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How to boost export and foster private sector driven economic growth in Ukraine? Analysis of Ukrainian manufacturing, agriculture and IT (MAIT) sectors

Discussion paper

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Approach to the study

This study aims to uncover drivers and obstacles to the growth of firms in the manufacturing, agribusiness and IT sectors (MAIT) of the Ukrainian economy. It does this by conducting a comprehensive assessment of the Ukrainian MAIT sectors development over the last 15 years. The focus of the study is on the analysis of export-oriented firms in terms of their behavior, resilience to economic shocks, and comparative performance.

Methodologically, we combine quantitative and qualitative analytical tools applied at firm and sectoral levels and perform international comparisons. This allows us to uncover factors related to the macroeconomic situation, the productivity, the inputs and outputs of the market performance, the regulatory environment, and the firm-level behavior patterns underlying business dynamics in these sectors.[1]

We first present stylized facts about the recent performance of the MAIT sectors in Ukraine between 2012-2016 based on firm and sectoral level data. Our focus is on the comparison of export-oriented and non-exporting firms. We also discuss the macroeconomic situation and the impact of the recent economic crisis on the performance of firms. Second, we consider the drivers of the performance of firms in the MAIT sectors, focusing on productivity, employment, and export. We compare the performance of firms of different sizes and ages, with different export and import status, different ownership type, and from different subindustries, following the methodologies outlined in (Foster et al. 2001; Bernard et al. 2007; Haltiwanger, 2013 and 2017). The main question we answer is what types of firms were driving productivity growth and creating jobs in this period. To address this question, our analysis is based on a longer sample of firms in MAIT sectors from 2001-2016. The study is complemented by in-depth interviews with the MAIT industry leaders and case studies based on a telephone survey conducted with a select group of exporting businesses.

[1] The process of business birth, growth, decline and exit.

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Vocabulary

BEPS – Base erosion and profit shifting. Used as a title for a package of domestic and international instruments to address tax avoidance, ensuring that profits are taxed where economic activities generating the profits are performed and where value is created. See for details. http://www.oecd.org/tax/beps/beps-actions.htm

CU – Customs Union. A trade bloc, which is composed of a free trade area with a common external tariff. In the text, it refers to the Eurasian Customs Union, which includes Armenia, Belarus, Kazakhstan, Kyrgyzstan, and Russia.

Industry leaders – term used in the study to refer to senior executives of the leading – top 20 by the 2016 total exports in monetary terms – companies in on of 3 industries: manufacturing agriculture or IT.

MAIT – manufacturing, agriculture, and IT sectors.

OFC – Offshore Financial Centers. See the full list of countries that belong to the list compiled from the IMF report in Annex F. http://www.imf.org/external/NP/ofca/OFCA.aspx

OECD - The Organisation for Economic Co-operation and Development

RoW – Rest of World. Used in this study to differentiate between FDI sourced from European Union (EU), Eurasian Customs Union (CU), offshore financial centers (OFC), and the rest of the world (ROW).

TFP – Total Factor Productivity. This is a measure of a firm's productivity characterized as the portion of output not explained by traditionally measured inputs of labor and capital used in production. In this study TFP is computed following the Olley-Pakes (1996) methodology. See Annex G for details.

EXECUTIVE SUMMARY

The present study explores the obstacles and the drivers of growth in the three most important export sectors of the Ukrainian economy – manufacturing, agriculture, and IT (collectively referred to as MAIT). The first two sectors have historically been the backbone of the country's exports. In total, they account for 78.1% of the total value of exports, while their cumulative share of GDP is 35% (as of 2016). Although the role of IT is still smaller, it has been growing at a very fast pace. In 2016, the IT sector accounted for 2.9% of Ukraine's exports and 2% of GDP.

In recent years, the three sectors grew differently. Manufacturing was hit hard by the crisis of 2008-2009 and then again by the way in Donbass, which started in 2014. It's now struggling to preserve its role in the economy, but the outlook may be gloomy as the capital stock in manufacturing declined sharply in recent years (by 31.6% in 2014-2016, not taking into account the effect of the loss of government control over Crimea and a part of Donbas). Agriculture was more resilient to those shocks, and its position started to strengthen after 2008-2009, but the growth was volatile. The IT sector just recently came to prominence. Although its role was minimal until the 2000's, its importance rapidly expanded in the last decade and it has been growing strongly. In 2015, IT grew to 150% of its 2012 performance level and by 2016, it had grown to 190%. As of 2016, IT was larger than basic metals production – the second largest subsector of manufacturing.

The analysis illustrates clearly that the export potential of all three sectors has not been met. The number of firms per capita in Ukraine's MAIT sectors is lower than in the corresponding EU sectors. Small and medium-sized firms are underrepresented (compared to the EU). The entry rate is low: less than 10% per year from 2013-2016. In other words, firms are not being created in sufficient enough numbers, their growth rates are subpar, and many of them continue operating even if their performance is lagging behind the market. This continuation of subpar business hinders the reallocation of resources from failing businesses to growing businesses.

The study employed two approaches to determine the obstacles and drivers of growth: the first one was based on rigorous hard data analysis, and the second was based on interviews with industry leaders. The obstacles determined by the data analysis are (1) unfavorable business environment, (2) constrained access to finance, (3), high level of concentration, and (4) lack of innovation. Business leaders added the following to that list (5) trade barriers, (6) internal market limitations, (7) a labor force shortage, and (8) underdeveloped and inefficient infrastructure.

Unfavorable business environment. Despite the technological differences between them, agriculture, manufacturing, and IT exhibit some common drawbacks in the distribution and dynamics of firms. In particular, all three sectors are characterized by the domination of large firms, as well as an abundance of micro-sized firms (their shares are larger than in the EU), and low entry rates for new firms. These facts suggest the presence of economy-wide obstacles to firm creation and growth. When grouped together, mean that there is an unfavorable business environment (including poor property rights protection, corruption, restricted access to public resources, and unstable macroeconomic situation). In this environment, large firms are likely to be more effective at withstanding unfavorable conditions, and micro-sized firms may prefer not to grow in order to stay 'beyond the radar' of burdensome regulation. Even large firms, who can "afford" to setup multi-jurisdictional companies and "outsource" commercial transactions as well as ownership to countries with more favorable legal protections, suffer from doing so because the costs are very high.

Constrained access to finance. Most firms in MAIT use little financial leverage, and its level decreased in recent years. Before the war (in 2010-2013), the ratio of bank loans to total assets was 0.10-0.11 in agriculture, 0.15-0.16 in manufacturing, and 0.14-0.37 in IT. By 2016 this ratio substantially declined in

agriculture (to 0.04) and IT (to 0.01). However, the ratio slightly rose in manufacturing (to 0.17), which can be partly explained by revaluation of foreign currency medium-term and long-term loans. In IT, a relatively high ratio of bank loans to total assets in the pre-war period was due to a few outlier firms which probably used the status of computer consultancy companies (KVED/NACE code 62.02) to conceal their financial activities. In 2010-2016, the corresponding ratio for the computer programming sector (KVED/NACE code 62.01) fluctuated between 0.002 and 0.06, implying that software development companies essentially do not use bank loans. In agriculture, constrained access to finance is due not only to economy-wide factors but also to sector-specific determinants including the inability to use land as a collateral, and the burden of previous period loans.

High level of concentration. The study found evidence that the degree of monopolization in Ukraine's MAIT sector is greater than in the corresponding EU sectors and that this monopolization negatively affects growth. One piece of evidence comes from an analysis of the distribution of employment between firms. In all three sectors, the total share of employment in large firms is larger than that of the EU. Another piece of evidence comes from the monopolization of the fertilizers market, where one group of companies has restricted the entry of new firms for many years.

Lack of innovation. Ukraine lags behind its European counterparts in adopting advanced technologies. The numbers of firms introducing product or process innovations is smaller than in most lower middle-income countries. Only a small portion of Ukrainian firms invest in R&D (5.2% as of 2016). Those that do invest are mostly large firms working in the manufacturing of pharmaceutical products, electronics, and transport equipment.

Trade barriers. Ukrainian exporters are highly exposed to protectionist policy measures abroad because they operate with large volumes and compete in some of the toughest markets – crops and steel (the two largest exports categories for Ukraine).

Internal market limitations. Some markets are nonexistent or very small in Ukraine, which limits opportunities for Ukrainian firms to mature in the domestic market and then start exporting.

Labor force shortage. Ukrainian enterprises, accustomed to competing globally by leveraging cheap labor, are now finding themselves struggling to find talent as more and more workers leave to neighboring countries.

Underdeveloped infrastructure. Inefficiency in the railroad services causes industries across Ukraine to lose revenue. The occupation of Donbas and the war itself destroyed or altered some critical railway routes. On top of this, the current water routes and roads do not correspond to the needs of business.

Still, some firms succeed in overcoming the above-mentioned obstacles. The **firm-level growth drivers**, revealed by the study, are new and young firms, exporters, importers, and FDI from non-off-shore countries.

New and young firms. New and growing firms proved to be strong job creators, generating more than 300,000 jobs from 2001-2016. Productivity growth was also higher for young, medium-sized firms who grew 0.7-2.1 percentage points faster than large old enterprises.

Exporters and importers. Export allows companies to grow faster and to increase their productivity through learning-by-exporting and scales economies. However, exporting in Ukraine is rare – only one out of seven firms exported during the period between 2001-2016. Import is another substantial source of increased productivity; it improves the composition of intermediate inputs, which has a positive effect on final output quality and quantity.

FDI from non-offshore countries. FDI from EU and the rest of the world (RoW) countries has a positive effect on firm performance, increasing productivity and job creation. FDI inflows from CU do not seem to robustly increase productivity, but they still do generate net job creation. FDI from OFC, on the other hand, is associated with lower TFP and negative productivity growth.

In addition to firm-level growth drivers, the study found industry-level growth drivers. For example, high-tech subsectors which are less capital-intensive and more competitive actually grow faster than others.

The analysis yields recommendations for how to boost export and foster private sector driven economic growth. These recommendations are aimed at revitalizing firm creation and growth, increasing investment (especially FDI), and resolving existing bottlenecks that hamper firms' growth. The recommendations emphasize the importance of policy changes aimed at resolving Ukraine's institutional problems including strengthening of the rule of law and removal of an abuse of monopoly power. Those changes are crucial for improvement of general business environment and are prerequisites for the proper functioning of the banking system and development of capital markets (by ensuring property and creditor's rights protection, contract enforcement, transparency in business reporting etc.).

More specific recommendations include development of programs for bank SME financing and contribution to enhancement of infrastructure for venture financing to draw in funds and entrepreneurial expertise from developed countries, as well as development of infrastructure for payment transfers and export-oriented goods delivery.

1. General trends in manufacturing, agriculture and IT

The development of the manufacturing, agriculture, and IT sectors in post-Soviet Ukraine was shaped by the country fundamentals, namely its favorable geography, abundant natural resources, good human capital, and its Soviet heritage in manufacturing and infrastructure. It was also driven by the constant growth in global food demand, a booming construction sector, rapid industrial development and technological advancement, and the country's transformation towards a free market economy.

Between 2001-2016, the productivity of the MAIT sectors in Ukraine – measured as Total Factor Productivity (TFP), grew 4 percent per year. As of 2016, IT is (roughly) twice as productive as manufacturing, and manufacturing is approximately 40% more productive than agriculture.

A long-standing characteristic of the economy was that the productivity of high tech firms was growing faster than those of low- and mid tech firms. The current structure of the economy rewards firms that manage to maintain the growth of their productivity, meaning that market shares are being reallocated in their favor. Such competitive tension is especially strong in IT and high-tech manufacturing where productivity growth is most rewarded.

1.1. Underlying economic trends

The macroeconomic process that were shaping development of the MAIT sectors:

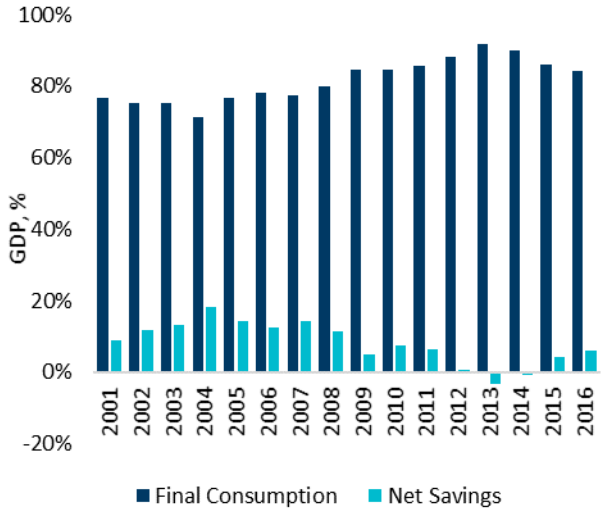
1. The macroeconomic fundamentals in Ukraine were comparatively more favorable for low-capital intensive industries, commodities markets, and industries that serve food production. Since the beginning of Ukraine's post-Soviet independence, these industries could rely on rich domestic natural resources and comparatively cheap labor to build businesses oriented towards global markets. They were more resilient to domestic problems like the underdeveloped financial sector, low in country demand and the highly volatile economy.
2. The strong science, technology, engineering, and mathematics (STEM) heritage of the Soviet education system has powered the growth of (low capital intensive) the IT industry as well as a few high-tech manufacturing firms.
3. The thorny path towards free markets, which was often complicated by Ukraine's juvenile democracy, was not benign for entrepreneurs, and restrained the development of the micro, small and medium enterprises.
4. Some large businesses managed to benefit from an overall environment of low property rights protection and weak rule of law by building vertically-integrated financial groups, which could rely on the more favorable legal practice of other countries.
5. The IT sector benefited from loopholes amongst the burdensome and inefficient taxation and regulation regimes that limit many other sectors.
6. Today, the downward price pressure on domestically important commodities markets, the localization tendencies across the world, the loss of traditional and not too fastidious Russian and Eurasian Customs Union markets and the outflows of human capital might lead Ukraine to losing long-lasing comparative advantages in manufacturing. The further strengthening of the upwards pressure on labor costs is looming on the horizon thus posing significant risks for agriculture and manufacturing.

In more detail:

Macroeconomic environment: rising industries oriented towards consumption goods, slow capital formation.

