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Ukrainian Machine Building: Strategic options and short term measures in view of trade disruptions with Russia

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Ukrainian Machine Building: Strategic options and short term measures in view of trade disruptions with Russia

Executive Summary

Ukraine faces the possibility of major trade disruptions with Russia due to the current political tensions. The machine building sector is most exposed to the Russian market among all Ukrainian sectors, with 32% of output being exported to Russia. For this reason, the focus of the present paper is on this sector.

The machine building sector is a major component of the larger manufacturing sector, contributing 25% to gross value added in the manufacturing sector and hence around 3.5% to the gross domestic product of Ukraine. It consists of six subsectors. 51% of output is produced by the three transport-related subsectors, the railway, aircraft/shipping and car industries. Manufacture of general machinery and equipment well as manufacture of electrical equipment are also relatively large subsectors of machine building, representing 27% and 16% of machine building output.

The possibility of major loss of access to the Russian market would hit the sector hard, particularly as export diversification and productivity are low in most subsectors. The largest subsector, the railway industry, sells 82% of its total output in Russia and on the Ukrainian domestic market. Productivity in machine building is only two thirds of the national average, indicating a capital and technology deficit as well as suggesting problems with international competitiveness.

In view of the possible loss of market access in Russia, the Ukrainian government has three strategic options: laissez-faire, conservation or modernisation. A pure market laissez-faire strategy would risk the loss of economic substance and potential, and is thus not advisable. But a state-centred conservation strategy is also not a sensible option, since it would not address the sector's competitiveness problem. Instead, government should develop a modernisation strategy as an intelligent combination of market forces and government intervention. In such a way, government can contribute to the ability of the sector to redirect and diversify exports by facilitating investments, optimising public policy and setting incentives for firms to increase their competitiveness.

Since such a strategy takes time to develop and implement, short run measures are needed in order to protect the economic substance and potential of the sector. Measures should be carefully designed in order not to counteract the competitiveness drive of the modernisation strategy. We identify government-assisted short term work schemes, public procurement schemes in selected goods useful for public infrastructure and an opening of the Ukrainian economy for FDI and joint ventures as short-run measures that should be prepared for the eventuality of massive restrictions to market access in Russia.

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1. Introduction

The machine building sector in Ukraine is facing a difficult situation. Recent research by the German Advisory Group[1] has found that machine building is the industry sector of Ukraine that is most heavily exposed to the Russian market in terms of the percentage of output exported to Russia. Apart from the fact that a large share of the production facilities of machine building are located in the eastern Oblasts of Ukraine, currently subject to political and military turmoil, there exists a pronounced risk that access to the Russian export market may be lost in future due to political decisions of Russia.

Due to the importance of the Russian market for the Ukrainian machine building sector, a possible loss of access to the Russian market would probably have grave consequences for the sector, accounting directly for 3.5% of Ukrainian GDP and 5.5% of employment in Ukraine in 2012. Absent some government intervention, a sudden loss of market access would likely overstretch the adaption capacity of firms, endangering the future of a large proportion of firms, jobs and economic potential in this sector.

This paper therefore explores policy options for dealing with the possibility of large-scale loss of access to the Russian market. In Section 2, we present an overview of the situation in the different subsectors of the machine building sector, focusing on economic value and vulnerability to shocks stemming from the Russian market. In section 3, we analyse current and potential Russian policies that may result in a loss of market access for Ukrainian firms. Section 4 and 5 then deal with possible responses by the Ukrainian government. We focus on long-run policy strategies in section 4, while section 5 deals with short-run measures geared at enabling the survival of economic potential in the short run.

2. The Ukrainian machine building sector: Economic importance and exposure to the Russian market

Beyond its aggregate economic significance and exposure to risks from the Russian market, the machine building sector of Ukraine is composed of different subsectors such as the car or aircraft building industry. These subsectors differ in terms of their size, productivity and exposure to the Russian market. As policy measures must respond to individual problem constellations, we first provide a more detailed overview of the machine building sector and its subsectors.

2.1 The machine building sector: Aggregate view

The machine building sector is one of the largest sectors within Ukrainian manufacturing. In 2012[2], Gross Value Added (GVA) in machine building (or mechanical engineering) was USD 5.5 bn or UAH 44.6 bn, representing 3.5% of total GVA and 25% of GVA in manufacturing. Although this number may seem relatively small, one should bear in mind that the total importance for the GDP of Ukraine of this sector is still larger, as the sector also utilises goods and services produced in other sectors of the Ukrainian economy. According to *Ukrstat*, total output of the sector – including the value of all inputs, regardless of their origin – amounted to USD 19.4 bn in 2012[3]. Total employment in the sector amounted to 585,000 people (5.5% of the total labour force) in 2012.

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[1] See Technical Note TN/03/2014, *Ukrainian exports to Russia: Sector and regional exposure,* by the German Advisory Group and the IER Kiev.

