Russian economy has contracted the Dutch disease, although it should be noted that other factors could also have driven sectoral changes. While it is beyond the scope of our study to examine whether the other chain links of the Dutch disease hold as well, it does provide evidence of some movements in the direction of deindustrialization, which is in line with the Dutch disease theory.

1. Introduction

Oil prices have witnessed a very strong rise and attained high levels in recent years. This development has renewed interest in the Dutch disease hypothesis and in exploring its validity for oil exporting countries like Russia. The core model of the Dutch disease hypothesis follows Corden and Neary (1982) and Corden (1984). It assumes that the economy consists of three sectors: Natural resources or resource tradable goods (simply referred to as “oil” in this contribution), non-resource tradable goods (“manufactured goods”) and nontradable goods (“services”).⁴ Windfall revenues resulting from an increase in oil prices have the initial effect of raising the aggregate incomes of factors

Chart 1: Rouble Real Effective Exchange Rate and Oil Price 1995-2006



Source: MinEcon and Bloomberg

⁴ Of course, these are not the only plausible references. For instance, in some countries/territories (Iceland, Greenland), fishing is the natural resource-based industry. Or, alternatively, in some Asian and African economies it is agriculture that can be squeezed by an increase in energy exports (Sachs and Warner, 1995; Bardt, 2005). Or, in particular circumstances, inflows of large amounts of foreign financial assistance might trigger deindustrialization (ICEG European Center, 2006). Furthermore, the above identifications, e.g. of nontradable goods as “services,” are admittedly not precise and somewhat outdated, as in the early 21st century some services are actually more tradable than manufacturing goods as they can be delivered via the Internet at virtually no cost – and under high competition. We continue to use the above terms, however, because they still seem to be largely correct and because they provide readers with concrete references that mean something to them.

employed in the oil sector. According to the model, this may give rise to a *resource movement effect* and to a *spending effect*.

The resource movement effect is brought about by a rise of wages in the oil sector, which induces a movement of labor out of manufacturing and nontradables (direct deindustrialization). The spending effect involves higher oil sector revenues which raise aggregate demand, thus pushing up the price of services and fanning inflation, which implies an appreciation of the real exchange rate. Upward wage pressure throughout the economy erodes manufacturing competitiveness and forces a downsizing of the non-resource tradable sector (indirect deindustrialization). Moreover, the crowding-out of manufacturing sets the stage for “unbalanced growth” which may be highly exposed to resource (oil) price and supply volatility and may therefore result in macroeconomic instability, stop-and-go investment activity, boom-bust cycles and overall sluggish long-term growth (Égert and Leonard, (2006)). Once manufacturing is forfeited, growth tends to slow down because positive externalities from manufacturing in the form of faster technological progress are lost and production shifts away from activities that facilitate learning by doing (Kronenberg, (2004)).

So far, there has not been much research on Russia and the Dutch disease. The reasons seem to be the short observation period for this transition country, difficult access to reliable data, frequent revisions of time series, and the fact that the most recent oil boom that could serve as a basis for measuring possible Dutch disease effects only started in 1999/2000. However, notwithstanding intermittent drops, this oil boom has continued until at least the fall of 2006, which is unusually long in the light of the experience related to oil cycles in the past decades. Moreover, Russia is one of the world’s primary producers of oil and gas. The share of oil and gas industries in Russia’s total GDP comes to about one-fourth and the share of these two industries in the country’s total export revenues has reached nearly two-thirds.

Most studies so far have found that while Russia exhibits some of the symptoms of the disease, it has not (yet) caught the full-fledged malady. Åslund (2005) stresses the fact that average wages have risen by over 30% annually in U.S. dollar terms from 1999 to 2005. His assessment concludes that many manufacturing branches cannot develop too favorably with such a leap in labor costs. Latsis (2005) goes one step further, maintaining that Russia’s currency is appreciating because of the huge inflows of export proceeds. In his view, the booming oil sector is strangling the country’s

manufacturing industries and he therefore concludes that “the Dutch disease is already here.”

In contrast, in a study measuring U.S. dollar wages and comparing production growth, export shares and import penetration, Westin (2005) finds no compelling sign of a decline in manufacturing. From a trade perspective, the growth of Russian exports of consumer-related and high-tech commodities worldwide and to the EU has not generally suffered in the period from 1997 to 2001. However, the Russian market shares in exports of these product categories to the EU have slightly declined during this time. Import penetration ratios are calculated for a very small group of eleven products (mostly belonging to machinery and equipment) where, according to Westin, production statistics reliably tally with customs statistics. Regarding this very narrow sample, import penetration has progressed at a slower pace than the economy as a whole in the period from 1997 to 2003.

Roland (2005) likewise finds it premature to speak of Dutch disease in Russia. The ruble has no doubt been appreciating in real terms, but this does not seem to have compromised manufactured goods' competitiveness. Between 2002 and 2004, the increase of Russian exports of iron, steel and manufactures outstripped that of fuels and mining. According to Ahrend (2005), real ruble appreciation in the period from 1999 to 2004 was matched by stepped-up industrial restructuring efforts that led to significant labor productivity adjustments in the large majority of non-resource tradable sectors. Much of the improved competitiveness has been attained by “passive restructuring” (labor shedding etc.). Real ruble appreciation as well as some other Dutch disease symptoms (e.g. the value added of some nontradables, namely trade and agriculture, growing faster than industry) are confirmed for the period from 1999 to 2004 by Égert (2005).

Based on sectoral and time series analyses covering the period from 1997 to 2004, Oomes and Kalcheva (2007) agree that high oil price-related windfall revenues in Russia have set the real exchange rate on an appreciation path that threatens the manufacturing sector's competitiveness. However, the resource movement effect is unlikely to play a significant role in Russia, given that the oil sector employs relatively few workers and that labor mobility is generally low. The spending effect seems to be more important. Consistent with the Balassa-Samuelson hypothesis, appreciation has been largely proportional to productivity differential growth. Oomes and Kalcheva conclude that what likely helped stall the Dutch disease thus far are Russia's prudent policies

of saving its oil windfall revenues in the Stabilization Fund and swiftly redeeming its foreign debt.

Analyzing data up to 2005 and comparing manufacturing sector growth with that of energy extraction and with total GDP growth, Beck, Kamps and Mileva (2007) only find mixed evidence on manufacturing sector decline in Russia. Moreover, they find that evidence on labor shifting from manufacturing to services and mining is not conclusive.

While according to most studies, the Dutch disease does not appear imminent in Russia – or more precisely, did not appear imminent at the time of writing – they do seem to maintain that the long-term threat of an outbreak remains real. There are unambiguous signs of a real appreciation of the ruble and that this real appreciation is at least partly triggered by oil price rises and foreign currency inflows (see also Chart 1). But the majority of studies do not (yet) see any clear adverse effects on Russian manufacturing.

In this light we propose to add a specific contribution to the research and discussion of (the possible existence of) the Dutch disease in Russia. However, we will not attempt to verify the functioning of all (hypothetical) chain links of the Dutch disease. Our focus will be exclusively on the final stage, i.e. on whether some degree of deindustrialization or a loss of manufacturing competitiveness has happened or is happening. We are aware that a loss of industrial competitiveness itself does not necessarily have to be triggered by the Dutch disease. Hence, any conclusions with respect to the existence or nonexistence of the Dutch disease need not be absolutely compelling in our case.

Looking at the last link of the Dutch disease, we will focus on external competitiveness. A decrease in exports can be triggered by real appreciation, which may, in turn, be attributable to nominal appreciation or to unit labor cost increases. This point should be taken up in future research. Imports can also provide valuable information on the competitiveness of domestic industries, which may be crowded out by imports given the effects of real appreciation, which is triggered either by nominal appreciation or by labor cost increases. In this study, we will concentrate on import competition, which in fact has not yet been analyzed in depth in the empirical literature on Russia. Does import growth outstrip domestic production growth in the non-fuel sector? And if it does, which size have imports attained compared with domestic output? We

will analyze these questions on a branch-by-branch basis for the entire range of goods.⁵

While this approach is promising, some qualifications must be noted with regard to import penetration being a useful indicator of the competitiveness of domestic industry. High import content in final domestic goods could mitigate this fact, especially if intermediate goods are classified differently than final goods. Higher imports do not necessarily compete with domestic goods if domestic goods are of low quality and imports are luxury goods. Furthermore, imports could have a positive impact on Russia's productive capacity and thus stimulate investment, exports and growth in the longer term. Finally, although we exclude exports from our comparison, the case is still strong as about four-fifths of Russia's exports are clearly natural resources, and manufactured goods account for only a tiny share of exports. Russia's market share in mature Western market economies' imports of manufactured goods is tiny. In the EU-25 market, for example, Russia's share of manufactured goods imports only comes to a few percentage points of total imports. Therefore, speaking of Russian export competition in this context would not be very meaningful.

The rest of this study is organized as follows. Section 2 is devoted to statistical issues and highlights the logic behind, and limitations to, our approach. Section 3 investigates whether Russia shows symptoms of the Dutch disease, based on the import competition approach. Section 4 draws overall conclusions.

⁵ We focus on manufacturing and do not include competitive market-oriented services (see footnote 1) given the lack of comparable data in the latter field.