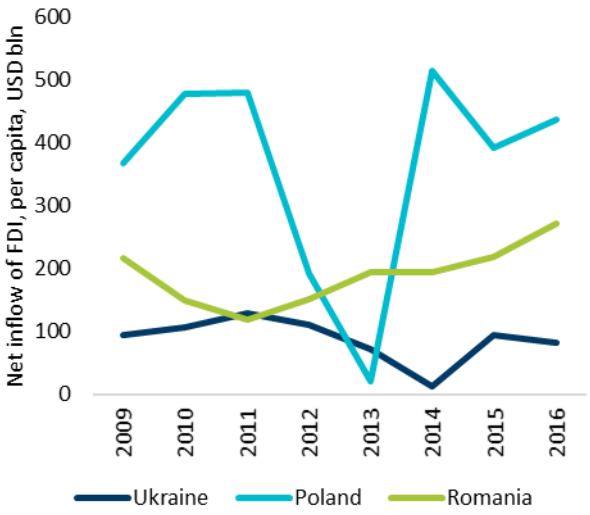
1. Gross consumption grew faster than savings, thus stimulating the expansion of consumption goods markets, but contributing very moderately to the formation of capital in industrial production. Foreign direct investments (FDI) inflow to Ukraine was very moderate. Between 2009-2013, the amount of net FDI into Ukraine was lower than into other countries in the region (USD 3.2-5.9 bln per year). In 2014 it decreased sharply (to USD 0.6 bn), with a partial rebound later on (USD 3.5 bln in 2016).
2. Demand patterns in the internal markets resembled those typical of emerging economies, meaning high demand for food and cheap consumables which stimulated imports of consumption goods and retail trade, as well as the growth of agriculture and food manufacturing. Changes in economic and political regimes were accompanied by high market volatility and uncertainty.

Figure 1. Final consumption and net savings as % of GDP



Source: State Statistics Service of Ukraine

Figure 2. Net inflow of FDI per capita



Source: Own calculations based on data from the IMF (via the World Bank Open Data), the National bank of Ukraine

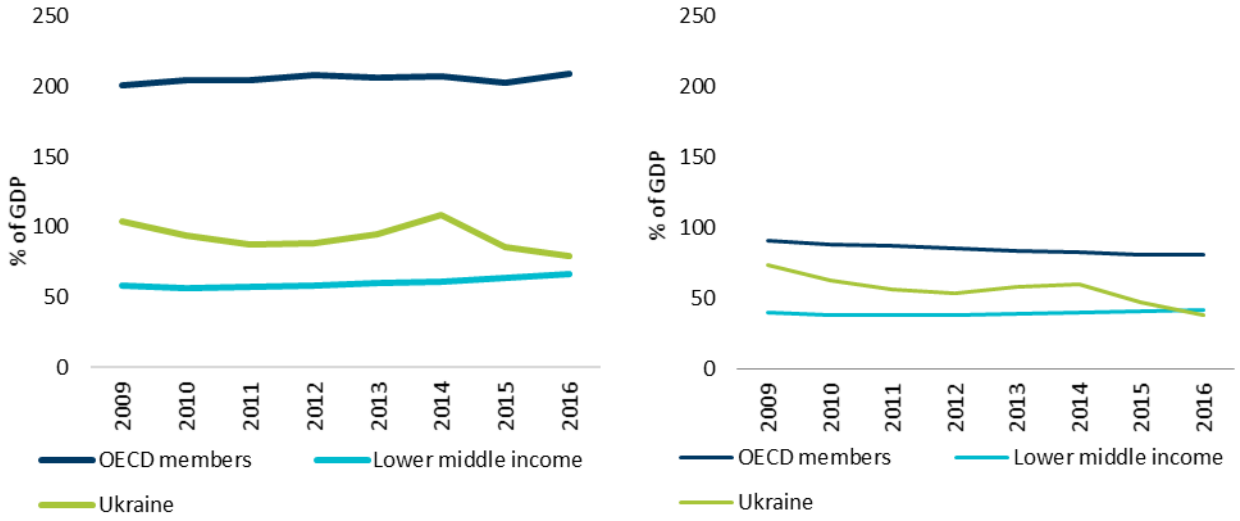
Financial markets: banks' lending has been the main source of external financing for firms as capital markets are underdeveloped and the amount of foreign investment has been low.

- Between 2009-2014, the ability of Ukraine's financial system to fund firms was stronger than in most lower middle-income countries, but weaker than in developed economies. However, since 2014, this ability substantially deteriorated because of the economic crisis and tight monetary policies, insolvency problems in the banking sector, and week corporate governance in state-owned banks.
- Apart from retained profits, banks are the main source of external financing for firms because Ukraine's capital markets are underdeveloped, and the amount of foreign investment is low. Between 2009-2014, the amount of credit provided by Ukraine's financial sector was 87-108% of GDP. Between 2015-2016, it decreased to 79% of GDP, which is close to the average for lower middle-income countries (Figure 3). In 2017 the situation didn`t improve.[2]

[2] From January to November 2017 the total amount of bank loans to residents decreased from UAH 998.7 bln to UAH 988.9 bn).

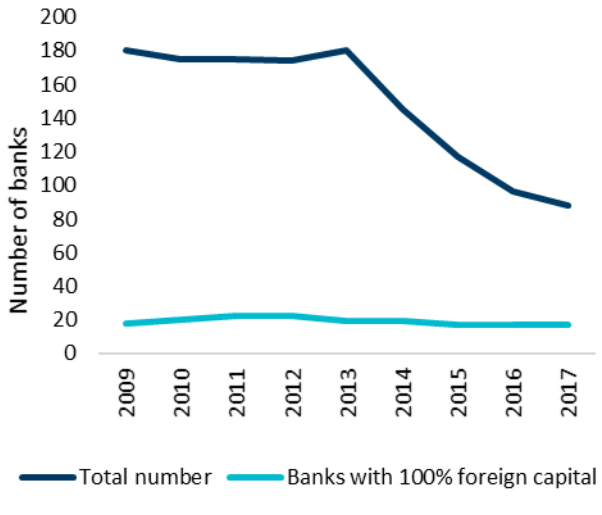
- Many private banks served as vehicles for cheap funds for their owners' businesses. This first turned them into 'zombie banks' with high levels of non-performing loans when economic conditions deteriorated, and then pushed them – around 88 or half of the overall banking sector - to closure when the National Bank of Ukraine (NBU) started cleaning the banking sector in 2014 (Figure 4).

Figure 3. Domestic credit provided by financial (left) and private (right) sectors

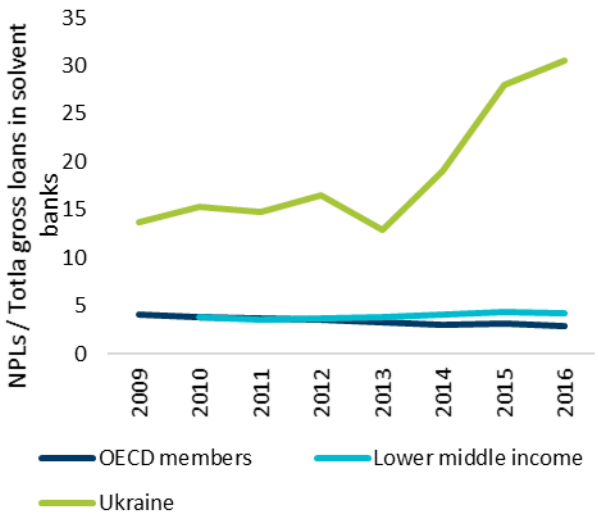


Source: IMF Global Financial Stability Report (via the World Bank Open Data)

Figure 4. Value of non-performing loans and number of solvent banks



Source: National Bank of Ukraine, as of October 1, 2017

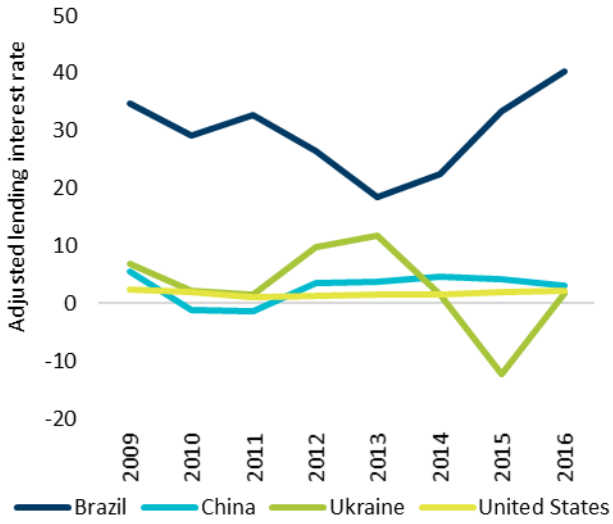


Source: IMF Global Financial Stability Report

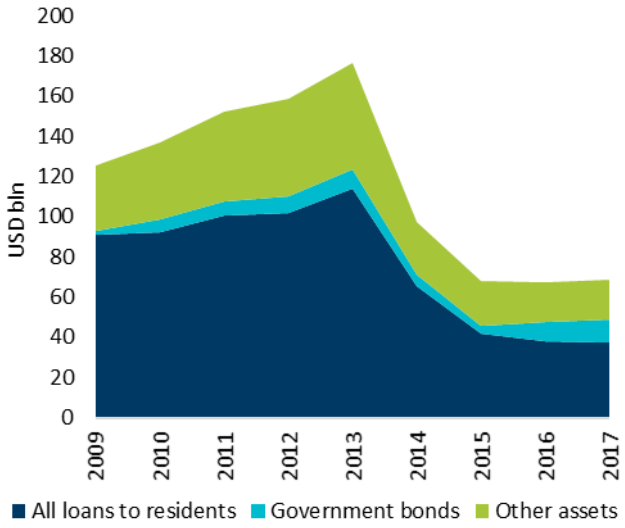
- Between 2016-2017, the amount of financing available to firms was also reduced because of an increased demand for funds by the government which sought to cover its budget deficit. From January 2016 to September 2017 the banks' investment in government bonds increased from UAH 81.6 bln to UAH 308 bln (or from USD 3.5 bln to USD 11.8 bln).
- Ukraine's capital markets are underdeveloped. The amount of bonds issued by non-financial corporations in dollar terms did not exceed USD 10 bln between 2009-2013 and declined to USD

2.4 bln between 2014-2016 (mainly due to the currency depreciation). The peak trade volume at "Perspektiva", a leading Ukraine stock exchange, was USD 40 bln (per year) between 2009-2016. Most of it came from bond trading, the volume of stock trading was insignificant.

Figure 5. Lending interest rate adjusted for inflation (left) and Ukraine`s banking system assets (right)

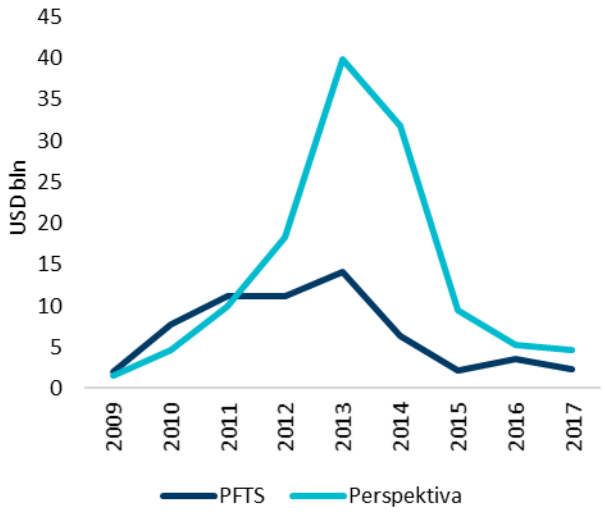


Source: *IMF, World Bank (via the World Bank Open Data)*

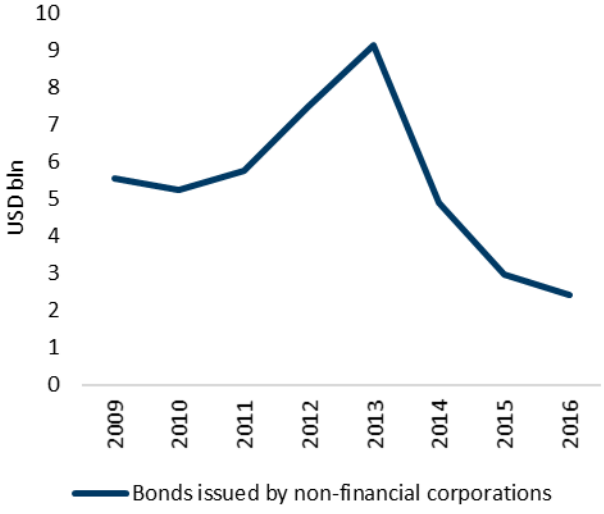


Source: National Bank of Ukraine, as of October 1, 2017

Figure 6. Trade volumes at leading stock exchange (left) and bonds issues by non-financial corporations (right)



Source: "Perspektiva", PFTS, National Bank of Ukraine



Source: National Bank of Ukraine

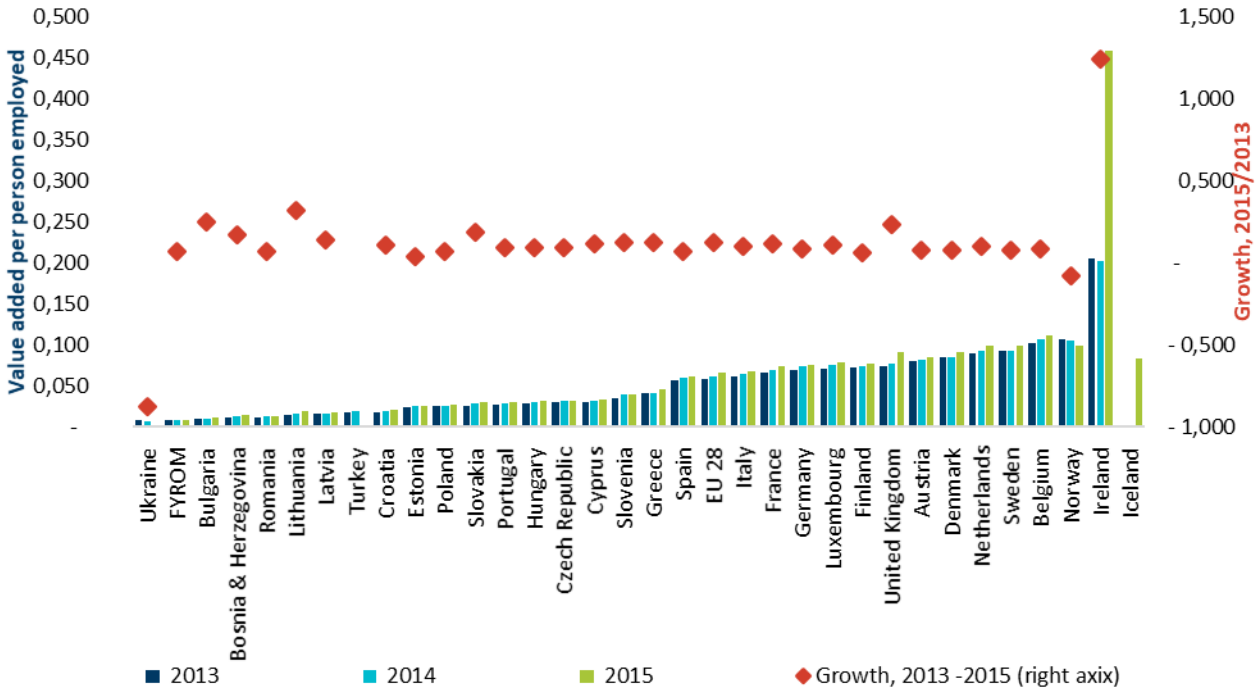
Human capital: high participation rates in education, strong STEM, deteriorated vocational training system, brain drain, and mass emigration.