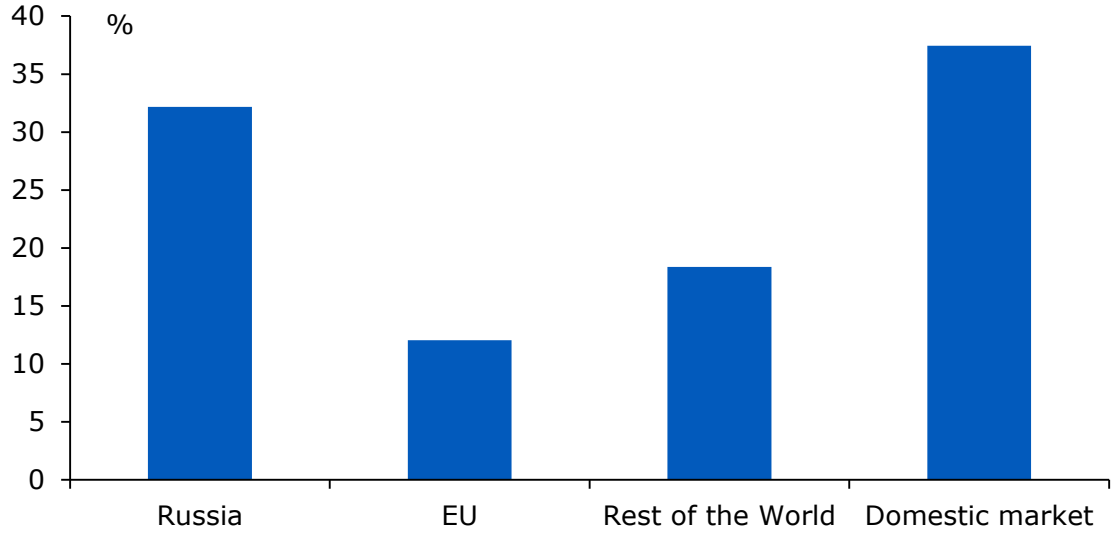
[2] Due to the political upheaval in 2013 as well as limited data availability, we largely use 2012 data in this paper. Data from 2012 provides a more accurate picture of the structure of the Ukrainian economy in normal times than data from 2013.

[3] Weapons production is not included in official statistics apart from some dual-use goods and is therefore largely excluded from the analysis presented here. However, there exists a large arms industry in Ukraine. Weapons exports are conducted by the state holding UkrOboronProm, encompassing 125 state enterprises, 9

As was already found in TN/03/2014, the exposure of the machine building sector to the Russian market and thus to the risk of losing market access is the highest among all industry sectors of Ukraine. In 2012, 32% of total output of the machine building sector was exported to Russia[4].

Figure 1

Destinations of output of the Ukrainian machine building sector, 2012



Source: State Statistics Service of Ukraine, own calculations

The large significance of the Russian market is largely due to the continuation of old economic ties. Due to good knowledge of trade partners, shared production standards and customised products, such long-standing trade relations usually are mutually advantageous and thus sensible to continue, although a diversification of exports is desirable as it reduces dependency on a single market and thus exposure to risks and shocks stemming from this key market.

Trade links with other countries exist: In 2012, the Ukrainian machine building sector exported another 30% of its output to countries other than Russia, including 12% of its output exported to EU countries. However, sector vulnerability to shocks from the Russian market is still very high. Given that the capacity of the domestic market to absorb more output should not be expected to be very high, in order to fully compensate a possible loss of exports to Russia, exports to the EU and the rest of the world would roughly have to double, which would be a highly ambitious goal.

Apart from absolute size, the economic value of a sector to a country is determined by its ability to generate wealth. In a static view, this is best captured by the concept of (labour) productivity, the ratio of GVA to employees. Productivity is driven by the capital and knowledge intensity of a sector as well as by competitive dynamics on world markets. In order to increase national wealth, it is in the interest of a country to foster a sectoral change from less to more productive sectors or, where sector productivity is below potential, increase the productivity of individual sectors.

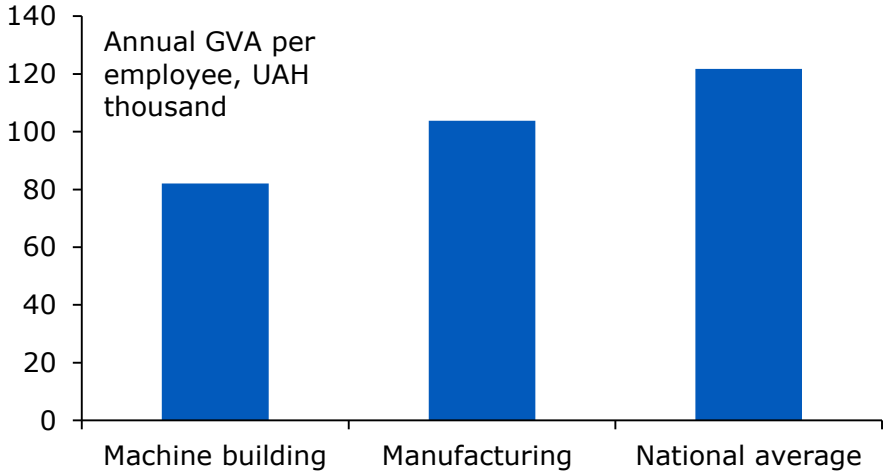
corporations and employing around 120,000 people. Exports by UkrOboronProm were estimated at USD 2.6 bn in 2012 and USD 1.1 bn in 2013 by the Stockholm International Peace Research Institute (SIRPI).

[4] In TN/03/2014, a slightly different calculation approach was used due to restricted data availability. Using output data in basic prices – the price concept most relevant for suppliers – we come to a slightly higher total exposure figure in this paper.

It is striking to see that the productivity of the machine building sector and indeed even of the next higher category, manufacturing, in Ukraine are *below* the national average and at very low values. We find that, at roughly 82,000 UAH per employee, productivity in machine building in 2012 was only 79% of productivity in manufacturing (103,700 UAH per employee) and 67% of national average productivity (121,700 UAH per employee).

Figure 2

Comparing machine building productivity (annual GVA per employee, UAH thousand) to manufacturing and national averages



Source: State Statistics Service of Ukraine, own calculations

Usually, machine building and manufacturing are relatively capital and technology intensive sectors, exhibiting above-average productivity. For example, productivity in manufacturing in Germany in 2012 was USD 94,400, 115% of national average productivity and more than seven times higher than in the Ukrainian manufacturing sector. These statistics thus suggest a huge productivity deficit, caused by a capital and technology gap in Ukrainian machine building and manufacturing.