2. Statistical Limitations

Instead of concentrating on import penetration like Westin (2005), we focus on growth rates in our approach. If imports in non-fuel sectors are found to have reached a substantial size and grow faster than domestic production, Russia would face some degree of the Dutch disease – otherwise not. Before proceeding to a detailed analysis of relevant data, some statistical limitations need to be discussed.⁶

The first problem we have to tackle is the lack of proper volume-based indices for Russian imports (and exports). The import figures reported by the Federal Customs Service of the Russian Federation are only available in nominal terms for international trade of goods classifications (Harmonized System⁷, two-digit level), while for 95 specific commodities only detailed volume figures are available, but no data aggregated by subgroups in any Harmonized System (HS) classification. Hence, we lack coherent official data on Russian foreign trade volumes.

The second problem related to trade figures is that the Federal Customs Service's figures tend to undervalue Russian foreign trade, and especially imports. This is true particularly in categories with high value-added commodities, textiles and footwear. For EU-25 exports to Russia, for example, the recorded value of 2005 exports was on average nearly 40% higher than the corresponding figure the Federal Customs Service reported for imports. Such discrepancies are partly connected to different ways of recording re-exports in trade with Russia. Moreover, personal imports and shadow economy activities are another reason for the gaps between partner countries' registered exports to Russia and Russia's registered imports. The Central Bank of the Russian Federation (CBR) includes a special estimate of this deviation factor in its balance of payments figures. It came to 22% of total imports in 2005.

⁶ For more details see Ollus and Barisitz, (2007).

⁷ The Harmonized Commodity Description and Coding System, better known as the Harmonized System (HS) is a nomenclature developed by the World Customs Organization and covering two-digit to ten-digit levels. The EU's Combined Nomenclature (CN) classification corresponds to the HS up to the six-digit level. The Federal Customs Service's "Tovarnaya nomenklatura vneshe-ekonomicheskoy deyatel'nosti" (TN VED) methodology also corresponds to the HS up to the six-digit level.

It is normal, however, that partner countries' trade statistics deviate to some degree, as there usually are differences in methodologies, exchange rates and accounting periods. Some countries also use secret categories for strategic goods, which makes comparisons more difficult. Figures reported by the Federal Customs Service differ from partner countries' statistics particularly for value-added goods, which are also important in our comparison of import competition. Moreover, as there are no detailed data given in volume terms and import prices for whole categories, it is impossible to calculate detailed sector-wise import penetration figures based on Federal Customs Service statistics.

We thus need to find an alternative way to calculate Russia's import development, namely on the basis of Russia's main trading partners' export statistics. In this paper we focus on Russian imports from the EU-25, as the relevant volume export data are available from Eurostat. According to the Federal Customs Service, the EU-25 have had a rather stable share of 44% in Russian imports over the past decade. A comparison of Eurostat data on exports to Russia with CBR import data also shows a quite stable average share of 48% for the same period. Hence, we use EU-25 exports as a proxy for developments in Russia's total imports. Still, we are aware that the structure of imports from the EU-25 is not similar to that of imports e.g. from China or the Commonwealth of Independent States (CIS). China's exports to Russia record a higher share of textiles and agricultural products with a lower value added than exports of the EU-25 and other OECD countries. However, we can probably assume that the structure of EU-25 exports closely corresponds to the export structure other OECD countries. According to the Federal Customs Service, the OECD countries account for 61% of Russia's total imports. Acknowledging the limitations in trade statistics, we still use EU-25 data by Eurostat for lack of any better alternative.⁸

We regrouped the Eurostat EU-25 data on exports to Russia from 12,061 categories according to the Combined Nomenclature (CN) eight-digit level to correspond to the international prodcom⁹ industrial output structure

⁸ Other OECD countries, like the U.S.A., Japan and South Korea, also publish volume-based export data, so it would be possible to widen the scope. As these countries' data vary in terms of classification, however, combining them would be very time-consuming. Moreover, their trade pattern with Russia correlates strongly with that of the EU-25. China and the other CIS countries do not publish detailed data on volume exports.

⁹ Prodcom is a system for the collection and dissemination of statistics on the production of manufactured goods. The title comes from the French "PRODUCTION COMMUNAUTAIRE" (Community Production) for mining, quarrying and manufacturing: sections B and C of the Statistical Classification of Economy Activity in the European Union (NACE 2). See <http://epp.eurostat.ec.europa.eu>.

(C, DA-DM and E) that Russia has followed since the beginning of 2005. Finally, the data were indexed to 2005 prices.

An additional constraint to our approach is the lack of reliable long-term industrial production data. The methodological change introduced by the Russian statistical office, Rosstat, at the beginning of 2005 for the reporting of GDP and especially industrial production output statistics makes it hard to construct long-term time series on Russian industrial production by subsectors. We built a monthly time series backward from April 2006 to the beginning of 2002 and indexed it to 2005 sold production prices. Our analysis is thus limited by the data basis it relies on and by the rather short time span it covers. Still, given that the rise in oil prices as well as the real effective exchange rate appreciation of the Russian ruble started to gather momentum at the beginning of this decade and continued largely unabated at least until mid-2006, our time frame for investigating the existence of the Dutch disease in Russia appears to be appropriate.

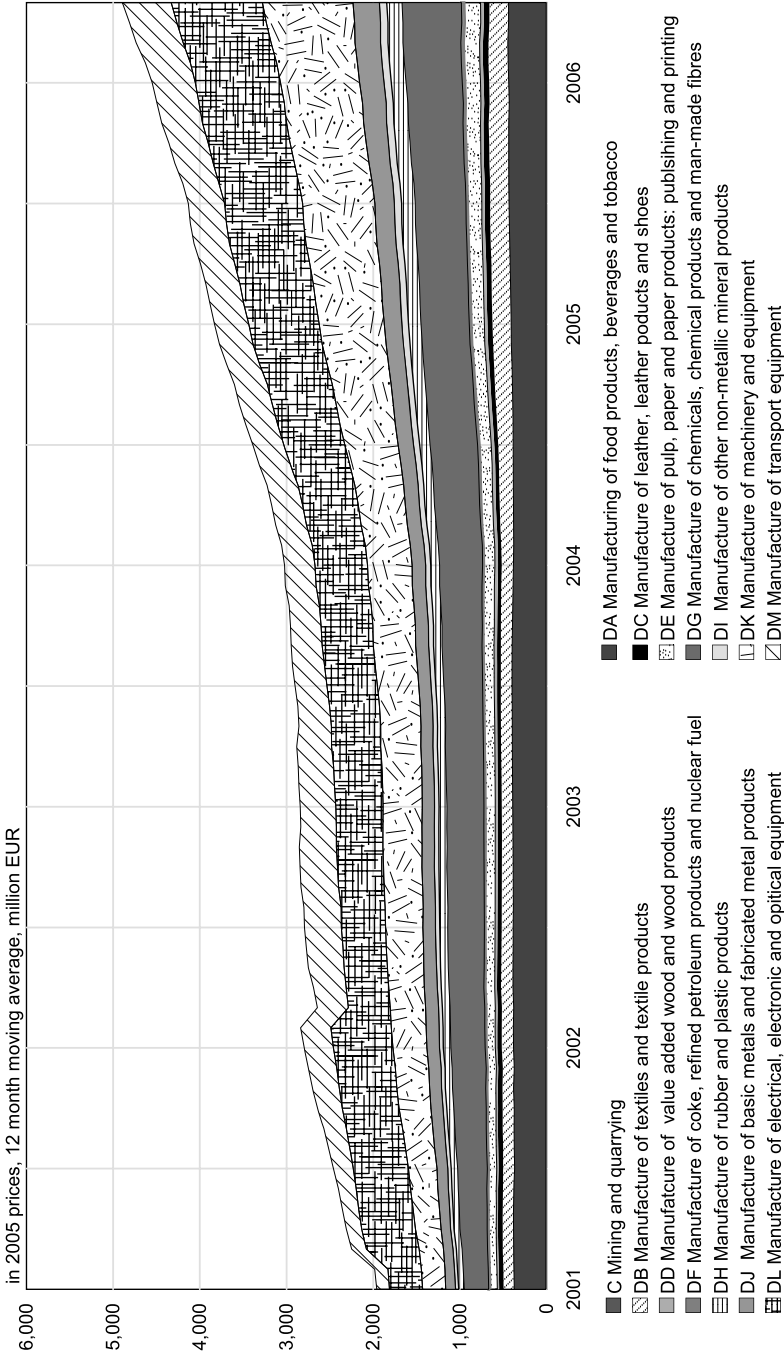
3. Results: EU-25 Import Competition

In nearly all categories reviewed, imports grew much faster than domestic production. Between 2000 and 2005, total imports increased by over 20% per year (in volume terms), while exports augmented by no more than 9% and production by little over 6%. Russian import elasticity is currently above 3, which is much higher than in emerging markets on average. The imbalance in the growth of export and import volumes, however is not yet visible in Russian trade or current account figures (as measured in USD) as energy prices have kept rising over the whole period under review. If imports grow at such a quick pace, however, this gives reason for concern. And if oil prices stop increasing or even fall for a sustained period, the underlying trade deficit will become visible. In the following section we show the main results of our comparison of imports to Russia from the EU-25 with domestic production.

Chart 2 illustrates the structure of EU-25 exports to Russia between 2001 and 2006. Russian imports from the EU-25 consist mainly of machinery and equipment (DK), electrical, electronic and optical equipment (DL, in the following referred to as “electronics and optical equipment”), chemicals, chemical products and man-made fibers (DG, in the following called “chemicals”) and transport equipment (DM). The first two groups each accounted for about one-fifth of Russian imports from the EU-25. Given the inherited production structure, both groups could be important factors in the development of Russia’s own competing non-fuel industry.