- The productive labor force in Ukraine has been shrinking under the pressure of aging, short life expectancy, low quality of life, and emigration. According to the Ministry of Economic Development and Trade estimates, the share of employees working in the public sector was 15.4% as of 2016. In some sectors, such as transport or electricity supply, this share was 43 -

53%. Almost half of Ukraine's population lives in rural areas and makes their living from small-scale farming.

- Risk tolerant Ukrainians with better developed skill sets search for work opportunities abroad. In 2015, according to the UN[3], 4.8 million Ukrainians lived outside Ukraine. Ukraine is 13th in the rankings of absolute number of emigrants. Around 10.8% of the population of Ukraine live outside its borders (the population was counted as 44.8 million). In 2011, according to the OECD Database on Immigrants in OECD and non-OECD Countries[4], Ukraine was among the top 10 countries in the absolute number of emigrants with higher education (612 thousand).
- In 2016, blue-collar workers were leaving the country at an increasing speed. According to Eurostat, Ukrainians obtained the largest number of residence permits in the EU (589,000 or 17.6% of the total number of permits), 17.8% higher than the 2015 level. Poland accounted for 87% of those residence permits and the Czech Republic for 4.1%. Ukrainians account for 87.5% and 30.3% of the total number of permits issued by the two countries, respectively. 82.7% of the permits to these 2 countries were aimed at working abroad. The Ministry of Family, Labor, and Social Policy of Poland[5] reports that in H1 2017, Polish employment offices registered 905,000 applications from Ukrainian citizens (95.5% of all work permits issued by Poland). [6]

Figure 7. Productivity of labor in EU and in Ukraine, 2013-2015



Source: EUROSTAT, State Statistics Service of Ukraine and author's own calculations. Labor productivity is measured as value added per person employed

[3] Source: http://www.un.org/en/development/desa/population/migration/data/estimates2/estimates15.shtml

[4] Source: http://www.oecd.org/els/mig/dioc.htm

[5] Source: https://www.mpips.gov.pl/analizy-i-raporty/cudzoziemcy-pracujacy-w-polsce-statystyki/

[6] However, the scale of labor migration could be even larger than the official statistics show. Experts at the Ptoukha Institute for Demography and Social Studies of the National Academy of Sciences[6] of Ukraine estimate the total number of Ukrainian labor migrants at 2.2 – 2.3 mln individuals (or 8% of the population aged 15 – 70).

- The reasons for high migration rates include both the policies of Poland, which specifically aim to fill the gaps of its working labor force with immigrants, and the internal conditions in Ukraine. One of the main reasons Ukrainians decide to emigrate to Poland is the difference in wages. According to State Statistics Service of Ukraine[7], a labor migrant earns an average monthly wage of USD 722, while a permanent employee in Ukraine earned on average USD 200 in 2016 (USD 262 in January – November 2017)
- The productivity of labor is low: ten times lower than in the neighboring European countries. Cross-country comparisons of labor productivity are of course prone to certain data deficiencies. However, the productivity of officially employed people in Ukrainian manufacturing enterprises, measured as value added per person employed, was 1/1000 in 2015, while the EU average was 123/1000 (Figure 7). This difference can be attributed to many structural and organizational features of the Ukrainian economy, such as low capital investment and low capital productivity; low wages and the practice of retaining a large number of employees; as well as a managerial approach that involves a multilevel hierarchy.
- A significant share of the economy is in the shadow – approximately 37% according to the Ministry of Economic Development of Ukraine[8] for the first quarter of 2017: a large proportion of people work according to informal unprotected arrangements. For example, while in agriculture approximately only 648,500 were officially employed in 2016, according to the State Statistics Service based on the State Household Survey, 2,866,500 worked in this sector.
- Most young people receive a higher education, which increases the age when young people enter the labor market. Education coverage is very high - 82% according to the World Bank. Education - including paid - is generally available but doesn't match the needs of the labor market: the discrepancy is estimated[9] from between 20% (subjective self-assessment) to 40% (normative assessment).
- The vocational training system problems lie both in coverage with vocational training, as well as the quality of this education. According to UNESCO data, the share of young people (15-24) studying in vocational training schools in Ukraine was 4.4% as compared to 15% average for European countries. Training infrastructure and curriculums are outdated and don't usually link up with the needs of modern businesses or placement systems.

1.2. Role of the MAIT sectors in the economy

MAIT sectors together constitute roughly one third of the Ukrainian economy. They proved to be more resilient to the recent economic crises of 2014-2015 than the rest of the economy. By 2016, agriculture had already recovered to the pre-crisis levels. With a few exceptions – food, beverages & tobacco, motor vehicles, and pharmaceuticals – manufacturing didn't manage to reach pre-crises levels. Strikingly, the growth of IT continued between 2014-2015 on the same path as in the preceding years even though economy overall has lost significant share of GDP.

Firms that work in the manufacturing and agriculture sectors heavily depend on the power of the upstream value chain: 77% of the production of the manufacturing and agri-sectors is consumed as intermediate products of other sectors, only 23% are bought by final consumers. Thus, development of manufacturing

[7] In December 2017, the State Statistics Survey of Ukraine published the Bulletin External Labor Migration (Based on Findings of Modular Sampling Survey) as of https://bank.gov.ua/doccatalog/document?id=63442011

[8] Source: http://www.me.gov.ua/Documents/List?lang=uk-UA&id=e384c5a7-6533-4ab6-b56f-50e5243eb15a&tag=TendentsiiTinovoiEkonomiki

[9] http://www.ilo.org/wcmsp5/groups/public/---ed_emp/---ifp_skills/documents/presentation/wcms_554332.pdf

companies is restrained by low capital investments (10% capital investment to fixed assets ratio, on average) of the firms in the upstream value chain.

MAIT sectors are exports-oriented. 38-42%[10] of local production is exported, and for 38% of firms' exports constitutes more than half of their total sales. Exports constitutes on average 26% of outputs in agriculture, 30% in manufacturing, and 51% in IT.

Below we outline in more detail.

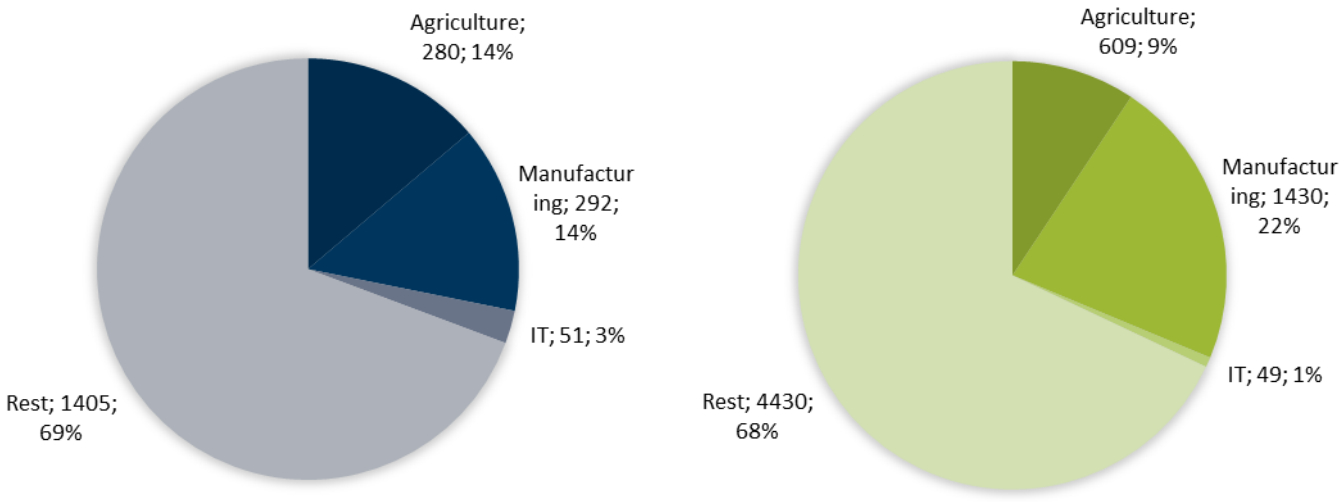
A. Size and dynamics of MAIT sectors
B. Private and State-Owned Firms
C. Ukrainian and Foreign Owned Firms
D. Output markets
E. Dependence of MAIT sectors on other sectors
F. Exports dependence

Size and dynamics of MAIT sectors. Manufacturing, agriculture and IT together constitute approximately a third of the formal economy (Figure 8).

As of 2016, they took up:

- 31% of the value added in the economy, or UAH 662 bln;
- 37% of GDP, or UAH 888 bln;
- 35% of the official employment by firms, or 2 087 K people;

Figure 8. Value added current UAH bln (left) and Official employment by firms, `000 people (right)



Source: State Statistics Service of Ukraine

[10] In 2013 and 2015 respectively, based on firm level analysis. Similarly, in 2015, according to inputs-outputs Figures of the State Statistics Service of Ukraine, 38% of local production was exported.

Figure 9. Sector share in GDP as of 2016, %.

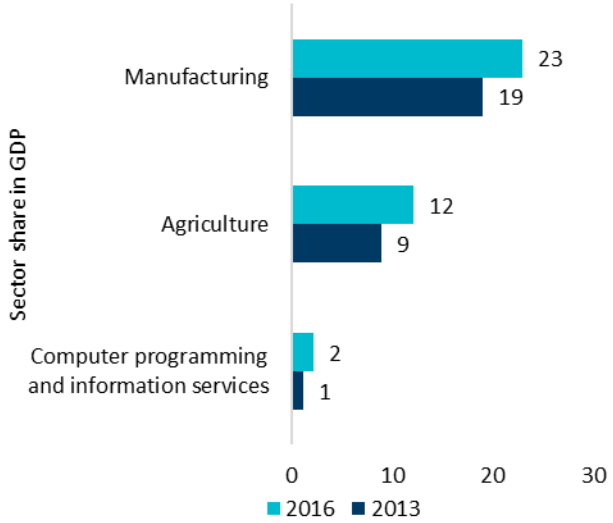
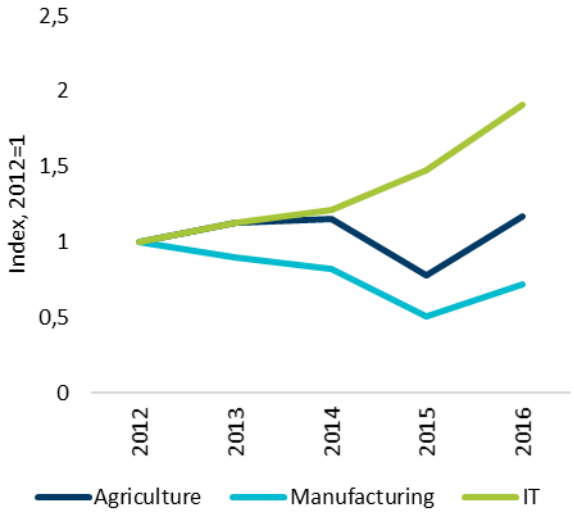


Figure 10. MAIT sectors growth



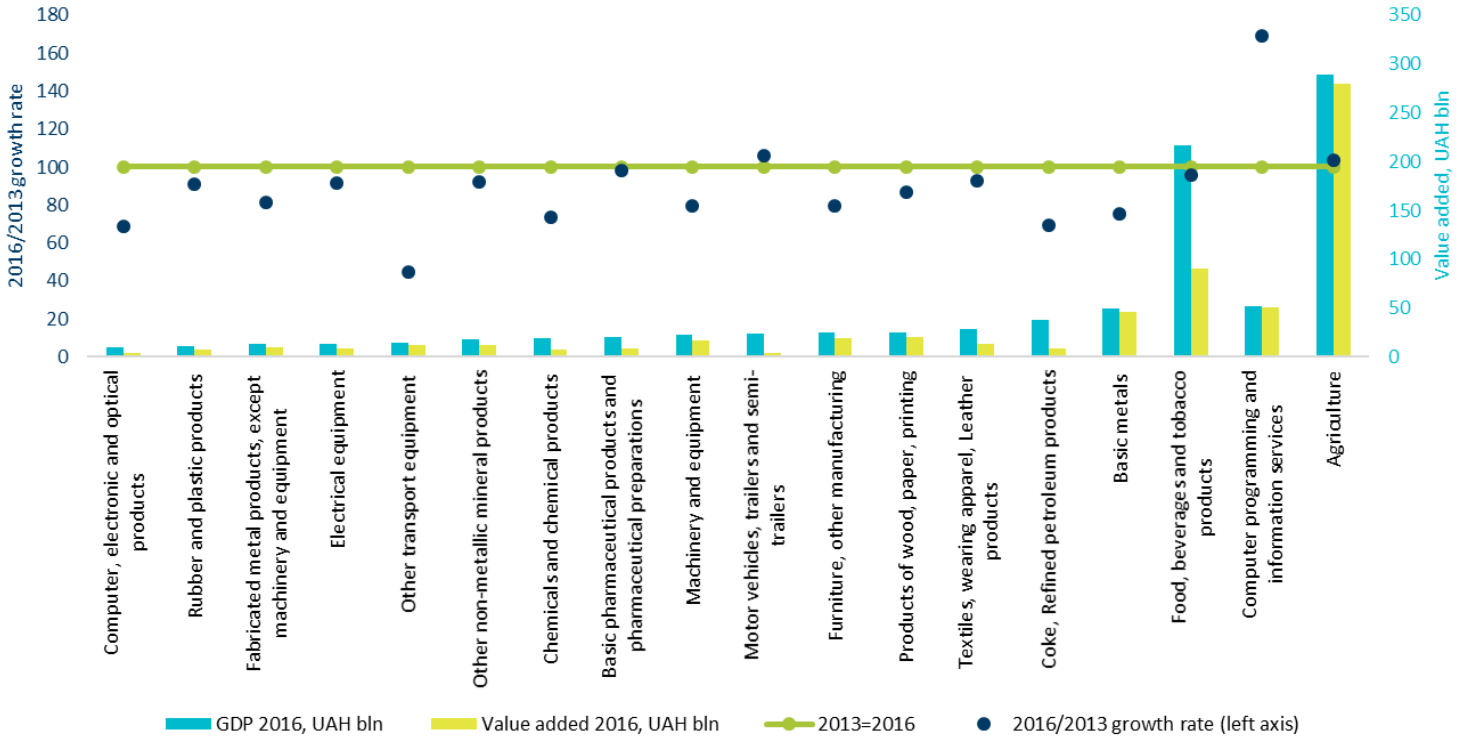
Source: State Statistics Service of Ukraine, own calculations based on data from the Ruslana database (both figures)

All three sectors have been demonstrating growth in recent years both in absolute terms and relative to the rest of the economy (Figure 8, Figure 9).