The capital and technology gap is likely caused by two factors in Ukraine: Low labour costs will shift the efficient combination of factors of production towards more labour-intensive production until labour costs rise. Also, bad access to credit and high interest rates discourage investment in the capital stock. Anecdotal evidence supports the view that a massive capital gap exists in Ukrainian machine building: For example, Motor Sich, a producer of aircraft and helicopter engines, still has compressor blades polishing made manually whereas in the West this process has been automated decades ago. And the Lugansk locomotive plant employed an enormous 40,000 people when it was running at full capacity.

One should therefore conclude that enormous room exists for investment and productivity increases of the machine building sector that will probably also strengthen its international competitiveness. Of course, price competitiveness can be achieved through low labour costs, but a more capital and technology intensive production will probably increase quality competitiveness and contribute to better wages and economic growth in Ukraine. The economic potential of the Ukrainian machine building with its long history and significant technological know-how seems to be far from fully exploited.

2.2 Size of the subsectors of machine building

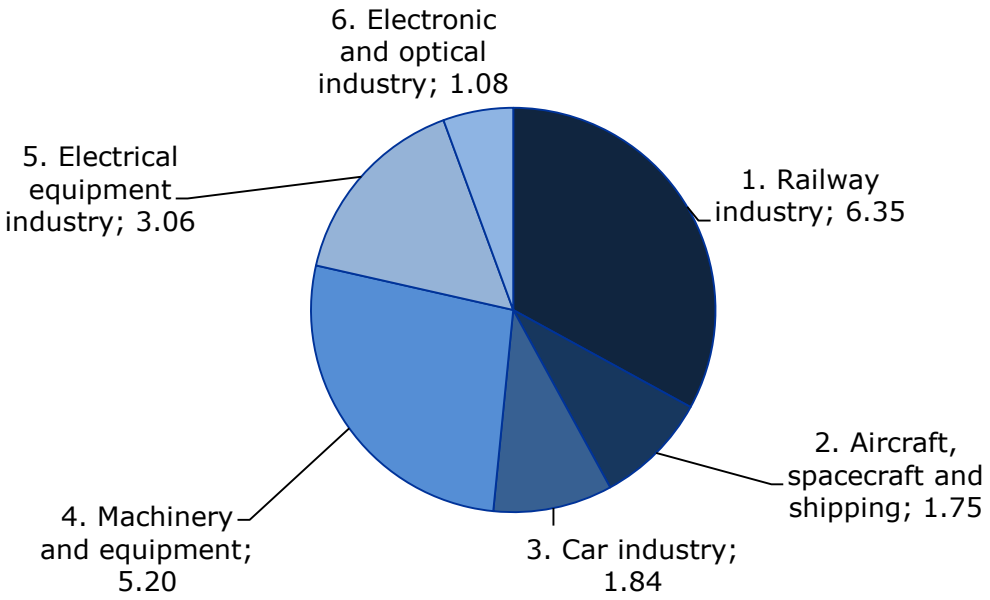
The Ukrainian machine building sector is composed of several subsectors, which constitute individual branches of industry, such as the car or aircraft industry. Six subsectors can be identified in official data[5], which we number for convenience.

1. Railway industry
2. Aircraft, spacecraft and shipping[6]
3. Car industry
4. Machinery and equipment[7]
5. Electrical equipment industry
6. Electronic and optical industry

To get an impression of the size of these six subsectors, we compare output volumes, for which more fine-grained data exists than for GVA. One fact stands out: Subsectors 1-3, the transport-related industries together accounted for USD 10 bn of output, around 52% of total machine building output in 2012. The transport industry should be counted as one of the key strengths of Ukrainian machine building.

Figure 3

Output of the subsectors of machine building in Ukraine, USD bn, 2012



Source: State Statistics Service of Ukraine, own calculations

1. USD 6.35 bn in output alone was created by the **railway industry**, 33% of Ukrainian machine building output in 2012. This industry is mostly producing railway wagons for the Russian wide-gauge railway system and has in past years

[5] These subsectors correspond to ISIC Rev. 4 Subsectors 26-30 or the equivalent NACE divisions 26-30, with the "other transport equipment" subsector divided between the railroad-related equipment and the rest, which will be dominated by the aircraft and shipbuilding industry in Ukraine.

[6] This subsector will be dominated by the aircraft and shipbuilding industry, but officially also encompasses military vehicles, data on which however is largely not published.

[7] All general- and special-purpose machinery that is not transport related or classified as electrical/electronic/optical machinery.

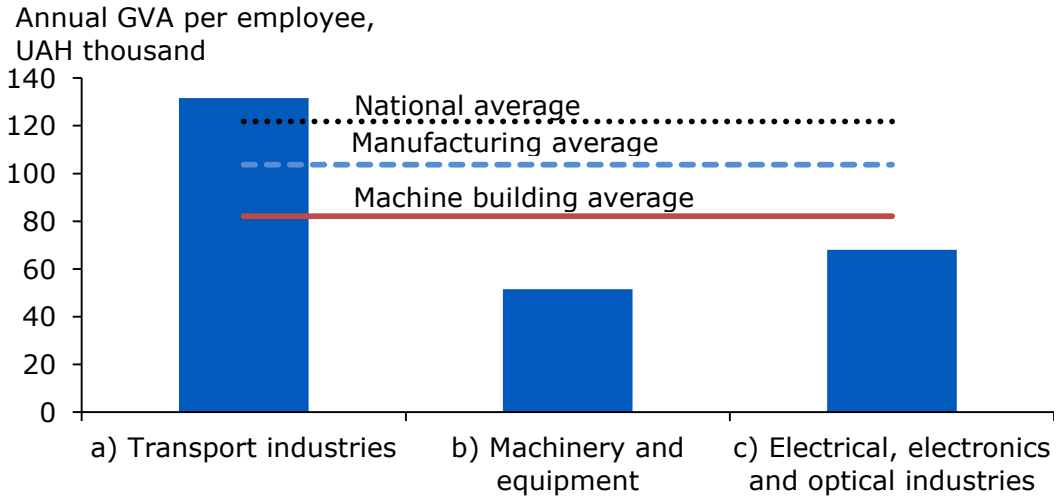
heavily benefited from a fleet modernisation programme of the Russian state railway company. In part due to the end of this order, output of this subsector declined sharply to around USD 4 bn in 2013.