In mining and quarrying (C), only non-energy producing material (CB) was imported from the EU-25. Russia was fully self-sufficient in the mining and quarrying of energy products (CA). The monthly time series in Russian industrial production volume data do not distinguish between CA and CB; we therefore only compare total mining and quarrying production with imports. There were also no electricity, gas or water (E) imports from EU-25 countries.

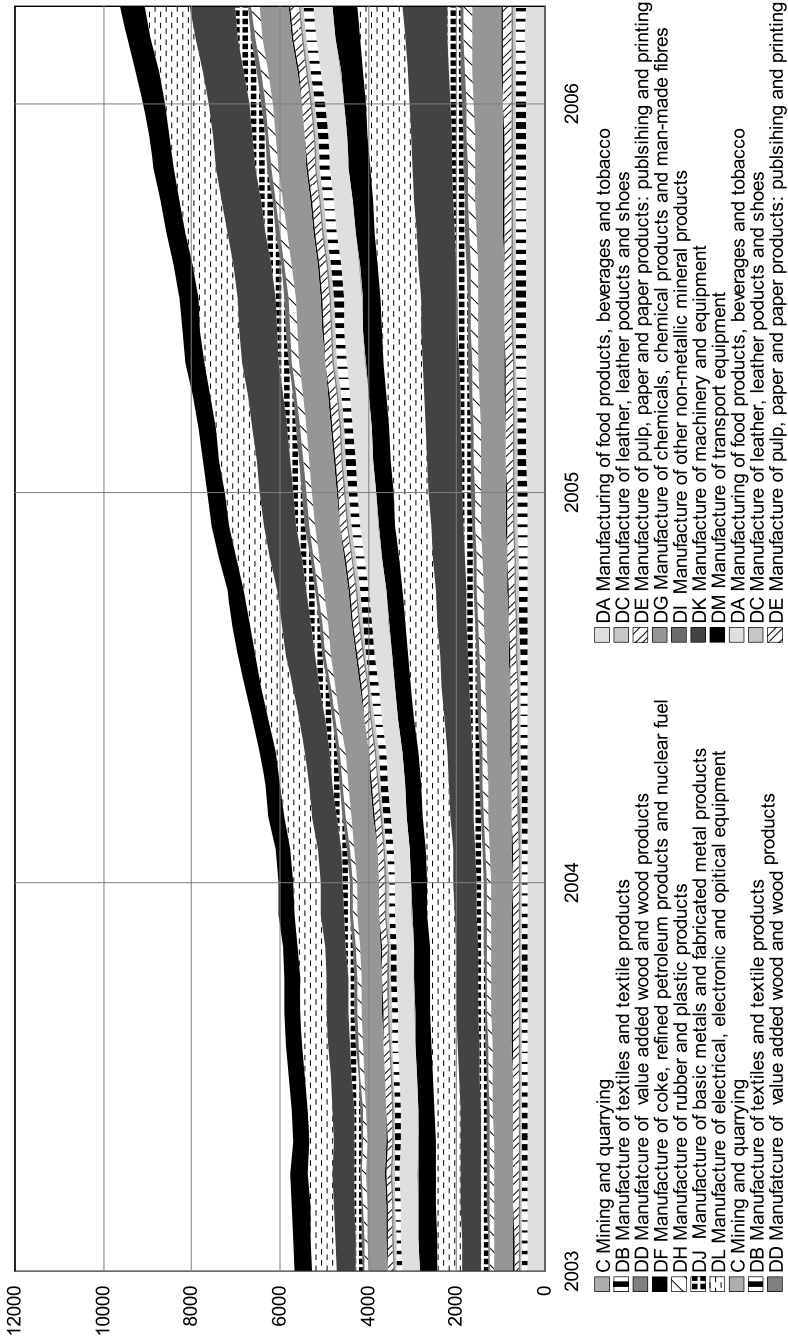
Chart 2 Structure of EU-25 Exports to Russia (2001–2006)



Source: Eurostat

Chart 3 Russian Domestic Industrial Production (2002–2006)

In 2005 prices, 12 months moving average, million euro



Source: Rosstat

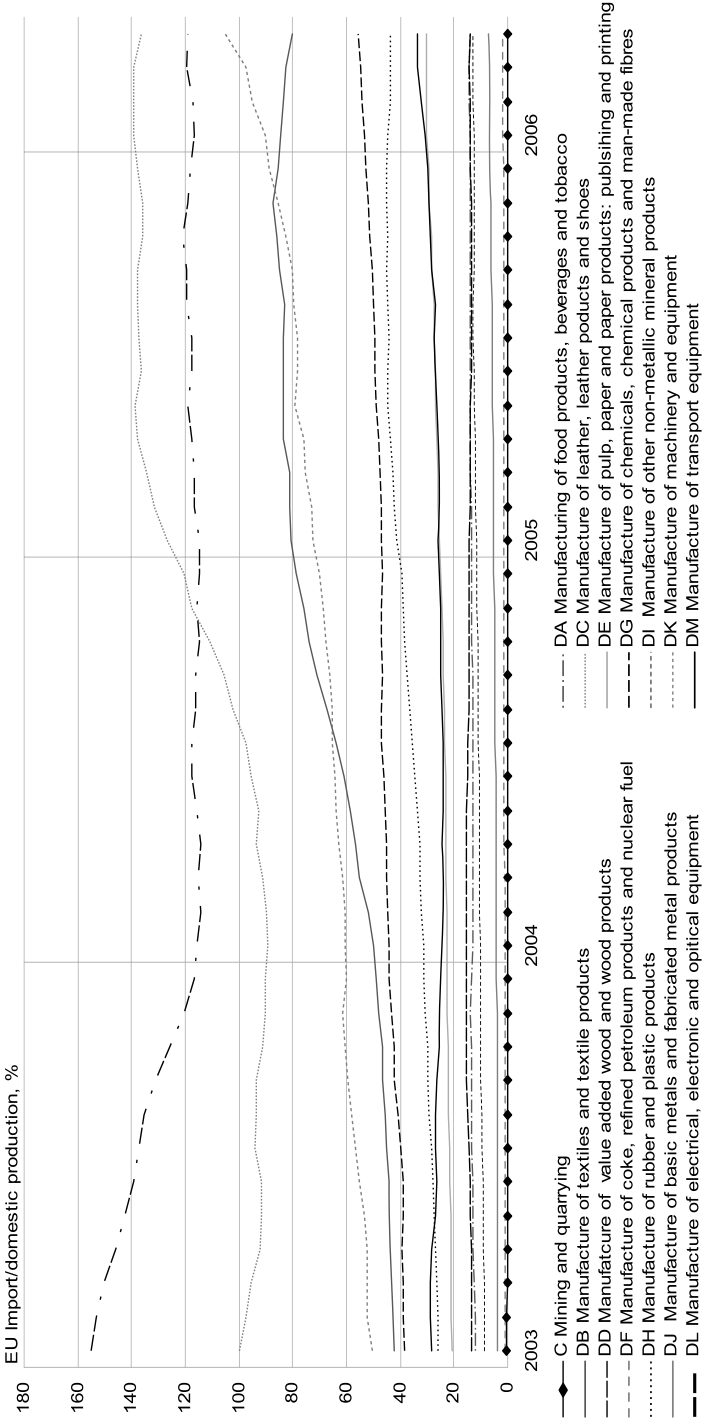
Chart 3 shows the structure of Russia's industrial production. Mining and quarrying is by far the largest group, corresponding to nearly one-fifth of total production. Within this group the largest contribution to production comes from the energy sector. It should be noted that oil refining also plays a role in the manufacture of coke, refined petroleum products and nuclear fuel (DF, in the following called "energy") as well as of chemicals. Energy and chemicals each account for about 5% to 6% of Russian industrial production. Accounting for nearly 18% of overall industrial output, the manufacture of basic metals and fabricated metal products (DJ, in the following referred to as "metals") has the second-largest share in production. These two categories mainly represent low value-added manufacturing. The manufacture of electricity, gas and water and the manufacture of foodstuffs, beverages and tobacco (DA, "food"), which account for about one-eighth of production each, have the third-largest share in production. While no import competition from the EU-25 is registered for electricity, gas and water, food is the largest industrial branch in Russia that really has to compete with imports. Other significant industrial clusters are the manufacture of machinery and equipment, electronics and optical equipment, and transport equipment, each accounting for around 4% of production. The output of other industrial clusters was very small. Total production growth has been slow over the last few years.

Chart 4 presents the ratio of imports from the EU-25 to total domestic production in Russia. In 2005 and 2006 imports from the EU-25 exceeded domestic production in the manufacture of leather, leather products and shoes (DC, "leather products"), electronic and optical equipment, and machinery and equipment. Imports from the EU-25 have reached a level of about 80% of Russian production in the manufacture of textiles and textile products (DB, "textiles"). In most of the above-mentioned categories, import penetration has rapidly increased in recent years.

Imports from the EU-25 are marginal or modest in categories like mining and quarrying, metals, other nonmetallic mineral products (DI), value-added wood and wood products (DD, "wood products") and food. Of these categories, mining and quarrying, metals, nonmetallic mineral products and wood products are all natural resource clusters or booming sectors, while only food is clearly a "lagging sector." With imports from the EU-25 corresponding to between 30% and 60% of domestic production, all other categories record a clear trend toward increasing import penetration.