Manufacturing encompasses a group of industries of which the manufacturing of food, beverages and tobacco products is the largest (Figure 11). The following industries belong to manufacturing:

- Food, beverages and tobacco products
- Textiles, wearing apparel, Leather products
- Products of wood, paper, printing
- Coke,
- Refined petroleum products
- Chemicals and chemical products
- Basic pharmaceutical products and pharmaceutical preparations
- Rubber and plastic products
- Other non-metallic mineral products
- Basic metals
- Fabricated metal products, except machinery and equipment
- Computer, electronic and optical products
- Electrical equipment
- Machinery and equipment
- Motor vehicles, trailers and semi-trailers
- Other transport equipment
- Furniture, other manufacturing

Figure 11. MAIT industries growth 2016/2013 (%) and GDP 2016 (UAH bln)



Source: State Statistics Service of Ukraine

Private and State-Owned Firms. Private companies account for most of the production in the MAIT sectors. In 2016, their share of total sales was 94.8% in agriculture, 91.5% in manufacturing, and 98.9% in IT sector. The corresponding shares in total employment were smaller (84.7%, 86.5%, and 87.0%), which suggests that, on average, labor productivity in private companies is higher than in state owned ones (the latter including companies with mixed ownership).

Between 2012-2016, the development trends in agriculture and manufacturing were mainly the same for both private and government-controlled companies: in agriculture their sales increased, in manufacturing the sales declined (in real terms). Therefore, the share of private and state-owned companies did not change substantially in those sectors. In IT, the situation was different: the private sector grew while the state-owned sector declined.

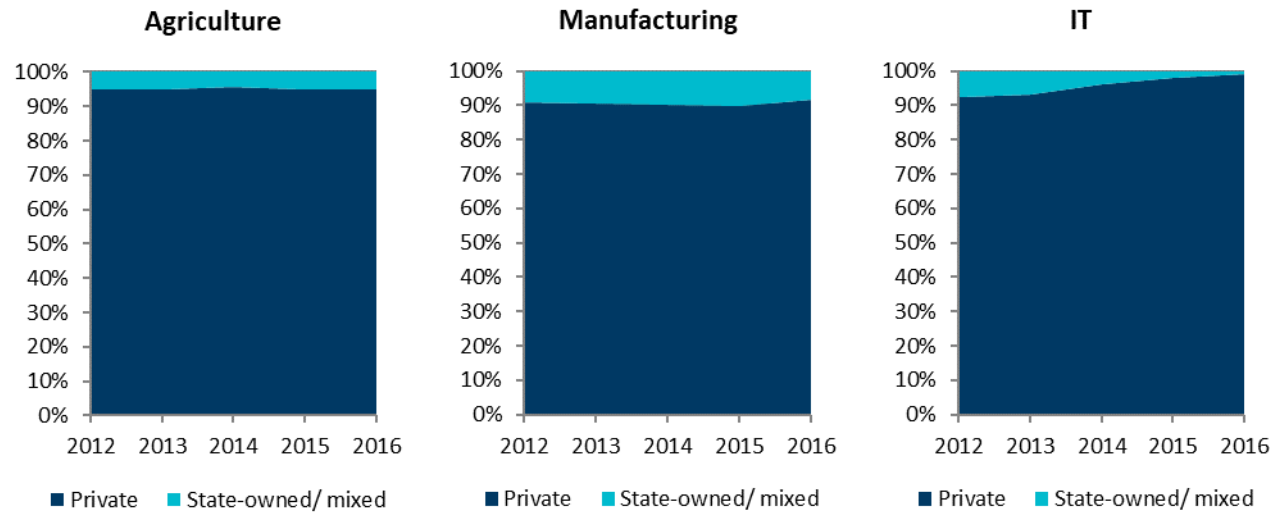
On average, in all three sectors state owned companies are larger than private ones (based on a comparison of their median sizes).

In more details:

Agriculture

- In agriculture, total sales (in real terms) of private and state-owned companies (including companies with mixed ownership) grew steadily between 2012-2015 but decreased in 2016. The ratio of sales by the two categories of companies did not change in 2016 compared to 2012. The share in total sales was 94.8% for private companies and 5.2% for state-owned ones, both in 2012 and 2016.

Figure 12. Shares of private and state-owned companies in total sales



Source: Own calculations based on Ruslana database

- The trends in employment were the opposite. In the beginning of the five-year period, employment both in private and state-owned companies contracted, later on it increased. But the increase in government-controlled companies was significantly larger than in private ones. On the whole, between 2012-2016 employment in private companies decreased by 10.7% while in state owned companies it increased by 0.8%. As a result, the share of private companies in total employment decreased from 86.2% in 2012 to 84.7% in 2016.
- On average, state owned companies are substantially larger than their private counterparts. In 2016, the median sales volume in the private sector was UAH 0.3 mln, while in the government-controlled sector it was UAH 6.1 mln. The median number of employees was 2 and 52, respectively.

Manufacturing

- In manufacturing, the sales volume was decreasing steadily between 2012-2016. Apart from 2016, the contraction was larger in the private sector. As a result, the share of private companies in total sales was almost the same in 2016 as it was in 2012 (91.5% and 91.1%, respectively).
- The employment both in private and state-owned companies also decreased steadily between 2012-2016. The ratio of employment in the two categories of companies also did not change. In 2016, the share of private companies was 86.5% (86.6% in 2012).
- As it is in agriculture, state owned manufacturing companies are larger on average than private ones although the difference is smaller. In 2016, the median sales volume was UAH 1.4 mln for private companies and UAH 2.3 mln for state owned companies. The median number of workers was 19 and 6, respectively.

IT

- The situation in the IT sector was different. Sales volume grew substantially in the private sector and declined in the government-controlled sector. As a result, the share of private companies in total sales increased from 92.5% in 2016 to 98.9% in 2016.

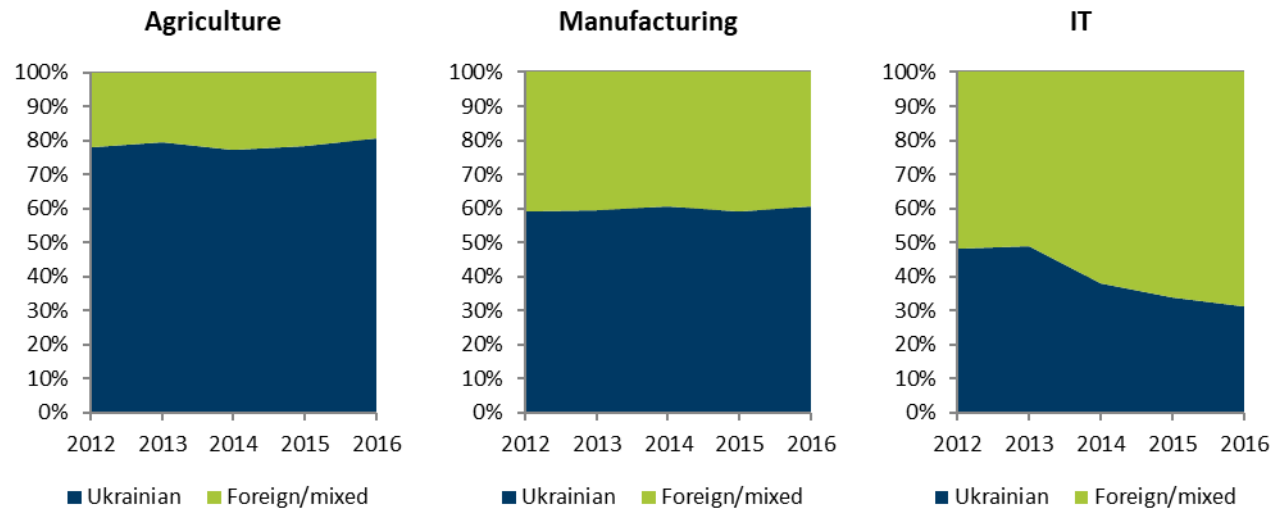
- The employment, however, decreased both in private and government-controlled sectors between 2012-2015.[11] The contraction was larger in state owned companies. As a result, the share of those companies in total employment in the IT sector decreased from 10.2% to 6.3%. But in 2016 the employment in the government-controlled sector suddenly increased to 13.0%. The reason was the restructuring of Ukrainian Railways, which led to the emergence of its IT division with more than 2,000 workers as a separate enterprise.
- As in agriculture and manufacturing, on average state-owned companies are larger than the private ones. In 2016, the median sales volume was UAH 0.7 mln for private companies and UAH 1.0 mln for state owned companies. The median number of workers was 17 and 3, respectively.

Ukrainian- and Foreign-Owned Firms. Ukrainian owned companies dominate Ukraine's agriculture sector and manufacturing sector. In 2016, their shares of total sales in those sectors were 73.5% and 68.0%, respectively. Between 2012-2016, those companies slightly strengthened their positions on the account of their foreign-owned counterparts (including companies with mixed ownership).

The situation in the IT sector is different. In 2012, a rough parity existed between Ukrainian- and foreign-owned companies. Since then, foreign-owned companies greatly expanded their activities while sales of Ukrainian-owned ones declined. As a result, in 2012, the share of foreign-owned companies in the sector reached 61.6% (in terms of sales).

On average, in all three sectors foreign-owned companies are larger than their Ukrainian-owned counterparts (the median size of the company is bigger). They are also likely to be more productive: the ratio of sales to employment in foreign owned firms is larger than in domestic owned companies.

Figure 13. Shares of Ukrainian- and foreign-owned companies in total sales



Source: Own calculations based on Ruslana database

In more details:

Agriculture

[11] The contraction of the number of workers in private IT companies may be explained by the fact that the companies employ a part of workers as independent contractors to reduce the amount of taxes paid.

- In agriculture, the sales of both Ukrainian and foreign-owned firms grew (with the exception of 2016) but, overall, the former expanded faster. As a result, their share increased from 72.5% in 2012 to 73.5% in 2016. Accordingly, the share of foreign-owned companies (including companies with mixed ownership) declined from 20.5% to 17.9% in that period.[12]
- The trends in terms of employment were similar. The share of agri-sector formal employees who work in Ukrainian-owned companies was 79.6% in 2016. It increased from 78.5% in 2012. The share of foreign owned companies decreased from 13.0% to 11.8% in that period.
- On average, foreign-owned agriculture companies are larger than their Ukrainian owned counterparts. In 2016, the median sales were UAH 17.6 mln for foreign owned companies and UAH 1.2 mln for Ukrainian owned ones. The median employment was 17 and 5 people, respectively.

Manufacturing

- In manufacturing, both Ukrainian and foreign-owned firms decreased sales steadily (in real terms) but business of the former contracted slightly less. The share of Ukrainian owned companies in total sales fluctuated in the range from 57.6% to 59.2% between 2012-2016. The share of foreign owned companies decreased from 40.2% to 37.7% in that period.
- Over those five years, employment in Ukrainian-owned manufacturing companies slightly decreased (from 69.1% in 2012 to 68.0% in 2016). Accordingly, employment in foreign-owned manufacturing companies increased (from 27.1% in 2012 to 27.5% in 2016).
- On average, foreign-owned manufacturing companies are also larger than Ukrainian-owned ones but the difference is smaller than that in agriculture. In 2016, the median sales were UAH 7.3 mln for foreign owned companies and UAH 1.4 mln for Ukrainian owned ones. The median employment was 15 and 6 people, respectively.

IT

- In the IT sector, the share of Ukrainian owned companies fell from 44.1% to 28.0% between 2012-2016 in terms of sales. The portion of foreign owned companies expanded from 47.8% to 61.6%.
- In terms of employment, the situation was different. The ratio of workers employed by Ukrainian owned and foreign companies did not change substantially over the five years. The respective shares fluctuated in ranges of 57.2-61.9% and 26.0-29.5%, respectively.
- On average, foreign -owned IT companies are also larger than Ukrainian owned ones. In 2016, the median sales for foreign owned companies were UAH 4.4 mln and UAH 0.7 mln for Ukrainian owned ones. The median employment was 5 and 3 people, respectively.

Output markets. Some industries – like non-metallic mineral products, transport equipment, pharmaceutical products, etc (Figure 14) – sell the majority of their outputs directly to final consumers, but the majority of industries sell their products to intermediate consumption by other sectors. The second group is thus vulnerable to power of the upstream value chain.

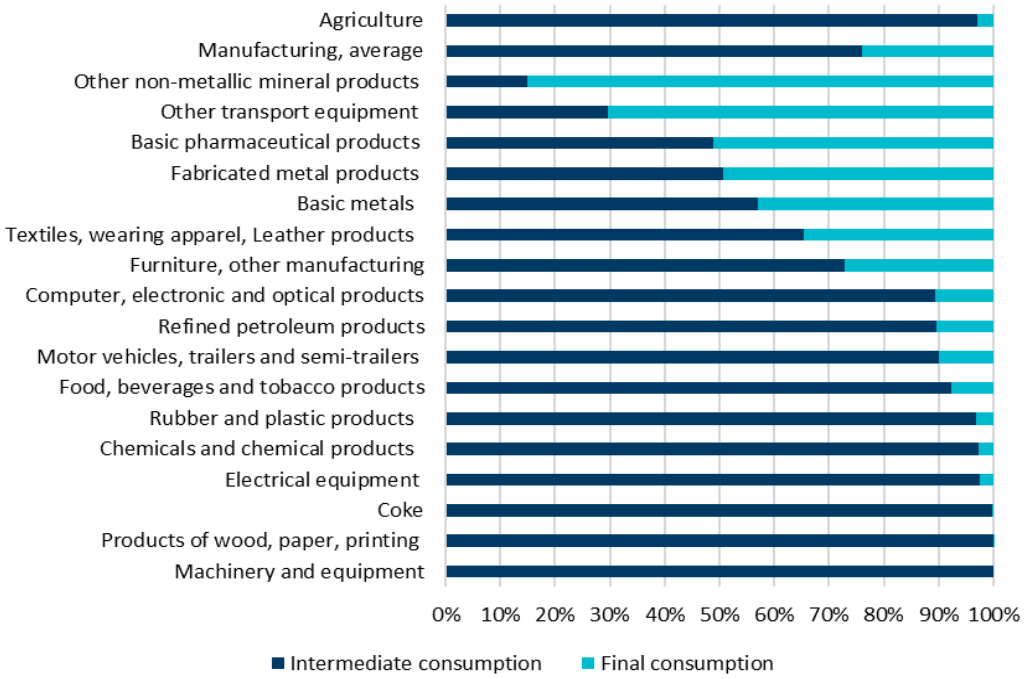
Dependence on other sectors. Manufacturing of machinery, equipment, metallurgy supply their products to mining and quarrying, manufacturing, utilities, energy sector and transportation - government monopolies of the post-Soviet countries. Over the recent years, these output markets have been generating

[12] The sums do not add up to 100% because of lack of data for some companies.

low demand in Ukraine. Levels of capital investments in these industries have been consistently low – between 3% and 7% in proportion to fixed assets (Figure 14). Construction and telecommunications make larger capital investments but from a lower base. The inefficiency of these output markets results in low sales and limited opportunities for the industries that traditionally rely on them.