2. **Aircraft, spacecraft and shipping** includes the production of Antonov airplanes and the production of helicopter engines by the "Motor Sich" company that have been indispensable for Russian helicopter production in past, amounting to USD 1.75 bn output.
3. The **car industry**, at USD 1.84 bn output in 2012, is similar in size to the aircraft, spacecraft and shipping industries and contains both suppliers for foreign companies as well as the building of cars in Ukraine, often using foreign designs produced by Ukrainian makers.
4. **Machinery and equipment**, at USD 5.2 bn or 27% of machine building output, is the second largest subsector of Ukrainian machine building output and encompasses different sorts of general-purpose machinery and machinery for metal-forming and agriculture as well as equipment for nuclear power plants such as turbines that do not fall under the "electrical equipment" category.
5. The **electrical equipment industry** is the third-largest subsector, with an output of USD 3.1 bn, 16% of machine building total. This subsector, distinguished from the computer, electronics and optical industries, produces various electrical motors and generators as well as wiring and further electrical equipment.
6. The **electronic and optical industry** is currently the smallest of the subsectors of machine-building, with an output of USD 1.08 bn in 2012.

Productivity can only be calculated for three broader subsectors, labelled a-c. Subsector a) includes the transport subsectors 1-3, subsector b) is equivalent to 4 (machinery and equipment) and subsector c) includes the original subsectors 5 and 6. The higher productivity in the transport sector stands out as this subsector exhibits a much higher productivity than the other subsectors of machine building and indeed is even slightly above the national average productivity.

Figure 4

Productivity (GVA/employee) of the subsectors of machine building, 2012, UAH thousand.



Source: State Statistics Service of Ukraine, own calculations

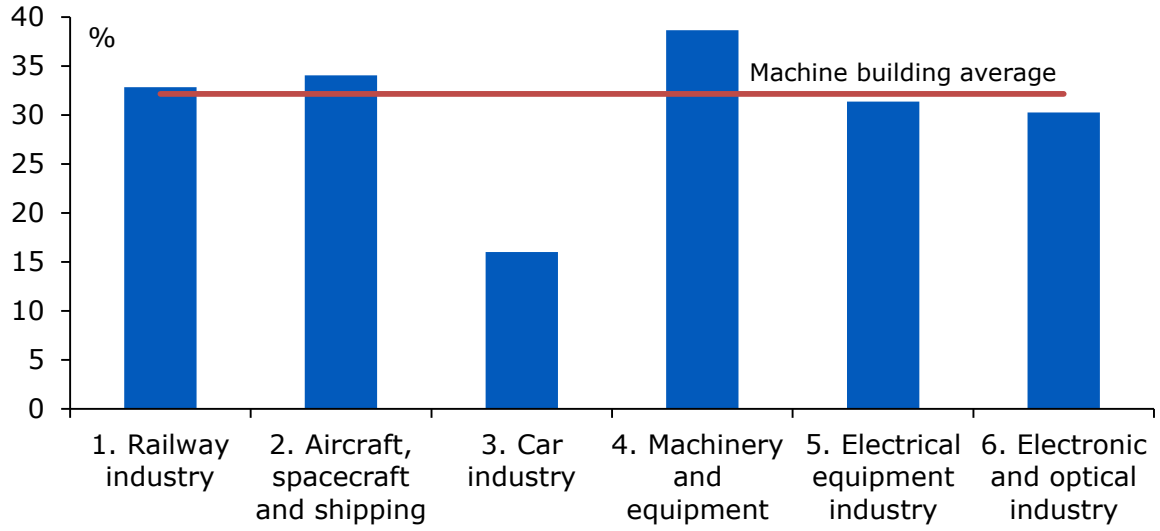
The higher productivity of subsector a) is likely due to a combination of some recent capital investments as well as a generally higher utilisation of available capacity. However, productivity in the other subsectors of machine building is astonishingly low, highlighting the need for investments in these industries.

2.3 Exposure of the subsectors to the Russian market

Due to the possibility of the loss of access to the Russian market, the vulnerability of the individual subsectors of machine building to this is of key importance for devising appropriate policy responses. Measuring exposure of subsectors to the Russian market as the share of exports to Russia in total output, we interestingly observe that the exposure does not differ very much between most subsectors.