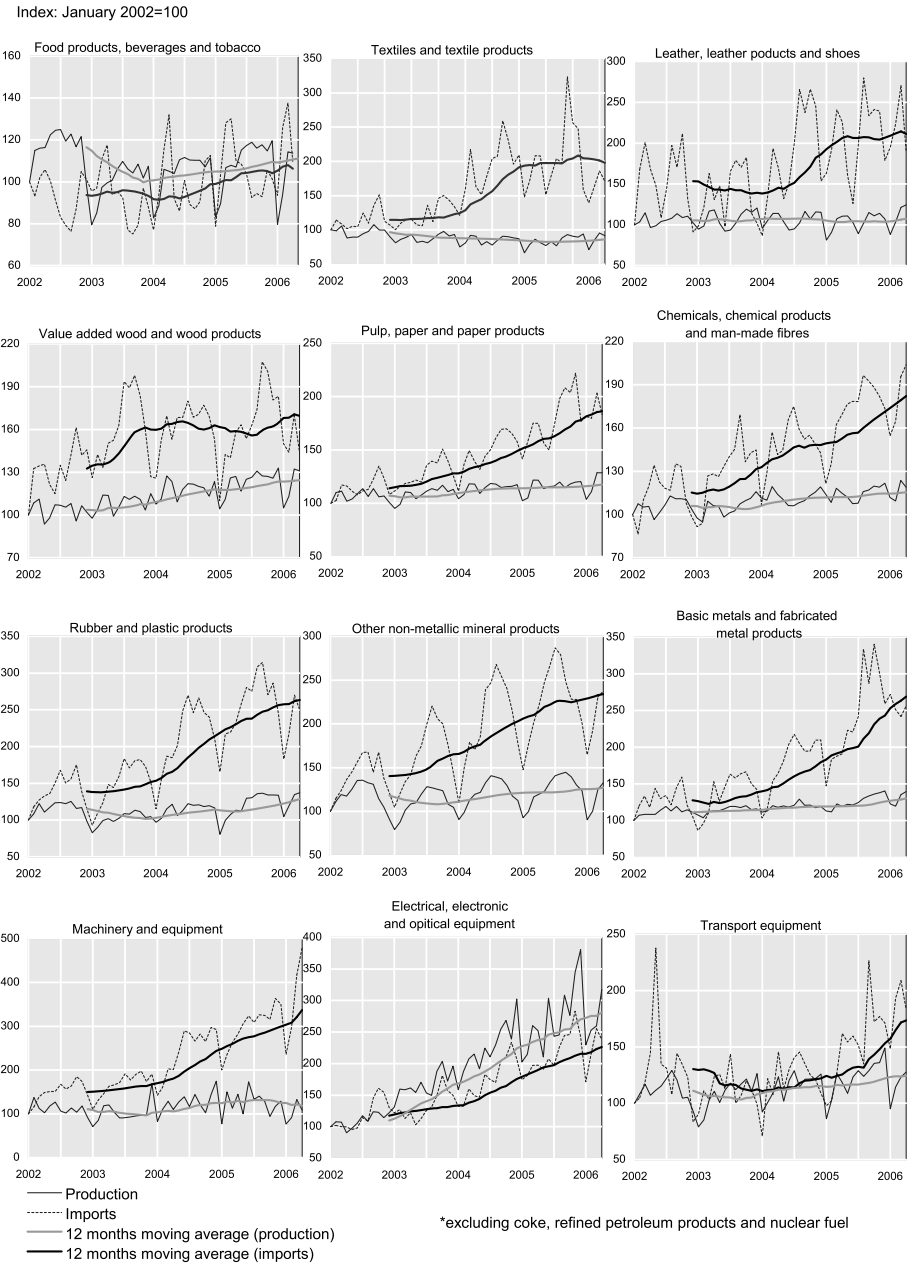
Chart 5 shows sectoral import and production growth. The chart show that in all the above-mentioned industrial branches except energy, a sector in which

Chart 4 Imports from the EU-25 as a Ratio of Domestic Production



Source: Eurostat, Rosstat

Chart 5 Production and Imports of Industrial Clusters* (2002–2006)



Source: Eurostat, Rosstat

Russia is largely self-sufficient and EU import competition is marginal. We see that imports grow significantly faster than domestic production in all categories except food and electronic and optical equipment. Food production increases almost at the same pace as imports, which shows that food is an industry where domestic enterprises are doing relatively well. Corresponding to between 12% and 13% of domestic production in volume terms, imports from the EU-25 are still significantly smaller than domestic production. Most of the larger food import categories are in fact complements¹⁰ of which Russia does not have its own production. Moreover, high import duties on most foodstuffs partly limit import growth. In general, the Russian food industry is among the industries that are most strictly protected from foreign competition by various means; customs duties were 15% on average in mid-2006.¹¹

The situation is different for electronic and optical equipment, as both domestic production and imports in this sector have grown fast in recent years. Imports from the EU-25, however, clearly exceed domestic production. These imports mainly comprise mobile phones and mobile phone parts (about one-fourth), computer parts, and consumer electronics. However, most of the commodities in this sector are high-value consumer goods Russia itself does not produce. The respective import duties averaged 10% during the observation period.

In most of the other categories, imports have nearly doubled or even tripled since the beginning of 2002, with machinery and equipment recording the fastest import growth. Imports have expanded threefold since 2002, while domestic production rose only little. Machinery and equipment imports from the EU-25 are quite heterogeneously distributed between various categories. One can argue that imports increase as machinery and equipment is needed to develop the domestic manufacturing sector and equip households with appliances. However, Russia could supply goods from domestic production in many of these categories. The development in the machinery and equipment category in Russia gives reason for concern, as imports have grown so fast. The sectoral import duty was 12% on average in mid-2006. Growth trends are also worrying for leather products, whose domestic production has grown

¹⁰ Complements are materials/goods that complement domestically produced goods, as opposed to substitutes, which replace domestically produced goods.

¹¹ Russia uses various trade barriers like import duties, product certificates and quotas to protect especially the food industry from foreign competition. It is difficult, however, to measure the quantitative effect of the various trade barriers, which is why our focus here is exclusively on average import duties given the availability of the relevant data which should also indicate a general level of protection for certain industries. Customs duties remained quite stable during the period under observation; the average Russian import tariff was about 12% to 13% in 2006. References to customs duties below are taken from Simola (2007).

modestly and whose imports have nearly doubled since 2002. The ratio of imports from the EU-25 to domestic production in this sector was highest in early 2006 at 140%. It is rather difficult in this case, however, to distinguish between luxury goods and standard consumer goods. The average import duty for leather products was 11%.

In the textiles sector, the import ratio expanded from 40% of the domestic production level in early 2003 to 80% in late 2005. Textiles was the only category where domestic production went down in the period from 2002 to 2005. The distribution of imports was also quite heterogeneous. Some of the categories clearly qualify as complements or special articles – categories in which Russia does not have its own competing production. The average customs fee for textiles was 12%. Moreover, most of textiles imports to Russia come from Asia, not Europe, and hence the comparison with EU-25 export data does not give a full picture of import competition in this sector.

Import growth was more restrained in wood products, pulp, paper and paper products (DE, in the following called “paper”) and transport equipment – categories in which imports from EU-25 countries have grown more modestly (i.e. by less than 100%) since 2002. In the sector of wood products, imports from the EU-25 correspond to around 15% of Russian domestic production, which is still of low quality and developing slowly. Given that Russia’s wood reserves are among the largest worldwide, however, the economic potential for wood products is obvious. The average customs duty for imports in these categories was 13%. Paper imports from the EU-25 correspond to about 30% of the domestic production level. Russia purchases a lot of paper abroad in order to satisfy domestic demand for paper products (especially newspapers and journals), which is also visible in the structure of imports from the EU-25. Parts of Russia’s newspapers and journals are in fact printed outside the country as production quality is better abroad and production capacities in Russia are insufficient. Such a big consumption-driven cluster would leave ample potential for stepping up domestic production. The average customs duty in this category came to 11% in the period under review.

In transport equipment, import growth has been more moderate than in most other industrial clusters. In this category, the ratio of imports to domestic production reached 30% in early 2006. Interestingly, passenger cars accounted for over 40% of transport equipment imports from the EU-25 in 2005; aircraft and spacecraft came to 14% and other vessels (including boats and ships) and parts accounted for the rest. According to reports by the Federal Customs Service, car imports, which are the main drivers of import

growth, have doubled annually in recent years. The average import duty in the sector was 11% in mid-2006. However, duties were higher on a number of specific products such as passenger cars (coming to at least 25%), which might be an important reason for establishing car plants in Russia.

Arguably, energy, chemicals and nonmetallic mineral products could also be classified as belonging to the fuel sector. Domestic energy production has grown at a slower pace than energy imports, which mainly comprise a variety of oils and – at a ratio of 30% to domestic output – do not constitute a serious threat to domestic production. The average energy customs duty was only 5%. The ratio of chemicals imports from the EU-25 to Russian domestic production grew from 40% to 60%. Accounting for about one-third of chemicals imports from the EU-25, medical products recorded the highest import shares. Most of the main subgroups in this sector are luxury goods Russia does not produce domestically (which is one of the reasons for the faster growth of imports). Although Russia has its own production in the medical sector, imports are clearly in the lead. The average customs duty for chemicals was 9%. In the area of nonmetallic mineral products, imports from the EU-25 corresponded to about 10% of domestic production. Various glassware accounted for one-third of imports, while various ceramics and half-fabricates accounted for the rest. In all these categories, Russia has the potential for significant domestic production. With import duties coming to about 16% in mid-2006, which is clearly above average, protection for nonmetallic mineral products is rather pronounced.