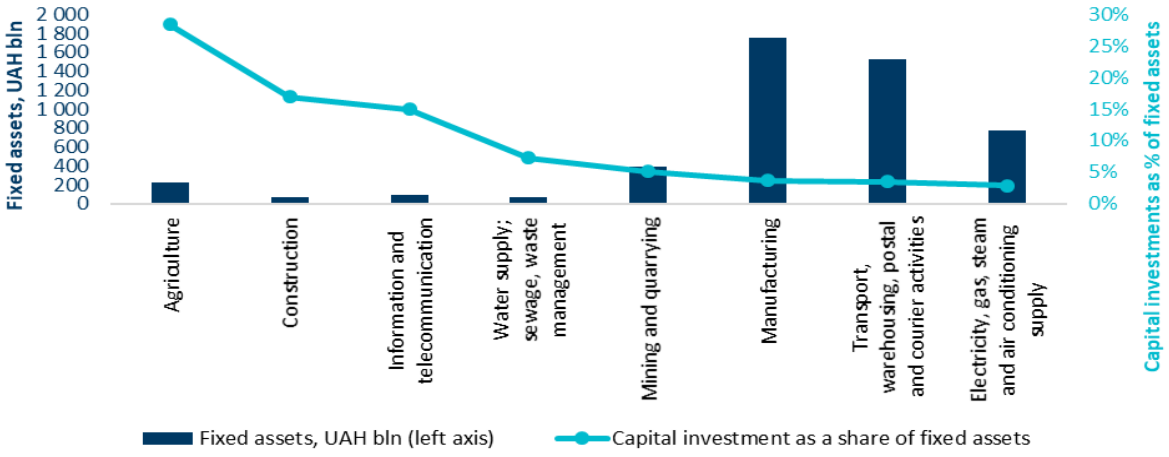
Exports dependence. Some local industries within the manufacturing sector – like furniture, motor vehicles, trailers and semi-trailers, electrical equipment, transport equipment, products of wood, paper, printing, non-metallic mineral products - are export-oriented and receive more than half of their revenues from foreign buyers (Figure 16). Exporters and importers in 2001 and 2013 shows that in 2013, for exporting firms, exports constituted on average 34% of firms annual output. In 2015 this indicator increased to 42%.

Figure 14. Intermediate consumption vs final consumption of manufacturing and agriculture products



Source: National inputs-outputs Figures. State Statistics Service of Ukraine

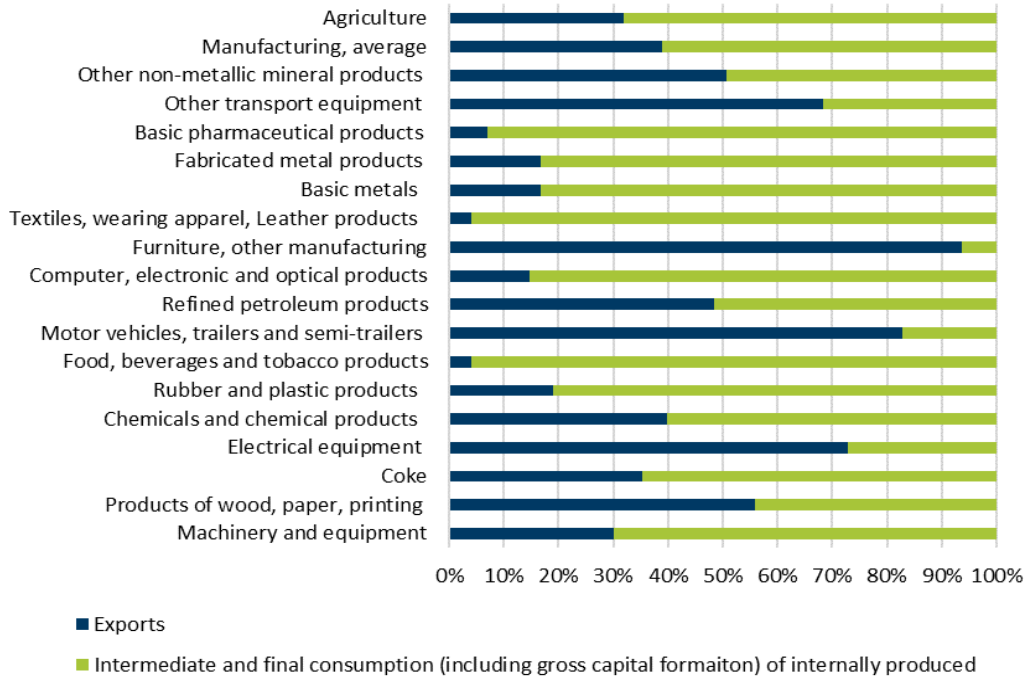
Figure 15. Capital investments in major industries, 2016



Source: State Statistics Service of Ukraine

High shares of revenue coming from foreign markets might benefit the company but also damage it. On the positive side, companies can capitalize on a more diversified portfolio of clients and outputs markets. On the negative side, exporting activities carry large fixed costs, thus making export-dependent companies liquidity constrained.

Figure 16. Exports vs internal use of local production



Source: National inputs-outputs Figures. State Statistics Service of Ukraine

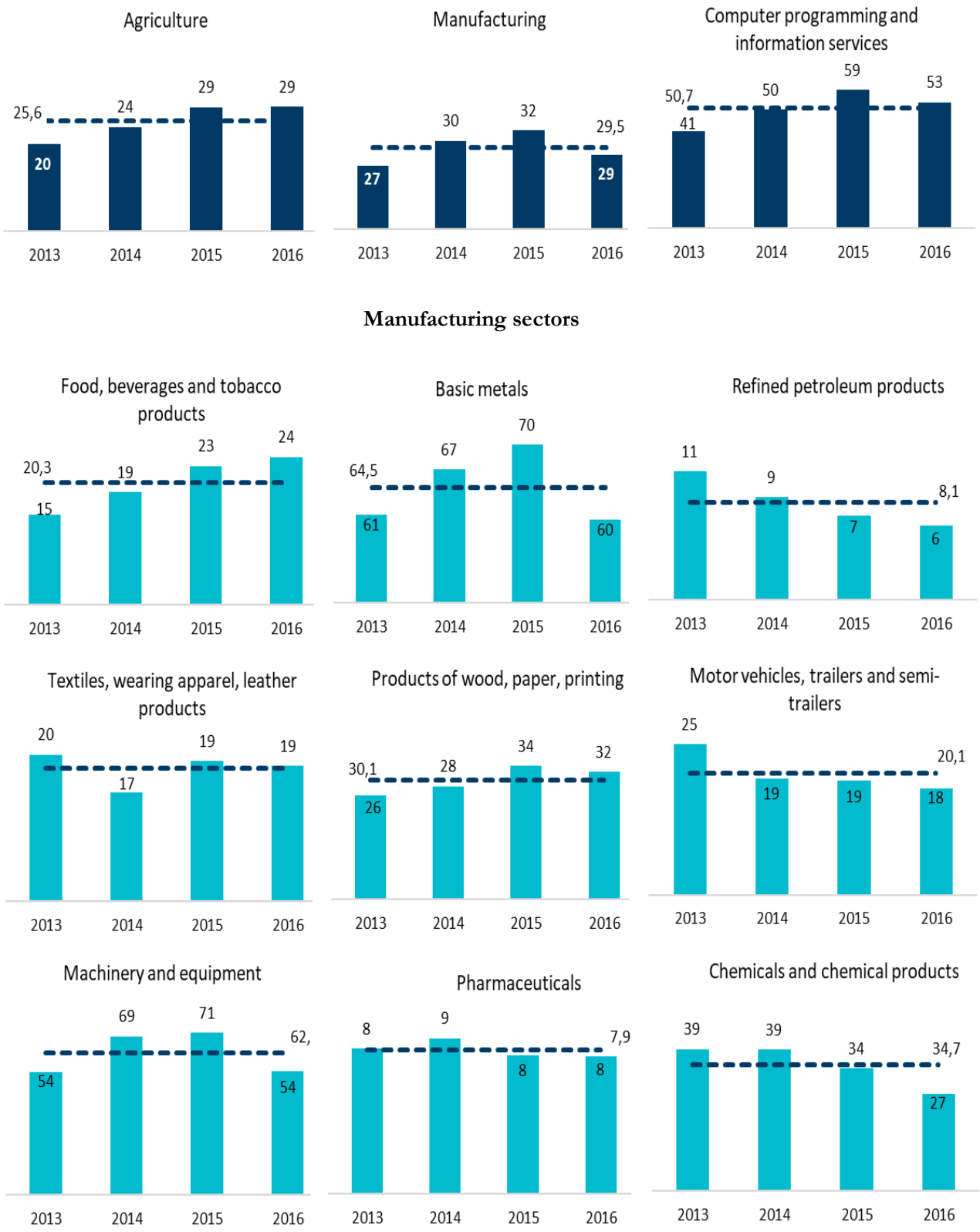
1.3. Export trends

Size, structure and key markets of exports in MAIT sectors. As of 2016, the export value of the MAIT sectors constitutes 81% of total exports. Metals and crops are the two largest categories of exports that contain 44% of all MAIT exports (8.3 bln or 18% and 12 bln or 26% respectively). In 2016, the IT sector exported USD 1.6 bln worth of goods and services. Exports constitute 26% of outputs in agriculture, 30% in manufacturing, and 51% in IT (Figure 17).

Between 2013-2015 exports of MAIT sectors dropped significantly (Figure 18) and in 2016 its exports had dropped 44% lower than 2013. But the MAIT sectors suffered less than the other sectors, thus their share of total exports actually increased by 4 percentage points (from 77% in 2013 to 81% in 2016).

Ukrainian exporters who traded with Russia suffered the largest decline in exports over 2013-2015 and are still struggling to reorient their trade flows to other countries (Annex C). Strikingly, many sectors retained trade relations with Russia and even intensified them, e.g. chemicals production. Other sectors never recovered their trade with Russia due to an increase in trade barriers and import ban imposed by Russia (wood production, cheese).

Figure 17. The share of exports in sectors' output, %



Source: authors estimates based on State Statistics Service of Ukraine Input-Output Tables data in consumer prices for 2013-2016

Figure 18. MAIT sectors export in 2013 and 2016, USD bln

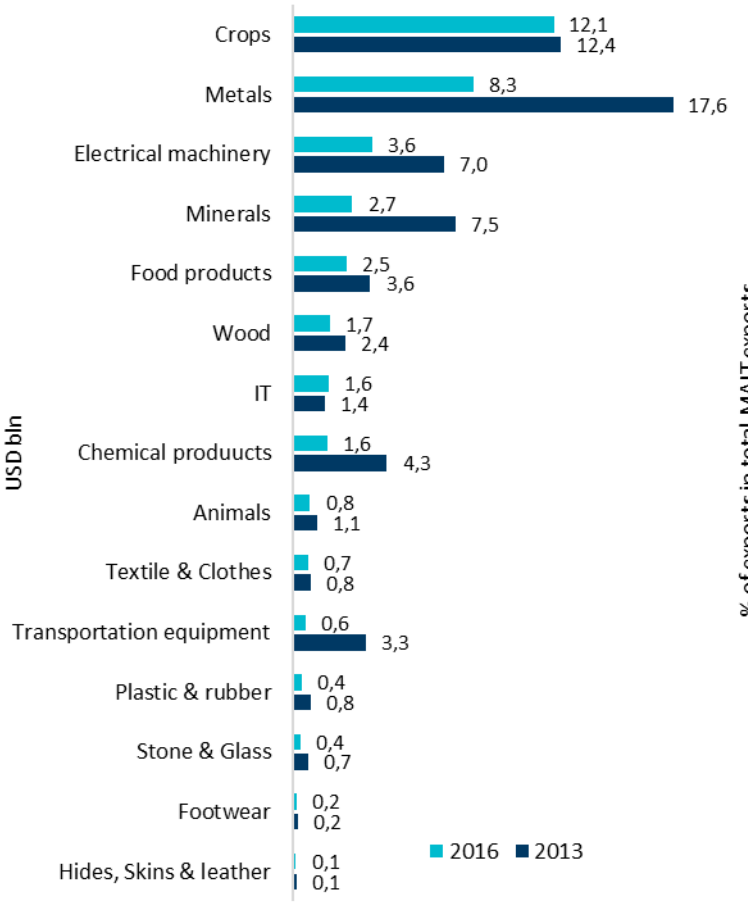
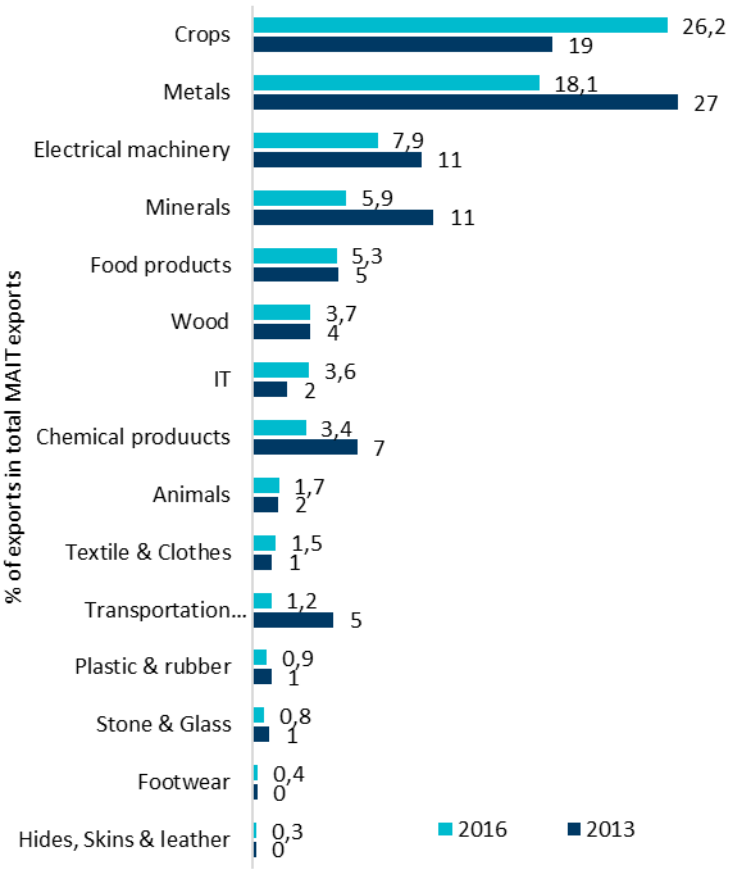


Figure 19. Share of exports in total MAIT exports



Source: NBU, State Statistics Service of Ukraine, authors estimates (both figures)

1.4. Productivity growth

Between 2001-2016, TFP in Ukraine grew on average 4 percent per year. IT has had the highest productivity growth of 7.5 percent per year. The period has been characterized by rapid productivity growth, considerable reallocation of market shares, and the massive entry of new firms, especially in the services sectors. Largely, these facts are linked to trade and services liberalization because of the WTO accession of Ukraine. While trade liberalization was limited due to already low pre-WTO import duties, services liberalization was performed on a much larger scale. It allowed to finance growth of new firms and to provide business services and insurance to small and young companies.

The IT sector is the most productive across MAIT sectors (Figure 20). As of 2016, IT is (roughly) twice as productive as manufacturing. In turn, manufacturing is more productive than agriculture (by approximately 40%).