Figure 5

Exposure (exports/output) of subsectors to the Russian market, 2012



Source: State Statistics Service of Ukraine, UN COMTRADE, own calculations

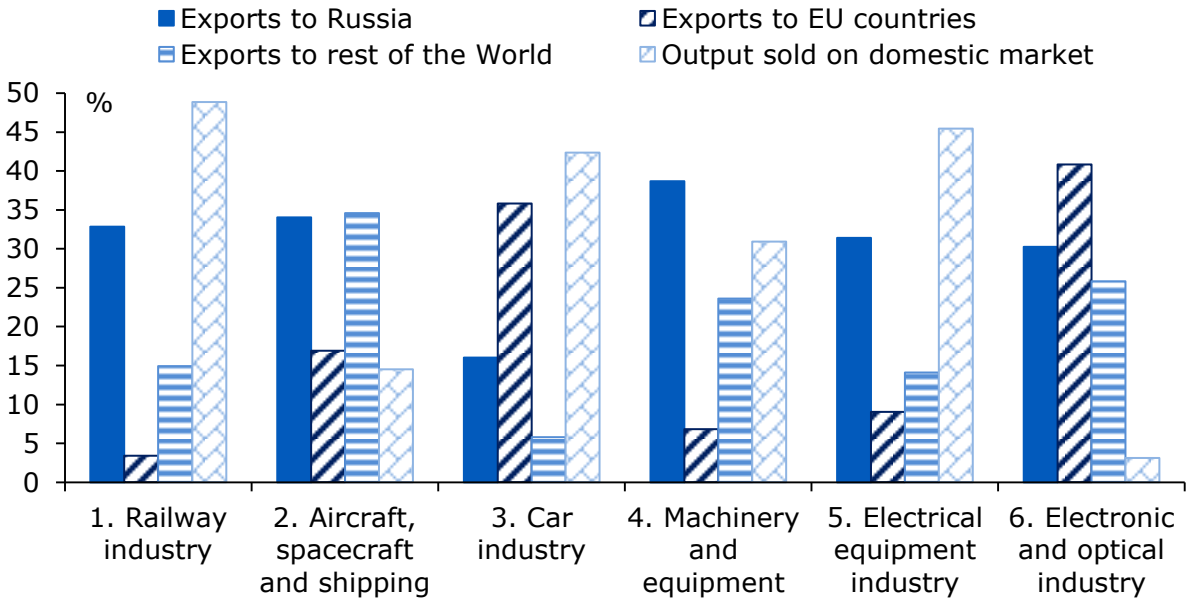
Most subsectors export around 30% of their total output to Russia, with subsector 4, machinery and equipment, exporting almost 39% of its output to Russia. The only notable exception is subsector 3, the car industry. The fact that only 17% of the output of the Ukrainian car industry are exported to Russia probably reflect that (final consumer-driven) demand for cars has significantly changed since the Soviet era, in which Ukrainian cars were popular throughout the Warsaw Pact countries. Russian demand has probably shifted towards Western European or Asian cars (often produced in factories within Russia set up by the makers). Ukrainian suppliers have apparently not become important parts of supply chains for car production in Russia.

Equally important to exposure to the Russian is the capacity of subsectors to absorb possible shocks from the loss of this market. Absorption capacity is hard to measure, but as a first approximation, it makes sense to look at the structure of sales of subsectors by destinations: to Russia, to the Ukrainian domestic market and to export markets other than Russia (Figure 6).

It can be assumed that the Ukrainian domestic market will not be able to absorb much extra output without some discretionary measures undertaken by the government. However, if exports are already diversified to several export markets, firms might find it possible to grow shares in existing destination markets if one export market is lost. It is easier to grow shares in several markets by smaller increments than in one market by a large amount.

Figure 6

Sales structure of Ukrainian machine building by subsectors, % of total output, 2012



Source: State Statistics Service of Ukraine, UN COMTRADE, own calculations

The subsectors of Ukrainian machine building differ significantly in the structure of output destinations. The railway industry is heavily focused on the Russian and domestic markets, with 81% of total output sold on these two markets. This is in no small part due to a large, but essentially one-off order by the Russian state railway company that has modernised its fleet until 2012. A continuation of demand from Russia in this extent cannot be expected.

Exports are relatively highly diversified in subsector 2 (aircraft, spacecraft and shipping) with exports to Russia constituting 34% of total output, but exports to the EU and the rest of the world amounting to 51% of output in 2012.

Subsector 3, the car industry, stands out insofar as the share of exports to Russia is smaller than in other subsectors (16% of 2012 output). With exports to the EU at 42% of output more than twice the size of those to Russia, as well as a large role of the domestic market, a shock from the Russian market would hit the car industry less severely than it would hit the other subsectors of Ukrainian machine building.

Subsector 4, machinery and equipment, is also heavily focused on the Russian and Ukrainian domestic markets. 70% of total output is sold on these markets, rendering the subsector relatively vulnerable to a shock from the Russian market.

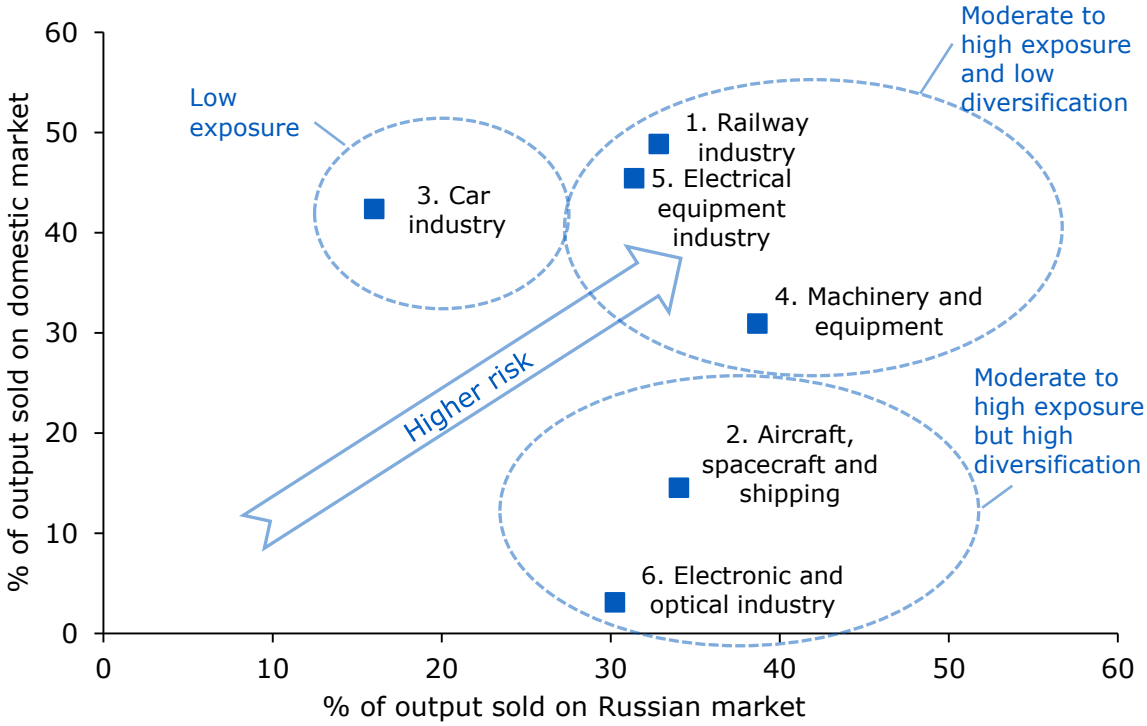
Although exports to Russia account for a similar share of the output of subsectors 5 and 6, the smaller electronic and optical industry (subsector 6) appears distinctly better placed to absorb possible disruptions in trade with Russia. The shares of exports to the EU and the rest of the world together are more than twice the size of the share of exports to Russia, indicating a capacity to redirect output relatively quickly.