For rubber and plastic products (DH, “rubber and plastic” for short), the ratio of imports from the EU-25 to domestic output went up from 20% to 40%. Here, the major categories of imports from the EU-25 were rubber tires, plastic plates, sheets, foil and film – in all these categories, competing domestic industries should exist. The average minimum import duty for rubber and plastic was 9% in mid-2006. For metals, the ratio of imports from the EU-25 to domestic production was about 5% and the import duty came to about 11% on average.

4. Conclusions: Russia Shows Symptoms of the Dutch Disease

Our approach showed that in the period from early 2002 to early 2006 Russian imports grew significantly faster than domestic production in nearly all product categories. This trend partly reflects overall economic developments, given that total Russian import growth (in terms of volume) has been nearly three times faster than GDP expansion during this period. In many industrial clusters, the share of imports is still small compared with competing domestic production; moreover, the imported goods are not necessarily substitutes of domestic products. This means that in some categories there are reasons behind the strong import growth which are not related to changes in the competitive position of Russian manufacturers. In categories like leather products, machinery and equipment, and electronic and optical equipment, however, imports from the EU-25 alone exceed domestic production. Moreover, imports of textiles nearly equal domestic production. Import growth exceeds domestic production growth in all sectors except electronic and optical equipment.

This could, however, imply that electronic and optical equipment may be an infrequent but important example of Russian firms (so far) withstanding foreign competition in a modern technological area. Textiles and leather products are marginal in total imports. Contrary to the situation of electronic and optical equipment, Russia's competitiveness appears to be waning in the realm of the other major import component from the EU-25, machinery and equipment. One should point out, though, that a large share of machinery, equipment and electronics imports is accounted for by investment goods, which may help the country build up competitive industrial structures. The textiles sector is clearly deindustrializing, as domestic production is declining.

The trend observed in numerous other categories – paper, transport equipment, rubber and plastics, and chemicals – gives rise to concern. Import competition in wood products is still weak, but growing. By contrast, imports do not appear to threaten domestic production in mining and quarrying, energy, metals and nonmetallic mineral products. Also in food production, domestic industries are doing well. However, the foodstuffs branch is seen to benefit from one of the highest levels of Russian tariff protection. Russia's WTO

accession process promises to force highly protected industries to gradually lower import duties, which should increase import competition and raise pressures to restructure in the medium term.

Unlike most earlier studies on the Dutch disease in Russia, we clearly find a trend of increased overall import competition. This result is derived using EU-25 trade data, which correspond to about one-half of Russia's value-based imports. Total imports are therefore probably twice as large as indicated by our exercise. In our view, the observed tough import competition might be interpreted as a certain degree of the Dutch disease syndrome in many of the Russian industrial production sectors, especially in some important ones that might have the potential to drive economic diversification. This overall picture may correspond to an incipient deindustrialization process that affects large parts of manufacturing.

However, our approach is limited in a number of ways. First, we are only examining what we see as the last link of the hypothetical causality chain of the Dutch disease theory. This last link may be exposed to other influences lying outside the causality chain. For example, Russia's strongly rising average income levels in recent years have obviously contributed to making higher quality imports more easily accessible to the average Russian population. Second, it is still difficult to distinguish between substitutes and complementary products, as this would require more detailed industrial output data. Third, the time span under review is rather short. Fourth, we do not have full volume-based data on total Russian imports.

Despite these limitations, we show that – based on the simple Dutch disease theory of import competition versus domestic production – Russia has reasons to worry. Of course, higher competition and rising purchases of capital equipment may contribute to improving the productivity of domestic production and to boosting Russia's competitiveness in the medium and long term. Mounting import competition in recent years may also largely reflect some structural adjustment related to Russia's transition and continuing integration into the global market.

However, such strong import growth against much slower growth in domestic production is not sustainable in the long term if Russia wants to diversify its production structure from being predominantly natural resource-intensive to focusing more on value-added manufacturing. The question of how to tackle the current challenge will therefore partly depend on how successful policymakers manage the macroeconomic developments and how effectively

they use the buffers created by the tight fiscal policy in recent years when oil prices were high. So far, their overall record in this regard is quite respectable. Notwithstanding Russia's recent redemption of its entire Soviet-era foreign debt from its stabilization fund means, the fund doubled in size in the course of 2006. Curtailment of domestic demand through taxing and sterilizing oil-related proceeds has doubtlessly contributed to countering Dutch disease pressures.

The outcome will also depend on the way in which policymakers handle structural adjustments and on how the investment climate evolves. An improvement of the Russian business environment could contribute to helping curb or contain the Dutch disease. In addition, increased integration to the world economy, induced by Russia's WTO accession, would probably force domestic manufacturing to become more competitive and offer new markets in the medium and long term. In the short term, however, import growth would speed up if customs tariffs were abolished.

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ENERGY PRICES, INFLATION, AND MONETARY POLICY¹

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1. Energy prices and inflation

Are increases in commodity and energy prices inflationary? The answer seems to be obvious: yes, of course, commodity and energy prices are important components of production costs. As costs increase, output prices are necessarily pushed upwards, thus creating inflationary pressures. QED.

Actually, things are not quite that simple. An increase in commodity and energy prices represents a change in relative prices, not necessarily in the price level. Indeed, what about the prices of other goods and services? They might well fall. As people spend more money on gasoline, they may have to cut back on other expenditures, such as restaurant meals or clothing, thus inducing some prices to fall, or at least to increase less rapidly. In the context of the quantity

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theory of money, for instance, for a given money supply, a constant velocity, and full employment, I would not expect to see an increase in the price level at all. Some prices will go up and others will come down, but the price level should remain unchanged.

Of course, this is merely a first approximation based on an exceedingly simple model. Reality is more complicated. Activity and velocity need not be constant. If some prices are sticky downwards, they might fail to decrease sufficiently to offset the increase in the prices of commodities and energy. This might impact negatively on activity, and thus, if activity does indeed decline as a consequence of the higher commodity and energy prices, the price level might well rise, even for an unchanged money supply. As for velocity, it might well increase as a result of changing expectations about future developments in the price level.

One must keep in mind, though, that even if one admits that an increase in commodity and energy prices will tend to increase the price level, this does not mean that it will lead to inflation. A once-for-all increase in the price level is not the same thing as inflation. Inflation means a steady and continuous increase in the price level, not a once-for-all jump in it. Admittedly, we do not measure the price level continuously, and thus it is difficult in practice to distinguish a stepwise increase in the price level from a sustained one. Nonetheless, the conceptual difference exists and should be kept in mind.

In any case, I do not want to suggest that an increase in commodity and energy prices does not tend to lead to at least a temporary increase in inflation, but I think it is important to remember that we are nonetheless dealing foremost with a real – rather than a nominal – shock, and that its inflationary impact ought to be limited. Typically, as energy and commodity prices increase, other relative prices must adjust. I earlier mentioned production activities. If energy becomes relatively more expensive, other inputs, such as perhaps labour, must become relatively cheaper. Real adjustments are needed. Real wages may have to come down.

2. The monetary policy response

One advantage of assessing a change in the commodity and energy prices as a relative price shock, rather than an inflationary shock, is that it shows exactly where the responsibilities lie with regard to inflation: clearly, the buck stops at the central bank. The reaction of the monetary authorities will be crucial in determining whether the commodity and energy price increase will indeed be inflationary.

If the central bank validates the price increase, so to speak, and opposes the real adjustments that are needed, then the commodity and energy price increase might well trigger an inflationary spiral, but it is monetary policy that would be at fault. This is pretty much what happened in the 1970s following the first oil price shock.

What should monetary policy then do? Should it oppose the price increase? Before answering that question, it might be useful to first briefly address another question: is a commodity or energy price increase a supply shock or a demand shock? The answer is: it could be either.

Consider first a closed economy (e.g. the world economy). The price increase could reflect an increase in demand, or it could be due to a fall in supply. Many people believe today that the current increase in commodity and energy prices has to do with the rapid growth of emerging market economies, particularly China and India. Some observers, though, also point at some supply factors, such as political instability in some oil producing nations. Speculation is often mentioned as an additional demand factor, although it is difficult to see how it could play a lasting role given the large cost of carrying inventories in most instances.

What about open economies, and particularly small, non energy and commodity producing, open economies, such as Austria and Switzerland? It does not really matter what causes the worldwide increase in the prices of commodities and energy as far as these economies are concerned, for either way they take the form of a negative supply shock – more precisely, an adverse terms-of-trade shock – that tends to reduce activity and put upward pressure on prices.

Monetary policy is then caught in a dilemma. If monetary policy is used to oppose the increase in the price level, it will tend to slow down the economy even further. If monetary policy becomes more expansionary in order to fight the slowdown, it will reinforce the price increase. Most central bankers would therefore argue in such a case that monetary policy should react with caution. It should not necessarily fight the initial price increase, but it should ensure that it does not feed into expectations, for this could trigger an inflationary spiral.

The fact remains that a worsening in the terms of trade is a real shock that inevitably reduces economic welfare. In many ways, this is similar to a technological *regress*: you get less for more. It reduces real domestic income, even though real gross domestic product (GDP) as it is conventionally measured will fail to register it.² Thus, there is no way around it: some, if not all, real factor rewards must decline, and there is nothing that monetary policy can do to avoid it.