Over the investigated period, TFP growth followed different trends in manufacturing, agriculture, and IT.

- In manufacturing, TFP grew slowly in the 2000's. After 2008-2009, the growth stalled (first a small decrease, then a small increase).
- In agriculture, there was fast growth in TFP during the 2000's, and slow growth after 2008-2009.
- In IT, the trend was the opposite of the one in agriculture: TFP grew slowly during the 2000's, and fast after 2008-2009.

Considering the period before the economic crisis of 2008, most growth came from the **entry of new firms** and **within firm productivity growth**, it was driven by trade and services liberalization and the development of the financial sector.

The after-crisis period, on the other hand, was characterized by the substantial **reallocation of market shares** towards firms with growing productivity. Between 2009-2016, the pace of productivity growth through improvements within firms has been 2 times slower than between 2001-2008.

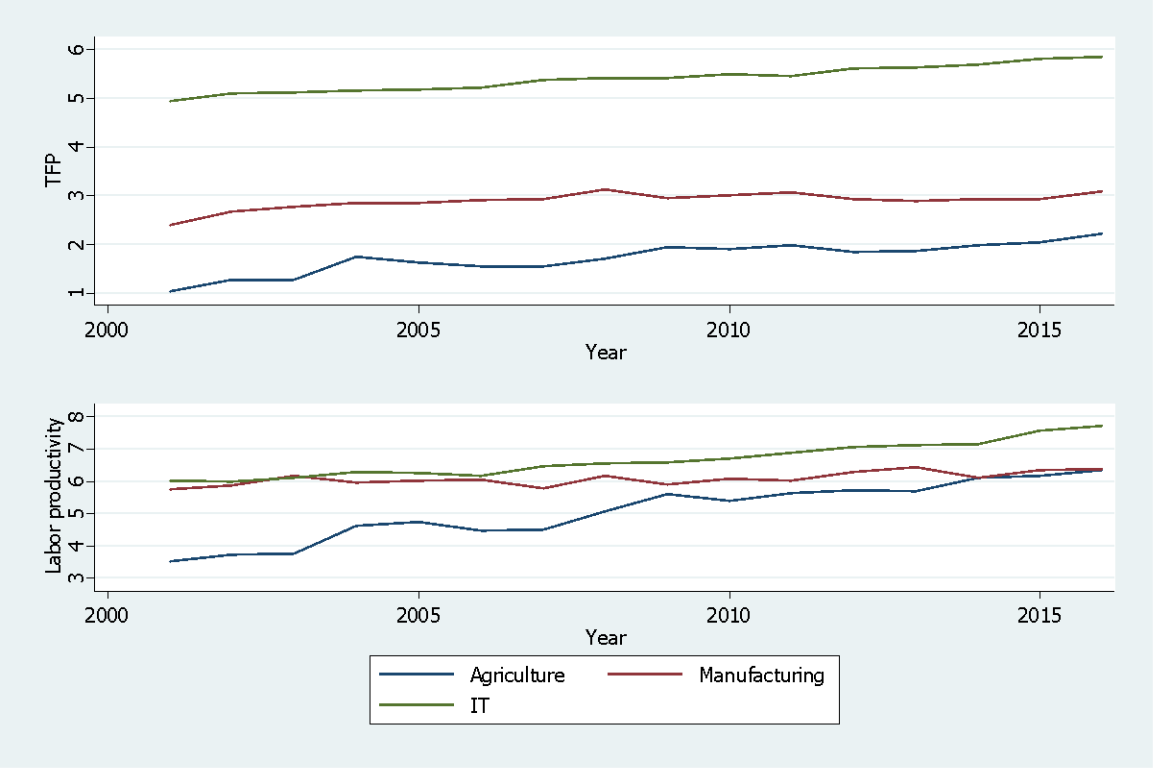
In the IT sector, however, the entry of new firms remained an important driver of productivity growth (in the after-crisis period). Its recent success came due to the rapid expansion of young and productive firms and an increase in the market share of already large and highly productive firms. At the same time, there was a low rate of exit of poor-performing firms in IT, which dragged the sector productivity growth down.

The low contribution of exit towards productivity growth, which spans through the whole period (2001-2016) and is present in all sectors, indicates that there are regulatory barriers to exit that prevent poorly performing firms from shutting down. This factor slows down the overall growth of the economy due to the existence of a large share of 'zombie' firms (financially insolvent or illiquid firms that survive due to soft budgets and delinquencies in the financial sector), which lock in the inefficient use of resources

As in the case of TFP, labor productivity in IT was the highest and in agriculture was the lowest. The manufacturing sector has started the period with labor productivity like the IT sector and ended the period with labor productivity as in agriculture. This happened because the labor productivity growth in manufacturing was slower than in the other two sectors.

Agriculture experienced rapid labor productivity growth before the 2008 crisis and slowed down its growth between 2009-2016. IT has been given a boost in labor productivity since 2014.

Figure 20. TFP and labor productivity between 2001-2016



Source: Author's computations based on Ruslana database. Crimea, Donetsk, and Luhansk are not included.

TFP decomposition.

We performed an analysis of productivity growth in Ukraine between 2001-2016, decomposing it as a) within-firm component, b) between-firm component, c) cross term, d) exit of firms, and e) entry of firms. It allowed the identification of the sources of productivity growth and the development of policies to address poor performance in some areas. All firms are divided into entering, continuing, and exiting firms. "Within-firm component" measures the internal growth of productivity in each continuing firm. "Between-firm component" represents productivity growth due to the increase in the market share of more productive firms (reallocation). Cross term represents productivity growth due to the expansion of market shares of firms with increasing productivity. The fourth term measures productivity growth due to the entry of new firms. Finally, the fifth term measures the contribution of exiting firms towards industry productivity.[13]

Table 1 presents the results of our analytical decomposition. Between 2001-2016, TFP increased rapidly, by 4 per cent per year on average. The main driver of TFP growth in Ukraine over the whole period was the entry of new, more productive firms, which increased productivity by 65 percent. This contribution was particularly large in the IT sector, high-tech manufacturing industries (manufacturing of pharmaceuticals and communication equipment), and agriculture. Firms also experienced internal productivity growth of 19 percent on average. Within-firm productivity did increase the most in agriculture and medium-low technology manufacturing industries, by 24 percent and 42 percent consequently.

Productivity growth was to a large extent caused by trade and services liberalization that resulted from the 2008 accession of Ukraine to the World Trade Organization (WTO) and reflected better provision of services to firms as a result of services liberalization (Shepotylo and Vakhitov, 2015). While trade liberalization has been relatively limited due to the already low pre-WTO import duties, services liberalization occurred on a large scale and has significantly boosted within-firm productivity. The WTO accession entailed the adoption of more than twenty new laws to harmonize Ukrainian legislation with WTO requirements, including in the areas of TV and broadcasting, information agencies, banks and banking activities, insurance, telecommunications, and business services.

Finally, all sectors saw the considerable reallocation of market shares towards more productive firms, which lead to an additional 15 percent increase in productivity. The reallocation effect was particularly strong in IT and high-tech industries where it contributed to 36 and 31 percent increase in productivity.

The whole period is naturally divided in half by the 2008 global financial crisis. Considering the period before the economic crisis of 2008, most growth came from the entry of new firms and from within firm productivity growth, driven by trade and services liberalization and the development of financial sector. The after-crisis period, on the other hand, was characterized by the substantial reallocation of market shares towards firms with growing productivity and relatively weak within firm productivity growth. In the IT sector, however, the entry of new firms remained an important driver of productivity growth.

Table 1. Decomposing sector productivity growth

Sector	Growth components					Total Growth
	Within	Between	Cross	Entry	Exit	
A. Productivity growth, 2001-2016						
Agriculture	0.24	-0.03	0.18	0.84	0.00	1.22

[13] For more detailed description of the decomposition please look at Appendix H.

Manufacturing		0.20	-0.10	0.14	0.59	0.02	0.81
	high technology	0.09	-0.15	0.31	0.90	0.01	1.15
	med-high technology	0.21	-0.03	0.08	0.70	-0.01	0.96
	med-low technology	0.42	-0.05	0.12	0.51	0.04	0.96
	low technology	0.06	-0.02	-0.02	0.34	0.02	0.33
IT		0.04	-0.11	0.36	1.96	0.07	2.17
All		0.19	-0.10	0.15	0.65	0.02	0.88
B. Productivity growth, 2001-2008							
Agriculture		0.19	-0.00	0.13	0.41	0.03	0.70
Manufacturing		0.21	-0.08	0.13	0.35	0.06	0.55
	high technology	0.10	-0.08	0.20	0.66	0.06	0.82
	med-high technology	0.25	-0.02	0.00	0.38	0.03	0.58
	med-low technology	0.40	-0.07	0.27	0.24	0.08	0.77
	low technology	0.07	0.02	0.04	0.27	0.05	0.35
IT		0.14	-0.01	0.26	0.74	0.33	0.79
All		0.20	-0.07	0.14	0.37	0.07	0.57
C. Productivity growth, 2009-2016							
Agriculture		0.04	-0.14	0.34	0.10	0.05	0.29
Manufacturing		0.10	-0.06	0.18	0.14	0.02	0.34
	high technology	0.02	-0.18	0.42	0.14	0.03	0.37
	med-high technology	0.14	0.00	0.13	0.09	-0.01	0.38
	med-low technology	0.14	-0.11	0.22	0.10	0.02	0.33
	low technology	0.07	-0.05	0.05	0.17	0.00	0.23
IT		0.13	0.39	0.47	0.28	-0.11	1.38
All		0.10	-0.05	0.20	0.14	0.01	0.38

Source: Author's computations based on Ruslana database. Crimea, Donetsk, and Luhansk are not included.

Between 2001-2008, productivity growth was achieved through the entrance of new firms and from improvements in the productivity within firms. Starting in 2008, most growth was achieved through the reallocation of resources towards more productive firms. Between 2009-2016, the pace of productivity growth through improvements within firms was 2 times slower than between 2001-2008. The only sector, whose productivity growth between 2008-2016 outpaced growth in the previous period, was the IT sector. Its recent success came due to the rapid expansion of young and productive firms and the increasing market share of already large and highly productive firms. At the same time, there was a low rate of exit of poor-performing firms in IT, which dragged the sector productivity growth down. Perhaps, non-performing firms expected to improve in the rapidly expanding market. The low contribution of exits towards productivity growth, which spans through the whole period and is present in all sectors, indicates that there are regulatory barriers to exit that prevent poorly performing firms to shut down and subsidies that destroy incentives for firms to go out of business.

These observations are supported by the latest Transition Report (2017), which points that firms in the EBRD region mostly run at the limit of capacity; further growth is hard to achieve and requires searching for new markets, perhaps in Asia, which is projected to continue to grow at 6 percent, while Europe and Central Asian growth is about 2-3 percent.

2. Growth factors

The following analysis is based on a Schumpeterian growth framework, which states that technological progress leads to economic growth through a process known as 'creative destruction'. The main element of that process is the continuous replacement of less productive incumbent firms by their more productive and innovative peers as well as new entrants to the market. Based on this, the analysis starts with a description of firm dynamics in MAIT sectors, the role of firms of different sizes and ages in productivity and employment growth, and competition. Then the most vital factors that facilitate or hinder the growth are considered. Specifically:

- investment,
- innovation,
- infrastructure, and
- trade barriers.

A separate section of the analysis focuses on exporters and importers. It examines determinants of being an exporter or importer, and the effect of having such a status on firm performance.

2.1. Firm dynamics

2.1.1. Firm distribution: large firms dominate

The number of MAIT firms is relatively small compared to both the total number of firms in Ukraine, and the corresponding sectors of EU's economy (controlling for the population in the latter case). All the three sectors under consideration are dominated by large firms. The number and role of small firms (in agriculture and manufacturing) and medium-sized firms (in manufacturing) is lower than in the EU, which may indicate the existence of substantial barriers to entry and growth. The most striking difference with the EU is in agriculture, which is populated mainly by small farms in the EU and industrial-type holdings in Ukraine.

Between 2012-2016, the positions of small, medium-sized and large firms somewhat weakened, on the account of an increase in the number of micro-sized firms.

Number of firms: less than in the EU

In general, MAIT firms account for a relatively small part of Ukraine's firm population, which is overall dominated by trade firms. As of 2016, agricultural, manufacturing and IT business entities represented 3.8%, 6.4%, and 4.9% of the total number of business entities (including both incorporated businesses and sole proprietorships), respectively.[14]

On the face of it, a comparison with the corresponding sectors of the EU economy does not show a common trend. Controlling for population, the quantity of agricultural firms in Ukraine is much smaller than in the EU. In Ukraine, the number of agricultural firms is 1.7 per 1,000 inhabitants whereas the corresponding number for the EU is 24.6. The quantity of manufacturing firms is also greater in the EU but to a much lesser degree: the number of firms of that sector in Ukraine is 2.9 vs. 4.1 in the EU. For the IT sector, the situation is the opposite. Ukraine has 1.9 IT firm per 1000 population, which is more than in the EU (1.4 firm).[15] However, the number for Ukraine is unlikely to represent an actual number of IT firms. It rather reveals a practice of disguised employment that is widespread in that sector, where permanent workers are officially employed as independent contractors in order to reduce the amount of

[14] Sources of data: State Statistics Service of Ukraine, Eurostat.

[15] In this paragraph the latest data available is used: 2015 for IT and manufacturing, and 2010 for agriculture. Sources: State Statistics Service of Ukraine, Eurostat.

taxes paid (see the next section for some evidence). This suggests that in Ukraine's IT sector, as in agriculture and manufacturing, the real number of firms per capita is smaller than in the EU.

Firm size distribution: a missing middle

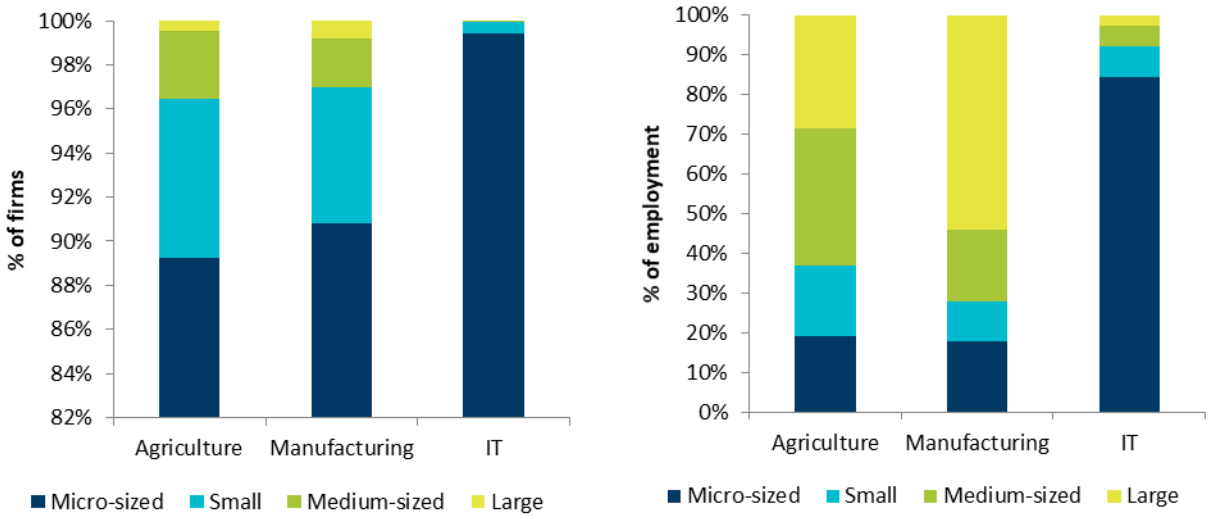
In all the three sectors in question, the size distribution follows "the pyramid rule". The distribution of firms in manufacturing and agriculture also exhibits the following features:

- the pyramid base is very large. i.e. the share of micro-sized firms is greater than in the EU,
- the middle layers are relatively thin, i.e. the share of small firms (in agriculture) or both small and medium-sized firms (in manufacturing) is lower than in the EU,
- a trend for the top layer (large firms) is generally inconclusive but it may be argued that Ukraine's manufacturing sector almost does not have giant firms with a headcount of more than 25,000 (as single legal entities, not holdings).