The bigger electrical equipment industry (subsector 5), however, is highly at risk to possible shocks from the Russian market. With very low exports to countries other than Russia, there seems to be little ability to quickly reorientate exports, whereas the important Ukrainian domestic market is probably not able to quickly absorb more output.

As the two main indicators for the vulnerability of a subsector to the possibility of a loss of market access in Russia are the immediate exposure to the Russian market and the lack of market shares in other export markets, we can illustrate the vulnerability of subsectors by plotting them in a graph that measures exposure to the Russian market on the horizontal axis and lack of other export markets (measured as the share of output sold on the domestic market) on the vertical axis.

Figure 7

Exposure to the Russian market and output share sold on the domestic market



Source: State Statistics Service of Ukraine, UN COMTRADE, own calculations

The vulnerability of subsectors in the top right hand corner of this graph is the largest. These industries are highly exposed to the Russian market and lack significant market shares in other export markets that may be able to absorb some extra output. The three most vulnerable industries are therefore the railway, electrical equipment and machinery and equipment industries. These are also the biggest subsectors in terms of output in 2012, together accounting for USD 14.6 bn in output, 75% of total machine building output.

Policy measures should be designed with a view to the fact that these subsectors will probably be in most need of assistance in the event of a loss of market access in Russia. The car industry is less exposed to the Russian market and the aircraft and shipping subsector as well as the electronic and optical industry have a more diversified export structure, which should put them in a better position to absorb such a shock. Some support may however still be required for these subsectors in the short run, too, but smaller-calibre measures may be sufficient than for the highly endangered three subsectors. Also, it should be borne in mind that the productivity statistics give reasons to suspect a competitiveness deficit in the entire Ukrainian machine building sector.

3. Risks of trade disruptions due to Russian policy

The large exposure of the Ukrainian machine building sector renders it vulnerable to shocks stemming from the Russian market. Apart from generally low growth of the Russian economy, which is expected to stagnate in 2014 and grow only 1% in 2015 after growth rates between 3% and 8% in previous years, there exists a risk that due to the political tensions, market access for Ukrainian companies may be severely restricted or even completely cut.

The use of market access restrictions by Russia for essentially political reasons has already been experienced by Ukraine, most prominently in the case of *Roshen* chocolate banned on the Russian market in 2013[8]. Also, Georgia and Moldova have been targets of such political measures, where food safety standards were given as an explanation for restrictions on the import of wine, meat and fruit[9]. Should Russia intend to ban machine building imports from Ukraine, it is uncertain how this would be implemented technically. Possibilities range from high import tariffs to official or unofficial bans on such imports. However, it should be expected that if the Russian government intends to pursue such a policy, it will find ways and means of doing so.

A complete loss of the machine building exports to Russia would directly reduce Ukrainian GDP by 1.1% compared to the baseline of 2012. No forecast can be made on whether Russia will implement such sanctions and for how long they would last. However, two points should also be taken into consideration:

1. It is uncertain whether a complete ban on Ukrainian imports is economically feasible for Russia in the short run.
2. An important question is, whether such measures would be temporary or permanent, as this should have an effect on policy responses.

If trade restrictions are installed immediately, some goods imported from Ukraine may be very hard to replace in the short run. Most imports from Ukraine will be readily replaceable by imports from other countries or domestic production, although possibly at higher prices. However, for some highly specialised imported goods, it may not be possible to find suitable replacements in the short run. If the importance to the Russian economy of these goods is high enough, they could indeed be used as a bargaining chip by the Ukrainian government. However, to our knowledge, the goods that most likely fall under this category are military-related products such as missile guidance systems and helicopter engines, which are currently subject to a ban on exports to Russia due to the political situation.

In the longer run, even imports of these goods will be substitutable. The Russian Ministry of Trade and Industry has recently submitted an import substitution programme to the government that is envisioned to increase the annual volume of production by more than RUB 30 bn (USD 890 m) starting from 2015[10].

A large-scale and long-run restriction of market access in Russia for Ukrainian machine building companies therefore seems technically and economically feasible. The German Advisory Group cannot make a political judgement, whether this is likely to happen, but it seems advisable for the Ukrainian government to prepare for this case. This is also supported by the logic of using economic restrictions for political purposes: The better Ukraine is prepared for political measures undertaken by Russia, the smaller will be the negative economic effect on Ukraine. This will reduce the attractiveness of such measures to Russia.