² Real GDP will even register an *increase* if it is measured, as it is still the case in most countries, by a Laspeyres quantity index, whether chained or not; see Kohli (2004).

3. The measurement of inflation

What about the measurement of inflation? If it is unavoidable that increases in commodity and energy prices will have at least a temporary effect on the price level, shouldn't central banks pay more attention to core inflation – that might exclude energy prices – rather than to headline inflation? I do not think that there is a generally accepted answer to this question. I personally believe, though, that the main emphasis should be on headline inflation, and this for at least two reasons. First, if the prime objective of monetary policy is to safeguard the purchasing power of money, then it must be all inclusive. One must look at the price of the entire basket of goods and services, not just part of it. In a way, this is again a debate about relative prices vs. absolute prices. If the core inflation rate is measured by excluding some goods from the basket, like energy and food, then one is no longer considering the general price level, but merely a subcomponent of it. The second reason has to do with communication. At a time of rapidly increasing energy and food prices, how can central banks convince the public that they are successful in achieving price stability, if they focus on what some people call the “cold and hungry” index? Energy and food prices are among the most visible ones for the population, and leaving them out is simply not credible.

One might argue that core indexes are better measures of the current trend of price developments than the headline index, which tends to be quite volatile. That might well be true, and indeed at the Swiss National Bank we compute and use a number of core indexes, such as trimmed mean indexes, a dynamic factor index, and indexes that exclude food, energy, and in some cases administered prices. These indexes are part of our tool box, and we observe them closely. Nonetheless, we should not take it for granted that they will always be better indicators of current developments, at a time when energy and food prices have been trending upwards for several years. It might well be, as argued earlier, that commodity and energy prices are increasing because of the strong demand from fast growing emerging market economies, but globalization has other consequences too, such as the falling prices of industrialized products on world markets. Thus, if food and energy prices are to be left out from the measurement of the price level, shouldn't one exclude the prices of cheap Chinese imports as well? Clearly, if one takes out all the prices that increase or decrease, what will be left will look fairly flat. That might look reassuring, but it might also be an illusion. As for the capability of core indexes to forecast future headline inflation, I have seen no convincing empirical evidence supporting that hypothesis.

4. Commodities and energy as an asset class

It is often argued that commodities and energy should really be viewed as an asset class. Moreover, there are economists who contend that monetary policy should react to – or even target – asset prices, in order to prevent bubbles from developing. This then begs the question: should monetary policy target commodity prices? Should monetary policy react if there is a commodity price bubble in the making? Ironically this would be almost exactly the opposite of the policy that I briefly reviewed earlier, i.e. targeting a core price index that excludes commodity and energy prices. I would certainly argue against this policy course as well. How can one be sure that the commodity price increase is due to a speculative bubble, rather than to legitimate economic forces? Are central bankers better placed than market participants to call a bubble? When Alan Greenspan, then Chairman of the U.S. Federal Reserve Board, gave his famous “irrational exuberance” warning in December 1996, the Dow Jones was trading at around 7,500. It then went on increasing to peak at over 11,700 in January 2000, before falling back to around 7,300 in October 2002. By then end of 2003, the Dow had returned to the 10,000 level, and it broke the 13,000 mark in January 2007. While there is no arguing in hindsight that a stock market bubble did indeed develop, it is certainly debatable whether it was called at the right time. Furthermore, there is always the risk that a policy intervention would be counterproductive, due to unforeseen side effects, unknown lags, and so on. And if one were to target asset prices, why focus on commodity prices, rather than say, equity prices, real estate prices, bond prices, or foreign exchange rates? Admittedly, there is one important historical precedent one should mention, and that is the gold standard regime, when monetary policy was indeed directed at maintaining constant the price of gold. In the late nineteenth century, policy was successful in fixing the price of gold, but at the cost of large swings in the cost of living. Luckily, no one seriously proposes to turn the clock back and to return to the gold standard.

5. Back to price stability

In my view, given the multitude of existing assets and the fact that the central bank ultimately only has one independent instrument at its disposal, it should concentrate on maintaining constant the price of the one asset that it is closest to, namely money, and thus it should focus on keeping the real price of money constant. While the *nominal* price of money is unity, the real price of money is one divided by the price level. Thus, seeking to keep the *real* price of money steady is exactly the same as maintaining price stability, which is what central banks should be doing all along.

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MONETARY POLICY AND COMMODITY AND ENERGY PRICES

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Energy and commodity prices have risen rapidly in recent years. This is largely due to emerging markets such as China and India becoming increasingly integrated into the global economy – what one often means when talking about globalisation. At the same time, globalisation has entailed low prices for imported products from emerging markets, and via stiffer competition has contributed to curbing the price increases for import-competing products in industrial countries. This has made it easier for the central banks to maintain price stability. For some considerable time the economic discussion focused on the inflation dampening effect of globalisation. The challenge facing some central banks, such as the Riksbank which I represent, was rather how to stimulate economies by means of monetary policy in order to push up inflation towards the target.

However it would now seem that globalisation has instead begun to push up inflation, as increasing demand from emerging markets pushes up world market prices not just for energy and metals but also for food commodities. Perhaps it is only now that the low inflation policy, which to all appearances has been conducted so successfully in many countries, is being put to the test.

How then, is inflation affected by rising energy and commodity prices and how should monetary policy deal with such price movements? The principles for this are essentially simple when applying so-called flexible inflation targeting. It means that the central bank tries to stabilise inflation

around the inflation target and, provided that confidence in the inflation target is maintained, also gives consideration to stabilising production and employment. Another and more concrete way of describing this is that the central bank tries to find a path for the policy rate which will ensure that the forecasted inflation rate is reasonably close to the target at the same time as the real economy develops in a balanced manner. These universal principles can be applied regardless of the nature of the shock facing the economy. In this sense, one could say that rises in energy and commodity prices do not pose any specific problem from a monetary policy point of view – in many ways it is a case of ‘business as usual’.

But even if the principles for the way in which monetary policy should be conducted are simple in theory, the practical implementation is far from simple. An assessment must be made of the way in which rises in energy and commodity prices affect the economy, not only inflation but also the real economy. An increase in energy and commodity prices can affect the economy in various ways. The price increases have a direct effect in that energy and food, for instance, are included in the inflation measure. But the real economy is also affected indirectly. For households, higher energy prices act roughly like a tax increase and curb domestic demand.

A more rapid increase in energy and commodity prices means that the production costs increase. The effect can be compared to the one that follows from a drop in productivity. It tends to dampen production and growth. At the same time, the rise in energy prices in recent years has, to a far greater extent than the rises in the 1970s and 1980s, been fuelled by strong demand in the world market rather than by supply shocks. The negative effects on the real economy of the rapid rise in energy prices have been wholly or partially counteracted by favourable price developments in other areas and by strong international growth. Thus it is not possible to give a standard answer as to how monetary policy should react to an increase in energy and commodity prices. Each shock must be analysed separately and the question of which policy is most appropriate must be determined from case to case.

What is characteristic to energy and commodity prices is that they tend to fluctuate considerably during an economic cycle. Periods with rapid price increases may be followed by periods of far calmer development or even by a decline in prices. These fluctuations also spread to consumers. Such rapid shifts in inflationary impulses are often impossible to predict and cannot be immediately counteracted by means of monetary policy. This is because of the lag in monetary policy’s impact on economic activity. It is, therefore, common

in the monetary policy analysis that, over and above the more comprehensive inflation measures, central banks also study inflation measures that exclude short-term effects in energy and commodity prices. In my view, this is not a question of whether there is reason to disregard energy and commodity prices when balancing monetary policy. Instead, it is a question of trying to differentiate between those price impulses that risk having a lasting effect on inflation and those that are temporary and which will ebb away without any forceful monetary policy counter-measures.

The way in which the practical monetary policy should react to rising energy and commodity prices is a question that the Riksbank, like many other central banks, is grappling with at present. In Sweden rising energy and food prices contributed to inflation increasing rapidly in autumn 2007. CPI inflation is currently more than one percentage point above the target of 2 per cent. In particular with regard to energy, but also to a large extent food, the rapid increase in prices reflects a substantial rise in world market prices. The assessments that need to be made in this type of situation have to do with the extent to which the effects will last, as well as how much the price increases have to do with increased demand and changes in supply.

In the forecast presented in connection with the monetary policy meeting at the Riksbank in mid-February the assessment was that world market prices would not continue to rise at the same rapid rate in the future. The inflationary impulses are therefore considered mainly to be temporary and inflation is therefore expected to fall back again in a year or two. But to some extent it also concerns effects on inflation which risk being more permanent and which should be counteracted by monetary policy.

It is also very important that confidence in monetary policy and the inflation target is maintained. The fact that inflation is above the target must be regarded as a temporary departure. The inflationary impulses cannot be allowed to take root in the economy and to push up inflation permanently. In this context, it is important to be particularly vigilant with regard to how inflation expectations develop. In Sweden, by means of specific surveys, we continuously monitor developments in inflation expectations among different social groups and with varying time horizons. These surveys reveal that inflation expectations have risen recently, not just in the short-term but in the long-term as well. In addition to continued good growth and high cost pressures, this was a key reason that justified the decision to raise the repo rate in February.

HOW SHOULD MONETARY POLICY TAKE COMMODITY AND ENERGY PRICES INTO ACCOUNT?