The distribution of firms in the IT sector cannot be estimated reliably from the data because of the practice of disguised employment.

Unlike in other chapters of this report where we use a three-category distribution of firms by size – small, medium and large[16] – we apply a four-category grouping in this chapter. This is important for the comparison of distribution with the EU countries. Specifically, we define micro-sized firms as business entities with 1-9 workers, small firms are the ones with 10-49 workers, medium-sized firms are those that have 50-249 workers, and the rest are large firms. A more detailed description is of the firm size distribution in Ukraine's MAIT sectors is below.

Figure 21. Distribution of firms by size (left), distribution of employment by firm sizes in Ukraine's MAIT sectors.



Note: data for manufacturing and IT is for 2015, data for agriculture is for 2010 (latest available years for comparison with the EU)
Source: State Statistics Service of Ukraine Ruslana database, authors' calculations.

In agriculture, micro-sized firms represent 89.3% of the total number of firms (as of 2015).[17] The shares of small and medium-sized firms are 7.2% and 3.1%, respectively. Finally, large ones account for 0.5% of the total number of firms in the sector.

[16] Small firms are defined as firms employing from 1 to 9 people, medium – from 10 to 99 people, and large – more than 100 people.

[17] The data are for 2015 and 2010 to ensure comparability with the corresponding EU indicators.

A direct comparison with the EU data is not possible because the EU uses other definitions of farm size, specifically the "economic size" (based on the monetary value of the agricultural output per unit of land or per head of livestock) or the physical size (the land area used by a farm). The data on land plots used by agricultural firms in Ukraine is not available.

However, it may be argued that the share of small firms is rather low. The reason being that the share of medium-sized firms is six times as large as the portion of large firms but the corresponding ratio of small firms to medium-sized firms is only 2.4. Moreover, a deeper look at the distribution of small firms indicates a lack of very small firms (10-19 workers). The share of such firms (3.4%) is slightly lower than the share of other small firms (3.5%), which have 20-49 workers.

The largest firm in agriculture has 4,978 workers. The number of firms that have more than 1,000 workers is 34 (the total number of large firms in the sector is 335).

In manufacturing, the situation is similar to the one in agriculture, but with a substantially lower share of medium-sized firms. Micro-sized firms account for 90.8% of the total number of firms (as of 2015). The shares of small and medium-sized firms are 6.2% and 2.2%, respectively. Large ones represent 0.8% of the total number of firms in the sector.

The portion of large firms in Ukrainian manufacturing is the same as in the corresponding sector of the EU economy, but the shares of small and medium-sized firms are almost twice as small (they are 13.2% and 3.4%, respectively, in the EU). Accordingly, the share of micro-sized firms in the EU (82.7%) is lower than in Ukraine.

As in agriculture, the data indicate a lack of very small firms (10-19 workers). In Ukraine's manufacturing, the share of such firms (3.2%) is roughly the same as the share of other small firms (2.9%).

The largest firm in manufacturing has 27,546 workers. In total, 2 firms have more than 25,000 workers, 20 firms have from 5,000 to 24,999 workers, and 172 firms have from 1,000 to 4,999 workers (the total number of large firms in the sector is 967).

In the IT sector, the overwhelming majority of firms are micro-sized. Their share is 99.4%. The portions of small and medium-sized firms are 0.5% and 0.1%, respectively. Large firms represent 0.01% of the total number of firms in the sector.[18]

In the EU, the share of micro-sized firms in the IT sector (94.4%) is also greater than in manufacturing but smaller than in Ukraine's IT sector. Accordingly, the portions of small, medium-sized, and large IT firms are substantially bigger than in Ukraine (in the EU they are 4.5%, 0.9%, and 0.2%, respectively).

However, the data from financial statements (which are cited above) does not represent the real picture within Ukraine's IT sector because of the widespread use of disguised employment in that sector. As mentioned above, permanent workers are officially employed as independent contractors in order to reduce the amount of taxes paid. Financial statements show that the number of large firms in the sector is 7, with the largest firm employing 866 people (as of 2015). But according to the estimates of dou.ua, a popular Ukrainian IT community web portal, at the beginning of 2017 the number of large firms was at least 50,[19] with the largest firm having 4,600 employees (and, in total, 9 firms with a headcount of more

[18] In this section the data only for firms with KVED code 62 ('Computer programming') are used to ensure comparability with the corresponding EU indicators.

[19] In particular, dou.ua did not take into account state-owned firms.

than 1,000).[20] This suggests that the shares of large, medium-sized and small firms are greater than data from financial statements show.[21]

Distribution of employment: dominance of large firms

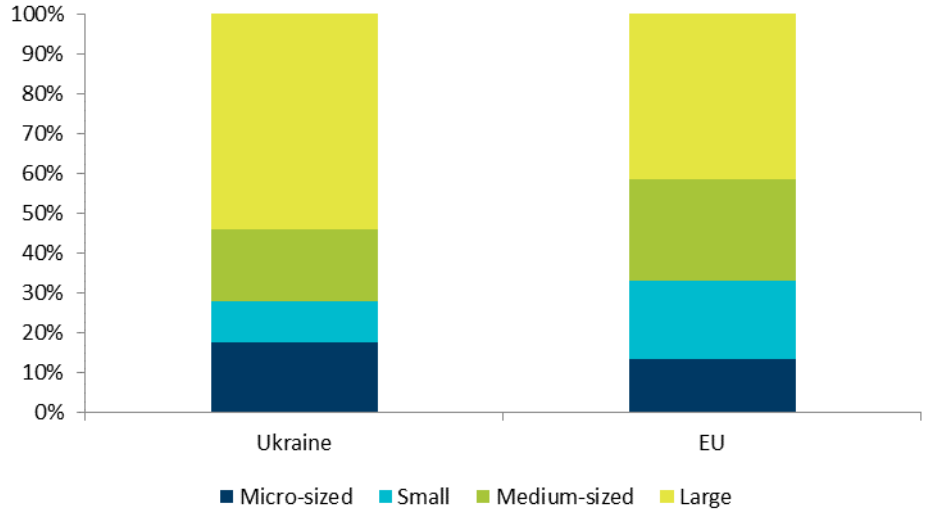
The distribution of employees between firms of different size categories exhibits the dominant role of large enterprises in tje MAIT sectors. In Ukraine, their role is greater than in the EU.

In agriculture, large firms share their dominant role with medium-sized firms. They account for 28.5% and 34.6% of the total employment in the sector, respectively. This differentiates Ukrainian agriculture from the corresponding sectors in EU countries that are mostly populated by small farms (in terms of number of workers). Moreover, a number of large and medium-sized agricultural firms in Ukraine are parts of large holding companies. (Lissitsa, 2010) estimates that the 40 largest agricultural holding companies control 4.5 million ha, or 13.6% of cultivated land in Ukraine.

In manufacturing, the share of large firms in employment is 54.2%, which is higher than in the EU (41.7%). Accordingly, the role of small and medium-sized firms in the EU is more important than in Ukraine, with the difference being especially big for small firms. Their share in employment in Ukraine is 10.1% while the corresponding figure for the EU is 19.6%.

In the IT sector, the share of large firms in employment is just 2.6%, based on data from financial statements. However, taking into consideration disguised employment, it is much larger. According to the dou.ua web portal, the total number of workers in the 50 largest Ukrainian IT firms is at least 40,000 (as of 2016, not including state-owned firms).[22] It is 43.6% of the total employment reported by official sources.[23] The employment share of large firms in EU's IT sector is 32%.

Figure 22. Distribution of employment by firm sizes in manufacturing in Ukraine and the EU.



Note: data as of 2015
Source: State Statistics Service of Ukraine Eurostat, Ruslana database, authors' calculations

[20] Source: https://dou.ua/lenta/articles/top-50-jan-2017/

[21] Because the share of real micro-sized firms is smaller than the data from financial reports shows.

[22] Source: https://dou.ua/lenta/articles/top-50-jan-2017/

[23] Source: State Statistics Service of Ukraine

More details on the distribution of employment are presented in the tables below.

Table 2. Distribution of firms by size in MAIT sectors of Ukraine and the EU.

	Ukraine				EU			
	Micro-sized	**Small**	**Mediu m-sized**	**Large**	**Micro-sized**	**Small**	**Mediu m-sized**	**Large**
Agriculture	89.3%	7.2%	3.1%	0.5%	n.a.	n.a.	n.a.	n.a.
Manufacturing	90.8%	6.2%	2.2%	0.8%	82.7%	13.2%	3.4%	0.8%
IT (official data)	99.4%	0.5%	0.1%	0.0%	94.4%	4.5%	0.9%	0.2%

Source: authors' computations, State Statistics Service of Ukraine, Eurostat, Ruslana database, dou.ua.
Note: official data for manufacturing and IT is for 2015, data for agriculture is for 2010 (latest available years), data from dou.ua is for 2016.

Table 3. Distribution of employment by firm sizes in MAIT sectors of Ukraine and the EU.

	Ukraine				EU			
	Micro-sized	**Small**	**Mediu m-sized**	**Large**	**Micro-sized**	**Small**	**Mediu m-sized**	**Large**
Agriculture	19.0%	17.9%	34.6%	28.5%	n.a.	n.a.	n.a.	n.a.
Manufacturing	17.7%	10.1%	18.0%	54.2%	13.3%	19.6%	25.7%	41.7%
IT (official data)	84.5%	7.8%	5.0%	2.6%	27.6%	19.6%	20.1%	32.0%
IT (estimates)	n.a.	n.a.	n.a.	43.6%				

Source: authors' computations, State Statistics Service of Ukraine, Eurostat, Ruslana database.
Note: data for manufacturing and IT is for 2015, data for agriculture is for 2010 (latest available years).

2.1.2. TFP growth and productivity. Entry, exit, and growth: lack of dynamics

- Productivity of new and young firms grows faster than that of mature firms. The trend for job creation is similar.
- There are a number of new firms that are large or medium-sized from the very beginning. Moreover, they account for most job creation.
- Mature firms contribute the most to job destruction (in comparison to young firms).

What firm level factors are associated with high TFP growth? According to Table 4, becoming an exporter or importer is associated with higher productivity growth. Firms that start exporting grow 5-6 percentage points more, while firms that start importing grow 1.9-2.9 percent faster. Moreover, firms that receive FDI grow 1-3.8 percentage points more. Also, when firms grew older, they find it more difficult to increase productivity.

Table 4. TFP growth and firm level characteristics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Lag TFP growth, %						-.405**	-.405**
						(.002)	(.002)
Exporter		5.831**			5.432**	6.051**	5.999**

		(.452)			(.460)	(.493)	(.493)
Importer			2.979**		1.944**	1.966**	1.907**
			(.426)		(.432)	(.457)	(.456)
FDI				1.475*	1.059	3.881**	3.848**
				(.698)	(.698)	(.759)	(.759)
Exit							-5.845**
							(.776)
Ln Firm age	-9.435**	-9.691**	-9.502**	-9.421**	-9.708**	-2.012**	-1.654*
	(.499)	(.499)	(.499)	(.499)	(.499)	(.714)	(.715)
Ln Employment	-.109	-.325	-.202	-.113	-.374	1.004**	.757**
	(.211)	(.212)	(.211)	(.211)	(.212)	(.259)	(.260)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	428335	428335	428335	428335	428335	339744	339744
R^2	.036	.037	.036	.036	.037	.183	.183

Robust standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$
The dependent variable is the change in the natural log of TFP. All regressions include firm fixed effects. The model is estimated by OLS. Exporter is a dummy variable that takes value of 1 if a firm exports and 0 otherwise. Importer is a dummy variable that takes value of 1 if a firm imports and 0 otherwise. FDI is a dummy variable that takes value of 1 if a firm a positive stock of foreign direct investments and 0 otherwise. Exit is defined as 1 if a firm exits an industry between periods t and t+1.

Comparing across firms in the same sector, Table 5 shows that new and young firms grow considerably faster. Also, small firms find it difficult to grow. However, once the firm is medium size, it grows 0.7-2.1 percentage points faster than large firms.

Table 5. Productivity growth, age, and size

	(1) Main	(2) +Exporter	(3) +Importer	(4) +FDI	(5) +All controls	(6) +Lagged TFP	(7) +Exit
New	21.32**	21.35**	21.28**	21.30**	21.33**	52.87	52.57
	(.966)	(.966)	(.965)	(.966)	(.965)	(28.465)	(28.394)
Young	2.563**	2.558**	2.517**	2.536**	2.535**	1.921**	1.972**
	(.218)	(.218)	(.218)	(.218)	(.218)	(.237)	(.237)
Small	-.336	.679*	.329	-.249	.850**	.621*	.825**
	(.247)	(.264)	(.263)	(.250)	(.270)	(.279)	(.279)
Medium	.694**	1.408**	1.175**	.751**	1.534**	2.033**	2.119**
	(.175)	(.186)	(.186)	(.176)	(.190)	(.190)	(.190)
Observations	428337	428337	428337	428337	428337	339744	339744
R^2	.026	.026	.026	.026	.026	.123	.123

Robust standard errors in parentheses. Dependent variable is the change in natural log of TFP.
* $p < 0.05$, ** $p < 0.01$
Notes: A new firm is defined as a 1 year old frim. A young firm is from 2 to 5 year old. A small firm is below 10 people, medium firm is between 10 and 99 people. Exporter is a dummy variable that takes value of 1 if a firm exports and 0 otherwise. Importer is a dummy variable that takes value of 1 if a firm imports and 0 otherwise. FDI is a dummy variable that takes value of 1 if a firm has foreign direct investments and 0 otherwise. Exit is defined as 1 if a firm exits an industry between periods t and t+1. The baseline is the category of mature and large firms. We also control for export and import status, FDI, exit of old firm and year, industry fixed effects. All regressions include firm fixed effects. The model is estimated by OLS.