4. Strategic options in view of a possible loss of market access in Russia

The Ukrainian government has the choice among three broad strategies for dealing with the possibility of the loss of market access in Russia for the machine building sector.

[8] The Economist, *Trading Insults*, August 2013.

[9] Tarr, D.; Volchkova, N. (2010) *Russian Trade and Foreign Direct Investment Policy at a Crossroads*, World Bank

[10] The Financial Times (2014, June 26,) *Russia looks to shield economy from sanctions*, retrieved from www.ft.com

4.1 "Laissez-faire" non-interference

A "laissez faire" strategy implies that the government does not intervene in the case of a shock but allows market forces to work. Some companies will disappear due to a shock and the relative sizes of economic sectors may change. If markets are well regulated, efficient and access to credit and investment is easy, market forces will ensure that in the end, an efficient production structure exists.

However, in the case of Ukraine, the access to investments and financial liquidity is extremely limited at present. Apart from structural weaknesses of the financial market, the ongoing military conflict and political uncertainties deter lenders and investors from becoming engaged in Ukraine. And as the possibility of severe trade disruptions seemed unlikely until one year ago, companies have had little time to prepare for this case.

Also, purely relying on market forces implies taking the risk that economic potential is not fully exploited. The current low productivity of the machine building sector indicates that it may face severe competitiveness problems on the world market and could sharply reduce in size if trade with Russia is restricted. However, international experience shows that such sectors have the potential to be drivers for wealth and growth of economies. Allowing a severe cut in the size of this sector due to market forces following a shock would imply the loss of this economic potential.

Although such a market-only strategy would avoid the risks inherent in government intervention in markets, it risks an excessive loss of economic substance and potential to Ukraine. **We therefore conclude that a laissez-faire strategy would not be the right response to the possibility of politically decided restrictions on market access in Russia.**

4.2 Conservation

The opposite of a market-only laissez faire strategy would be a conservation strategy that deploys state measures to insulate a sector from the effects of a shock by measures such as straightforward subsidies or demand stabilisation through public procurement. A conservation strategy is suitable if competitive sectors are hit by a temporary and unexpected shock and the only objective of government is thus to ensure the survival of the economic substance until the shock effects have waned away.

However, such a strategy always carries with it the risk that it is setting negative incentives for firms, who may neglect their competitiveness and become dependent on government support, thus creating a permanent drain on state finances to support inefficient structures.

In the case of Ukraine, the possible loss of market access in Russia may be permanent and strong signs exist that the machine building sector lacks competitiveness and the ability to quickly substitute the Russian export market. A conservation strategy would not address these deficits. On the contrary, it would likely set adverse incentives to firms and risk creating a permanent financial commitment of the state, which could not be financed. **We therefore conclude that a conservation strategy would be inadequate in view of the risks from Russian policy**.

4.3 Modernisation

A modernisation strategy is directed at improving the competitiveness of a sector. As a shock response, it works on the assumption that market processes alone would lead to the destruction of economic potential and a conservation strategy would be an insufficient response to a permanent shock to a sector with competitiveness problems. Other than laissez-faire and conservation strategies, it is no purely market- or state-centred strategy but an intelligent combination of market forces and state intervention to accomplish the goal of developing the economic potential of a sector.

In order to increase the competitiveness of a sector, a modernisation strategy deploys measures directed at improving the production process of a sector as well as its infrastructural and institutional context. This can include measures directed at facilitating capital investments or improvements in training of workers or investments in research and development activity as well as optimising sector-related infrastructure and restructuring state institutions to better contribute to the sector's competitiveness.

A particular challenge in such a hybrid state-market economic policy is to ensure that policy measures of the state are incentive-compatible by strengthening the sector without obscuring market pressures towards increased competitiveness. Also, it implies the development of an industrial policy strategy setting out clear criteria for which sectors and industries should be actively developed by government[11] to prevent excessive government interventionism or demands for it.

Ukrainian machine building has a high potential to positively contribute to national wealth in future, given the rich experience and history of this sector. At present, a permanent loss of market access in the key Russian export market must be considered possible. Despite the high volume of trade with Russia, there are good reasons to believe that the sector is presently not competitive on the world market. **We therefore conclude that a modernisation strategy with the aim of improving sector competitiveness should be employed for the Ukrainian machine building sector in view of the possible loss of market access in Russia.**

4.4 Elements of a modernisation strategy for Ukrainian machine building

A comprehensive modernisation strategy for the machine building sector should therefore be developed in Ukraine that includes a detailed assessment of modernisation needs in different subsectors of machine building, an array of measures that answer to these needs as well as an integration into a broader industrial policy framework. From a present point of view, it appears that two kinds of measures will be of particular significance:

1. **Investment facilitation**: The low labour productivity indicates that the capital stock and technology intensity of essentially all subsectors of machine building are comparatively low. This can be expected to hamper the competitiveness of the sector on the world market. Although the products may be price-competitive, they may not correspond to standards expected on international markets. Investments into capital and technology are currently significantly held back by the lack of access to finance at attractive interest rates in Ukraine. Attractive credit programmes for investments should therefore be set up in cooperation with organisations such as the IFC, EBRD or EIB. Also, more foreign direct investment (FDI) should be drawn into the sector, for example by creating more attractive conditions for joint ventures between Ukrainian and international firms.
2. **Improving the promotion of Ukrainian exports**. As the development of new markets is often a difficult and risky undertaking for companies, elaborate support structures for export facilitation have been implemented by many countries, incorporating activities from marketing via legal assistance to financial risk-mitigation systems. Support for Ukrainian exporters is currently only conducted through Ukrainian embassies in the destination countries and the service is widely perceived to be inadequate.