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Over the past five years, the price of oil and non-energy commodities in euros has increased by significantly more than 60 percent (See Figure 2 below). This has put upward pressure on consumer price inflation. How should central banks respond to those price changes? At a general conceptual level, the consensus view is simple: Modern central banks like the European Central Bank that focus on maintaining price stability in the medium term should work out what the implications are of those relative price changes for the risks to price stability and respond accordingly. To the extent that such relative price changes are expected to have only temporary effects on headline inflation, the central bank can look through them and does not need to respond. Because energy and commodity prices are typically highly volatile and flexible, it is often argued that central banks should focus on price indices that exclude those components, so-called core inflation indices. However, if those price changes risk unhinging private sector inflation expectations from the central bank's medium-term objective and lead to second-round effects on prices and wages, a less accommodative monetary policy response to the incipient rise in headline inflation is warranted. In practice, the policy response therefore depends on a number of factors such as the source and the persistence of the price changes and the overall macroeconomic environment, which prevents a simple mechanistic approach as suggested by exclusively focusing on core inflation measures. Moreover, whether shocks to commodity prices have

¹ The views expressed in this contribution are my own and do not necessarily reflect those of the European Central Bank.

short-lived effects on inflation will depend on the expected policy response and therefore should not be treated as exogenous to monetary policy.

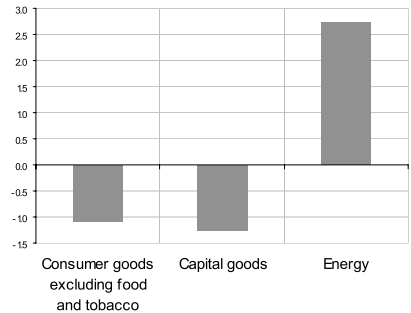
In this panel contribution, I make six points that have a bearing on the implications of energy and commodity price changes for price stability and on how central banks should respond to such changes. First, over the past ten years energy prices have persistently grown by more than the average price level, while other prices have persistently fallen. Such persistent relative price changes are an important feature of the market mechanism, which monetary policy can not and should not do anything about. However, given the relatively large weight of energy in the consumption basket, it also implies that excluding such price changes from the targeted consumer price index would lead to a systematic upward bias in headline price inflation and the cost of living. *Second*, for a net importer like the euro area economy increases in energy and commodity prices push up import prices and therefore lead to a deterioration of the terms-of-trade. Such negative terms-of-trade developments are akin to negative productivity shocks, which make euro area residents poorer. The response of the equilibrium real interest rate will depend on whether the negative supply effects coming from rising marginal costs outweigh the negative demand effects coming from reduced income and wealth. *Third*, the source of the rise in energy prices matters for its inflation implications. Empirical evidence has highlighted that the recent energy prices are mostly driven by a world-wide increase in the demand for energy, partly due to the rapid growth of China and India. Such demand-driven price increases may have different implications for the outlook for price stability from changes in oil prices driven by supply disruptions. *Fourth*, there is evidence that the inflationary effects of a given oil price increase have declined in the euro area. *Fifth*, it is important to take the source of this reduced effect into account. To the extent that the reduction is due to the improved credibility of a low and stable inflation regime and increased real wage flexibility, these factors need to be monitored in calibrating the policy response. The role of anchored inflation expectations in reducing the pass-through also points to the fact that it is generally difficult to distinguish first from second-round effects. Finally, in the euro area exclusion-based measures of core inflation are not very good predictors of underlying headline inflation. In the next few pages, I briefly elaborate on each of these points.

Energy prices have persistently increased by more than the general price level, but other prices have persistently fallen.

Most changes in energy and commodity prices are relative price changes that reflect the working of the market mechanism in bringing the supply and demand for energy and commodities in equilibrium. In a dynamic setting, these price changes also help bringing about an efficient allocation of resources. For example, to the extent that the recent increase in energy prices reflects the increasing shortage of mineral energy sources and low inventory levels, the price increases will help stimulate new investment both in exploring new oil fields and in alternative forms of energy. Central banks can not and should not affect those relative price changes as it is likely to interfere with the efficient allocation of resources. In this sense, changes in energy prices are not different from changes in the prices of other goods and services.

Figure 1: Components of producer and consumer price inflation in the euro area

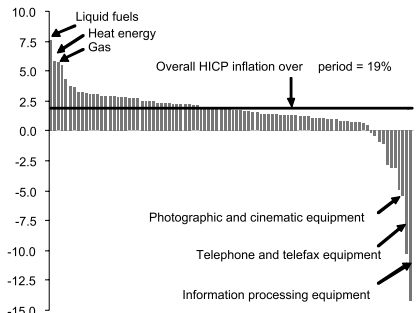
Producer prices: Evolution of selected sub-indices relative to overall index



Notes: Difference between annualised growth rate over 1996–2006 in component relative to overall index, %.

Source: ECB calculations based on Eurostat data.
Reproduced from Trichet (2008)

Consumer price: Average price changes in euro area HICP subcomponents



Notes: Average annual change of 92 subcomponents over 1996–2006, %.

Source: ECB calculations based on Eurostat data

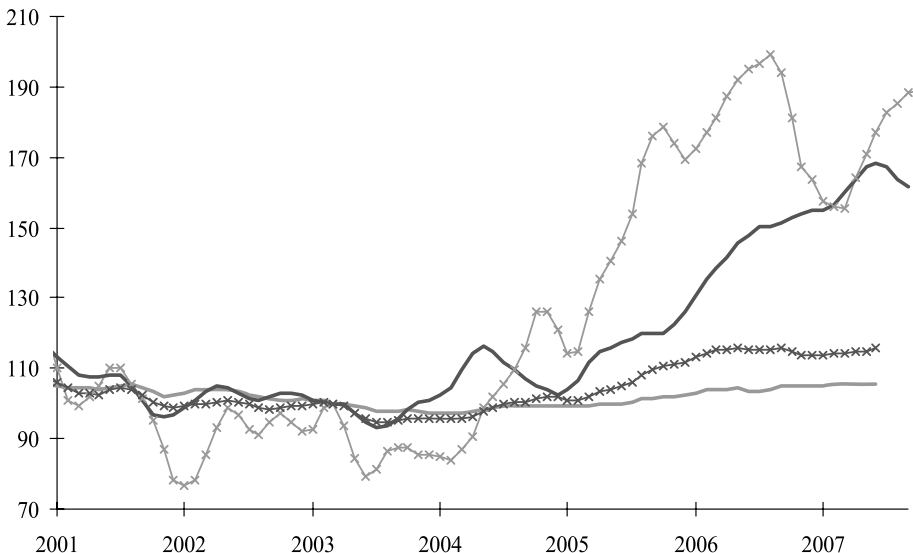
Figure 1 exhibits the average price changes of selected components of the producer and the consumer price index over the past 10 years. Two comments are worth making. First, the left panel shows that the producer price of energy has increased on average by more than 2.5 percentage points more relative to the overall producer price index over the past ten years. In contrast, both consumer and capital goods have on average increased by less. Similarly at the retail level, the prices of liquid fuels, heat energy and gas have on average

increased by more than 6% over the period 1996-2006, while photographic, telephone and information processing equipment prices have on average fallen by at least as much in absolute value. Clearly, these large relative price changes have been persistent and reflect relative productivity and demand factors. Seen from this perspective, it is not clear why one should exclude prices that have been rising faster than average and not exclude those that have been falling. Obviously, doing so would lead to a persistent upward bias in the cost of living.

Persistent changes in energy and commodity prices affect the terms of trade and the wealth of the euro area.

The euro area is a net importer of oil and commodities. The recent rise in energy and commodity prices has therefore led to a deterioration of the euro area's terms of trade. Figure 2 shows that since 2003 non-energy commodities have increased by almost 70 percent, while the price of oil has increased by 90 percent. In contrast, prices of manufacturing imports have increased by

Figure 2: Extra-euro area import and commodity prices



Notes: Indices: 2003M1=100, 3-month moving average. All prices are in euro.

Sources: ECB, HWWA, Eurostat . Reproduced from Trichet (2008).

much less than general price inflation, partly reflecting the lower prices of imports from China and other Asian economies.

Negative terms-of-trade shocks are like negative productivity shocks: they make a nation poorer. Rising import costs lead to an increase in marginal costs and a reduction in output either directly through a rise in the costs of intermediate inputs or indirectly through the rise in producer wages relative to consumer wages. Ultimately, the increase in marginal costs has to be compensated by a reduction in real wages. Rising import prices therefore also reduce real incomes and have negative wealth effects which will tend to reduce demand. Whether in the short term the equilibrium real interest rate has to fall or rise in response to rising import prices depends on whether the demand or supply effects dominate. This will in turn depend on a number of factors such as the perceived persistence of the shocks. If the current rise in imported energy and commodity prices is perceived to be persistent, then households may feel permanently poorer and may reduce demand significantly. In that case, the equilibrium real interest rate may stay put or could even fall. However, to the extent that there is real wage resistance, this may not be the case and real rates may have to rise in equilibrium.

The source of energy and commodity price changes matters for the outlook for price stability.

Recent research (e.g. Killian (2008) and Baumeister and Peersman (2008)) has shown that the source of oil price changes may have changed over the past decade. Using a time-varying VAR model, Baumeister and Peersman (2008) distinguish between oil supply and demand shocks by imposing sign restrictions: i.e. supply shocks move production and prices in opposite directions, while demand shocks move them in the same direction. They find that the frequency and the size of supply shocks have fallen over the past two decades, but the demand elasticity has increased. As a result, a given supply disruption leads to larger price changes. In contrast, world demand shocks have become more important and most of the recent price hikes are due to an increase in world demand for energy.