[11] Although this is a contentious point – classic economic theory argues that the state should only provide a level playing field to firms - recent literature suggests that governments should actively develop branches of industry that are likely to contribute to wealth and growth in future (see Rodrik, D. (2008). *Normalizing industrial policy*. International Bank for Reconstruction and Development/The World Bank or Hausmann, R., & Rodrik, D. (2006). *Doomed to choose: Industrial policy as predicament*. John F. Kennedy School of Government)

A modernisation strategy does not necessarily imply that a sector will grow in comparison to its present state. Rather, it provides a set of policy measures designed to increase the competitiveness of companies within the sector and lets market processes then determine the size of the sector. Some individual subsectors may grow as a result of the strategy and others may shrink in size. The objective is to ensure that, after modernisation, the sector is internationally competitive and domestically productive, constituting a stable contribution to national wealth and economic growth.

5. Recommendations for short term policy measures

A restriction of market access for Ukrainian exporters in Russia has the potential to severely affect large parts of the Ukrainian machine building sector. Should market access restrictions be implemented quickly by the Russian government, the sector would be hit hard, probably overstretching the adaption capacity (the use of liquidity buffers or working time reductions) of several subsectors.

As the effects of the modernisation strategy cannot be expected to come about in the short run, policy action is required to preserve economic substance and potential. This policy action should under no circumstances allow firms to become permanently dependent on government support in order not to run counter to the objectives of the modernisation strategy.

The temporary nature of measures should thus firmly be enshrined. Competitive pressures should continue to work on the firms and not the entire burden of the shock should be relieved. Market interventions should be minimised. Three classes of measures should therefore be considered and prepared by the Ukrainian government:

5.1 Government-supported short-term work schemes

The instrument of government support to short-term work schemes has been highly popular and successful in the economic crisis that started in 2008. The principle of this measure is that employment relations – and thus the economic substance of firms – are preserved through a concerted effort of employers, employees and government. Workers work significantly less than usual – or not at all – but still receive an, albeit reduced, salary. Firms essentially pay a premium to retain the workers (thus ensuring that only such employment relationships that are likely to become productive again are retained) and the government covers part of the difference between the full salary and the payment of employers. The application of this scheme, with an extended duration, by Germany in 2009 is widely renowned as immensely helpful in overcoming the crisis and preserving industrial structure until the effects of the crisis calmed down.

Ukraine has also used a short-term work assistance scheme, the "partial unemployment benefit" in 2008/2009, with a maximum duration of 180 days for assistance payments. This instrument should be prepared for use again for the possibility of a shock through restrictions on market access in Russia. The instrument has the potential to effectively aid firms in preserving their structure through a period of low capacity utilisation and constitutes a relatively minor market intervention as it should not have an effect on product demand or prices.

In light of the experiences from the use in previous years, the instrument should be updated to improve usability, reduce the potential for abuse of the instrument and streamline administrative procedures. Also, it should be considered to increase the maximum duration over the present 180 days to allow for longer transition phases. However, this should be done under consideration of the financial capability of Ukraine.

5.2 Public procurement schemes

Using public procurement to artificially increase demand for some classes of goods constitutes a larger market intervention than short-term work schemes. Such measures

may be warranted if short-term work alone will not prevent a large-scale destruction of economic structure and potential in an industry following a shock. This is particularly realistic when an industry does not have a diversified export structure and the domestic market must play a key role in keeping the industry afloat.

Public procurement schemes serve a double goal: Improve the capacity or efficiency of the public body that receives the good and stabilise demand for the supplier of the good. Only where a real need for the goods exists should procurement schemes be set up, as regular tenders with a clear competitive element. This is to ensure an efficient use of public funds and competitive incentives for companies.

A thorough screening of public investment needs and a matching with potentially challenged Ukrainian industries should be undertaken by the Ministry of Industry in order to design possible procurement schemes. These possibilities then would need to be discussed with potential financiers, most likely international development banks. Two examples of possible procurement schemes are:

1. Modernising the wagon fleet of the Ukrainian state railway system. Ukrzaliznytsia's wagon fleet is outdated and in clear need of modernisation, but a fleet renewal programme has not been undertaken due to lack of funds.
2. Renewing energy turbines, generators and related equipment in the power plants of Ukraine in order to improve energy production efficiency. In the electrical equipment and machinery and equipment industries, many companies are producing such equipment. No compromises should be made on the quality of the procured products as efficient energy generation will be a key factor for the future national competitiveness of Ukraine.

5.3 Increasing openness to FDI and joint ventures

Investments in capital and technology will be one key ingredient of improving the competitiveness of the machine building sector of Ukraine. As the financial market situation in Ukraine is highly problematic, FDI attraction will play a vital role in ensuring that the required investments are made. Also, foreign investments and joint ventures between Ukrainian and international companies in particular will facilitate an influx of new know-how and methods, both in technical and management aspects, that should further enhance competitiveness. Once the political and military turmoil in Eastern Ukraine calms down, interest of international investors in Ukraine will return. Policy should seize this opportunity by promoting FDI and joint ventures. The cases of the Czech Republic and Slovakia, which both opened their economies to foreign capital before EU accession, illustrate that openness to international investors can also be a key component of a modernisation strategy.

The process of increasing openness to FDI and joint ventures should also include a revision of the list of companies of "strategic importance" to Ukraine. This status prohibits the financial involvement of foreign investors in companies of "strategic importance". A revision should ensure that all other measures to protect vital interests (such as legal safeguarding of intellectual property) are exhausted before employing this blunt instrument. An excessively broad definition of "strategic interests" should be avoided in order to prevent significantly negative economic effects to be suffered for uncertain political benefits.

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