The source of oil price changes is important because the overall effects on domestic inflation may be different depending on the source. In particular, to the extent that the current rise in energy prices is related to the increasing demand for energy coming from China and India, one should take into account that there are offsetting effects. For example, as mentioned earlier, the prices

of imported goods from those countries have fallen. In the euro area, it has been estimated that this has contributed to 2 percentage points lower average inflation in import prices since 1999. On the other hand, growth in China and India will also lead to an increase in the demand for exports from the euro area and this may give rise to increasing inflationary pressures (keeping everything else equal).

The estimated pass-through of oil prices into producer and consumer prices in the euro area has fallen

Recent research has shown that in many OECD countries the pass-through of oil prices into producer and consumer prices has fallen (e.g. Blanchard and Gali (2008), Baumeister and Peersman (2008), Hahn and Mestre (2008)). These findings are similar to the empirical evidence on the reduced pass-through of exchange rate changes over the past two decades. Table 1 reports the elasticities of oil price changes on prices at various stages of production in the euro area based on rolling-window VAR estimations in Hahn (2008). The Table shows that the impact of a 1% increase in oil prices on other prices has fallen at all stages of production. While the direct effects on the consumer price index are still there, the indirect effects have fallen quite significantly. The elasticity on HICP ex energy after three years has fallen from 0.07 in the start sample to 0.01 in the end sample. Also the impact on producer and non-oil import prices has fallen considerably.

Table 1: Impact of a 1% increase in oil prices on euro area prices after 12 quarters (deviation from baseline)

	Full sample	Start sample	Middle sample	End sample
Non-oil import prices	0.17	0.24	0.08	0.02
Producer prices	0.10	0.09	0.03	0.06
HICP	0.07	0.09	0.04	0.03
HICP ex energy	0.05	0.07	0.01	0.01

Notes: 1) The results of the full sample refer to 1970Q2 – 2007Q1. 2) To ensure robustness, the results shown for the start, middle and end sample are averages of the estimates derived from 10 consecutive rolling window estimates. That is, the estimates for the start sample are averages over the 10 estimates derived from the data sample 1970Q2 – 1985Q1, and the nine following sample periods, by which the first and last period are moved stepwise by one quarter, i.e. the last sample period taken into account is 1972Q3 – 1987Q2. The estimates of the middle and end samples are computed in the same way. For the middle sample estimates the first data window included is 1979Q4 – 1994Q3 and the last refers to 1982Q2 – 1997Q1. For the end sample estimates the first data sample included is 1990Q1 – 2004Q4 and the last data sample is 1992Q2 – 2007Q1.

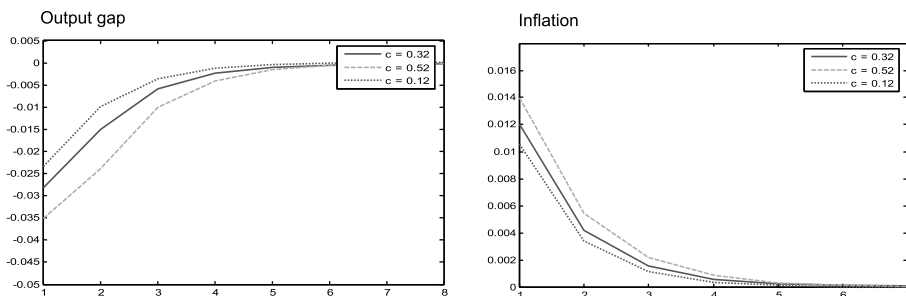
Source: Hahn (2008).

This evidence is consistent with other empirical evidence. Blanchard and Gali (2008) investigate which factors may have contributed to this fall in pass-through and conclude that in addition to a more favourable environment due to offsetting shocks and a lower energy content of production, two factors are likely to be important: the improved reputation of monetary policy makers for maintaining price stability and reduced real wage resistance. Both factors contribute to a lower pass-through of oil prices in headline inflation.

The sources of the reduced pass-through of oil prices are important for calibrating the policy response.

Gaspar, Smets and Vestin (2006) show that in an environment of imperfect knowledge and learning in expectation formation the monetary policy response to cost-push shocks will depend on factors like the perceived degree of inflation persistence by the private sector. Figure 3, which is taken from Gaspar, Smets and Vestin (2006), illustrates the response of inflation and the output gap to a cost-push shock in a simple calibrated New Keynesian macro model where the private sector is learning about the inflation process by recursively running first-order autoregressive regressions on inflation and forms its inflation expectations accordingly. The various cases correspond to different initial levels of perceived inflation persistence.

Figure 3: Mean dynamics of output gap and inflation following a one-standard deviation cost-push shock.



Notes: The different impulse responses refer to different starting values of the estimated degree of inflation persistence by the private sector.

Source: Gaspar, Smets and Vestin (2006)

Three comments are worth making. First, if the perceived inflation persistence is low (e.g. the private sector estimates that inflation returns to its target with

an autoregressive parameter of 0.3), the effects of the cost-push shock on inflation and the output gap are lower and less persistent. This illustrates the benefits of a low and stable inflation regime. Both output and inflation volatility will be lower in such a regime. Second, if the perceived persistence is low, the central bank should respond only mildly to the cost-push shock. In contrast, if the perceived persistence is high, inflation expectations are not well anchored and give rise to second-round effects, the central bank should respond more aggressively and persistently. As shown in Gaspar, Smets and Vestin (2006), such a response will help in establishing a track record for low inflation and provide future benefits in the face of cost-push shocks. Third, the example illustrates that first-round effects (i.e. the immediate impact of a cost-push shock on inflation) depend on the perceived second-round effects, which will in turn depend on the monetary policy reaction. As shown by Gaspar, Smets and Vestin (2006), in this environment a policy that does not let bygones be bygones will be powerful in reducing the actual and perceived persistence of the inflation response to cost-push shocks.

In the euro area, exclusion-based measures of core inflation are not good predictors of underlying headline inflation.

It has been argued that exclusion-based core inflation measures are useful indicators because they are good predictors of underlying inflation. Excluding volatile items such as energy and unprocessed food may indeed help

Table 2: Core inflation measures as predictors of underlying headline inflation

	<i>H=6</i>	<i>H=12</i>
HICPX	1.13	1.60
HICPXX	1.11	1.72
Trimmed mean (5% each side)	1.24	1.26
Trimmed mean (16% each side)	1.25	1.34
Median	1.15	1.37
Eurocore	0.95	0.97

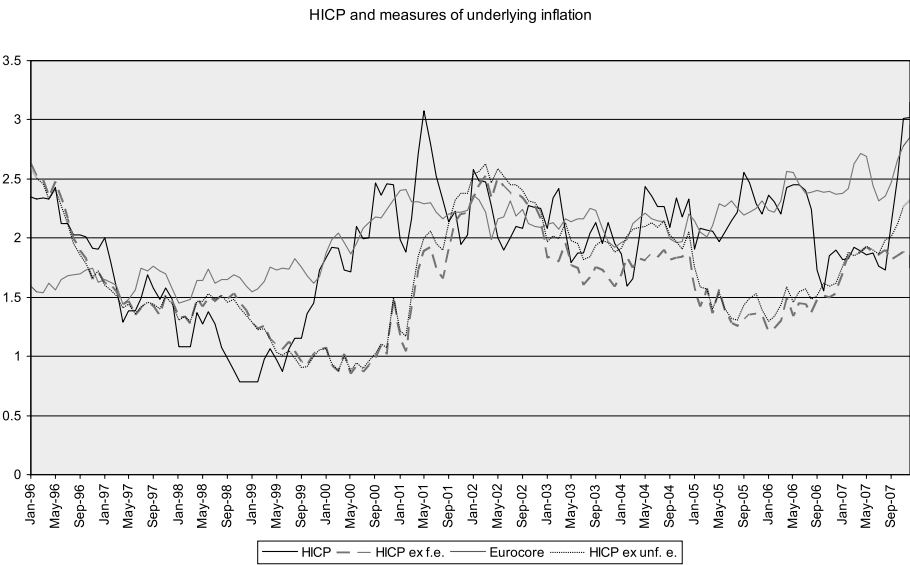
Notes: 1) HICPX is HICP excluding unprocessed food and energy; HICPXX is an ad-hoc permanent exclusion measure; Eurocore is based on a dynamic factor model estimated on the components of the HICP 2) The entries report the ratio of the RMSE over the RMSE of a benchmark (AR) model. Sample period: 1996:1 – 2005:10

Source: Lenza (2007)

recovering the underlying inflation trend. However, as shown above, changes in energy prices have been quite persistent. Moreover, Vega and Wynne (2001) and Morana (2000) have investigated the forecasting properties of alternative core inflation measures in the euro area and have found that the HICP excluding food and energy scores badly. This measure is outperformed by basically all the other measures in out-of-sample forecasting exercises. Moreover, the HICP-ex does not improve on forecasts based only on lags of headline inflation. These results are also borne out in more recent empirical evidence produced by Lenza (2007), reported in Table 2.

Lenza (2007) shows that a dynamic factor model based on the components of the HICP is a better predictor of underlying inflation. Figure 4 illustrates why this is the case. In 2000, for example, the HICP-ex measure indicated lower inflation, while headline and underlying inflation was clearly higher.

Figure 4: HICP and measures of underlying inflation



Source: Lenza (2007).

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