Productivity

According to Table 5, relative to mature firms (6 years or older), new firms tend to have more than 20 percentage points higher growth in productivity, while young firms (1-5 years old) grow 1.9-2.6 percentage points more than mature firms. Relative to large firms, medium size firms have robustly superior productivity growth of 0.7-2.1 percentage points, while small firms struggle to grow, which highlights a serious problem in the economy. Without successful transition from small to medium size enterprises, Ukraine fails to achieve healthy growth.

Table 6. Who created jobs in Ukraine between 2001-2016?

Category:	**Size:**			
Sector and age	**Large**	**Medium**	**Small**	**All**
Agriculture				
Mature	-310,038	-408,916	-458,285	-1,177,239
New	113,021	62,805	1,963	177,789
Young	-2,517	-110,360	-232,076	-344,953
Total	-199,534	-456,471	-688,398	-1,344,403
Manufacturing				
Mature	-475,643	-287,318	-1,008,670	-1,771,631
New	246,668	137,917	16,473	401,058
Young	237,966	159,392	-291,105	106,253
Total	8,991	9,991	-1,283,302	-1,264,320
Information Technology				
Mature	5,742	4,255	-34,987	-24,990
New	2,703	9,588	5,201	17,492
Young	10,363	15,958	-6,785	19,536
Total	18,808	29,801	-36,571	12,038

Notes: Job creation is reported as number of people. Crimea, Donetsk, and Luhansk are not included. New firm is defined as a 1 year old frim. Young firm is a firm that is from 2 to 5 year old. Mature firms are older than 5 years

Employment, job creation, and job destruction

Table 6 presents a breakdown of net job creation in Ukraine between 2001-2016. New and young firms were strong job creators, generating more than 300,000 jobs, while mature firms lost almost 3 million jobs between 2001-2016.

Table 7 shows factors that contribute to job creation and destruction. New and young firms generate more jobs relative to mature companies. Small and medium size firms are more successful in creating jobs than large firms. Importers create 3 percent more jobs than non-importers. Exporters show no robust pattern in job creation, while firms with FDI mostly generate 1.3-2.3 percent more jobs then firms without FDI.

Job creation persists over time; firms that created more jobs last year are more likely to add jobs this year as well, as indicated by positive and significant coefficient of lag job creation in columns (1) and (2).

Columns (2) and (3) of the Table 7 demonstrate factors contributing to job destruction. New and young firms destruct fewer jobs. Interestingly, small and medium firms destruct proportionally more jobs than large companies do. Small firms are particularly strong in destructing jobs, which demonstrates their vulnerability relative to larger companies. Importers destroy significantly fewer jobs (4.5-7.2 percent fewer), while exporters and firms with FDI destroy fewer jobs only if we do not control for exit. Also, job destruction is not as persistent as job creation, as indicated by flipping sign and small coefficient of lagged job destruction in models (3) and (4).

Table 7. Job creation and destruction

	(1)	(2)	(3)	(4)
Dependent variable:	Job creation		Job destruction	
Lagged value of the dependent variable	.0528** (.001)	.0616** (.001)	-.0505** (.002)	.00802** (.002)
Exporter	-.775** (.149)	-1.122** (.149)	-2.185** (.174)	.107 (.155)
Importer	3.677** (.163)	3.195** (.162)	-7.187** (.169)	-4.573** (.147)
FDI	2.332** (.213)	1.325** (.212)	-2.788** (.296)	2.921** (.274)
Exit		-3.863** (.132)		35.33** (.268)
New	10.75** (.341)	20.00** (.482)	-15.60** (.418)	-12.17** (.367)
Young	6.247** (.087)	7.150** (.100)	-2.333** (.166)	-3.669** (.128)
Small	-.605** (.112)	1.895** (.119)	47.96** (.158)	22.57** (.129)
Medium	3.755** (.106)	3.422** (.106)	4.409** (.099)	4.304** (.091)
Observations	958003	824670	958003	824670
R^2	.038	.048	.135	.131

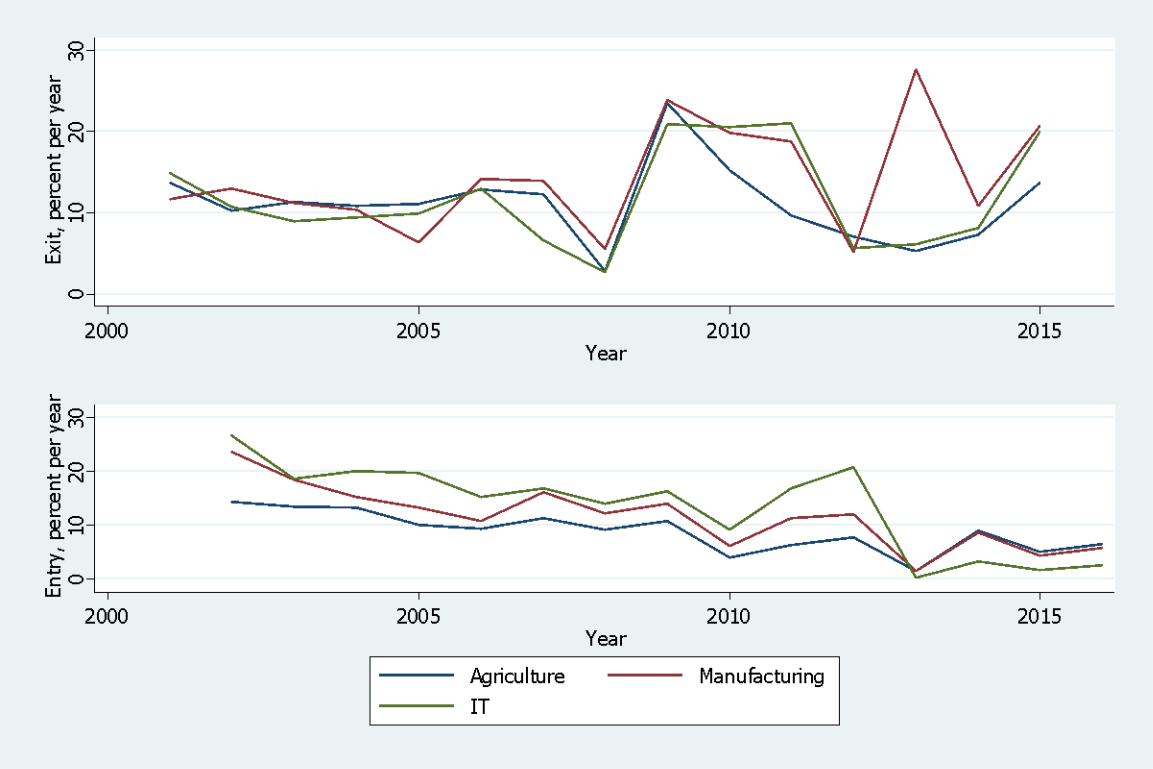
Robust standard errors in parentheses. Dependent variable is rate of job creation in percent.
* $p < 0.05$, ** $p < 0.01$
Notes: New firm is defined as a 1 year old frim. Young firm is a firm that is from 2 to 5 year old. Small firm is below 10 people, medium firm is between 10 and 99 people. Exporter is a dummy variable that takes value of 1 if a firm exports and 0 otherwise. Importer is a dummy variable that takes value of 1 if a firm imports and 0 otherwise. FDI is a dummy variable that takes value of 1 if a firm has foreign direct investments and 0 otherwise. Exit is defined as 1 if a firm exits an industry between periods t and t+1. The baseline is the category of mature and large firms. We also control for export and import status, FDI, exit of old firm and year, industry fixed effects. All regressions include firm fixed effects. The model is estimated by OLS.

Dynamics of entry and exit

The entry rate in the IT sector was the highest between 2001-2013 and has dropped since, while in agriculture it was the lowest for most of the period (Figure 23). The entry rate was higher at the beginning of the period and reached the minimum in 2013, when it started to pick up again. The exit rates were similar in all sectors and experienced spikes between 2009-2010 and between 2013-2015. Exit of

firms in manufacturing between 2013 and 2014 was particularly high due to political instability and the conflict in Eastern Ukraine, where a large part of the manufacturing base is located. Agricultural and IT firms were less affected.

Figure 23. Exit of firms, entry of firms between 2001-2016

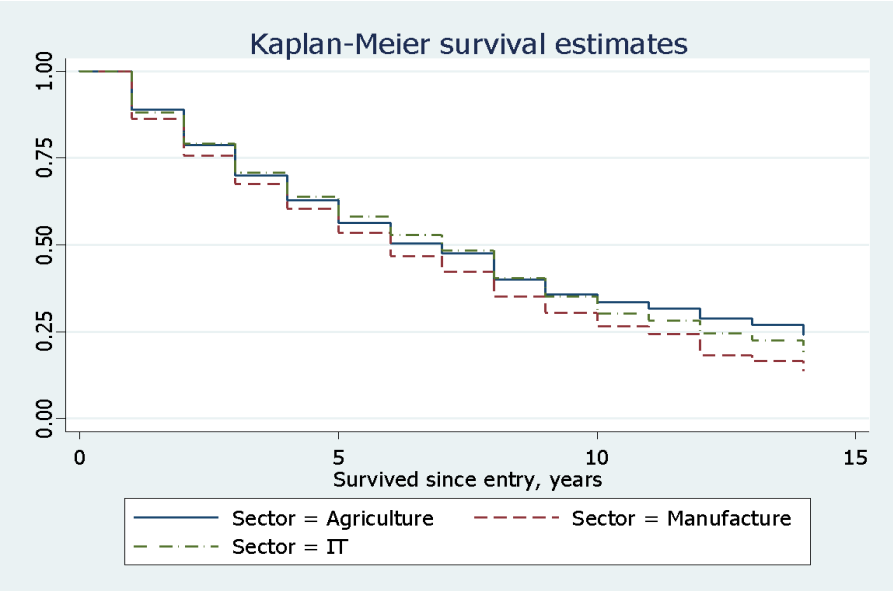


Source: Author's computations based on Ruslana database. Crimea, Donetsk, and Luhansk are not included.

Firm survival analysis

Figure 24 reports firms' survival rates since their creation or since the beginning of the sample in 2001 (whichever comes later) reported separately for different sectors. There is around an 88% chance that a firm survives after its first year. After ten years, 28 percent of firms survive in Manufacturing, 32 percent in IT, and 35 percent in Agriculture.

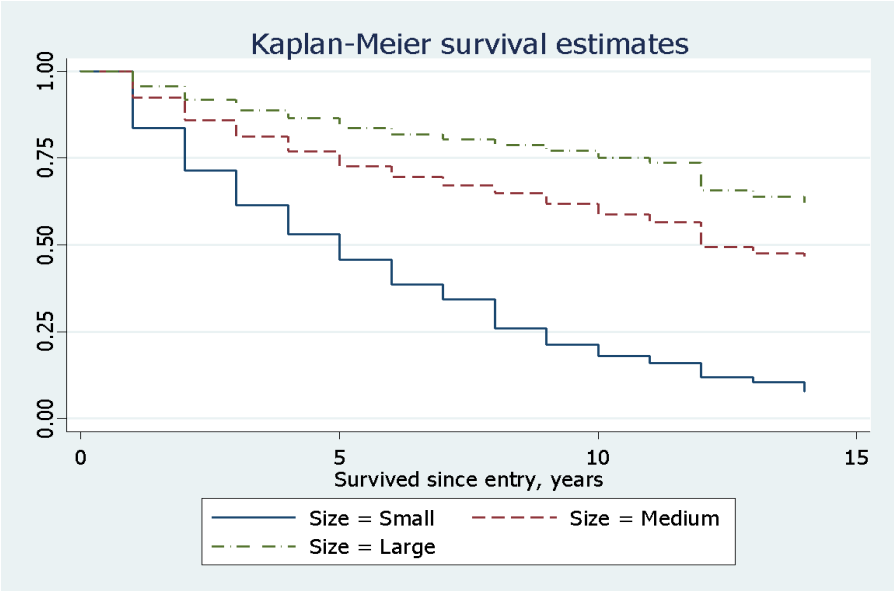
Figure 24. Firm survival in Ukraine between 2001-2016 by sector



Source: Author's computations based on Ruslana database. Crimea, Donetsk, and Luhansk are not included.

Figure 25 reports survival rates for firms of different sizes. Smaller firms are less likely to survive. The survival rate after the first year is 84 percent for small firms, while 96 percent for large firms. After ten years, survival rate for small firms is 19 percent, for medium size firms is 60 percent, and for large firms is 75 percent.

Figure 25. Firm survival in Ukraine between 2001-2016 by firm size



Source: Author's computations based on Ruslana database. Crimea, Donetsk, and Luhansk are not included.

2.2. Perspective of the industry leaders

We conducted 16 in-depth interviews with the firms leading MAIT exports - 5 in agricultural sector, 7 in manufacturing, 4 in IT – and 2 interviews with infrastructure business experts and business leaders. Top business executives of the largest Ukrainian companies were asked about their perspective on key issues that drive and prevent Ukrainian exporters from exporting more and adding more to the growth Ukrainian economy.

Factors that were mentioned as hampering exports can be roughly divided into 4 groups:

1. Demand side factors
2. Supply side factors
3. Critical infrastructure
4. Trade barriers

Demand side factors.

- Low demand inside of the country limits exporting potential **(manufacturing).**

Several interviewees mentioned low demand for their products in Ukraine as a limiting factor for growing their exports. This concern arose in two contexts: first, as a liquidity issue, second, as a structural problem in the economy that prevents businesses from implementing their strategies.

Liquidity. Companies whose revenues were mostly earned abroad – as mentioned by one of the respondents - cannot rely on the Ukrainian market as a place for development. Electrical equipment, motor vehicles and transport equipment production companies are the case in point. These industries were dependent on exports to Russia and Post-Soviet countries before the crises and were selling only a small portion in Ukraine. After losing the Russian market, many companies faced a post-crisis period wherein their financial sustainability was demolished, and they lacked the liquidity to recover from the significant reduction of sales in foreign markets.

One of the fundamental Ukrainian industries – metallurgical – illustrates the issue from another angle. Unlike the differentiable high value-added products mentioned above, many positions in the line of basic metals are commodities that can be sold on international commodity exchanges. Diversifying sales is relatively easy for commodities. But the market power of sellers is very low, thus buyers switch their suppliers easily too. As a result, unfavorable periods in the international markets lead to significant drops in the sales of many companies in the sector. Squeezed between the downward pressure on prices in the global market and the rising cost of labor in the local market, Ukrainian companies are having hard times. The transformations needed to increase productivity and diversify the portfolio of products seem especially hard to implement without predictable revenue streams inside of the country.

Structural problems of the economy. Some respondents spoke about attempts to expand their businesses which didn't succeed because of non-market forces that shaped market structures in Ukraine.

One of those examples is the inefficient markets in the downstream value chain. Some equipment and machinery producers mentioned that output markets where they can work abroad – mining, electricity, gas supply, water supply, transports - are very thin in Ukraine because of low capital investments of the respective companies and underdeveloped markets.

As an example, the renewable energy market is much smaller in Ukraine than in every other European country (but Russia): while renewable energy takes only 3.5% of total energy consumption in Ukraine, it takes on average 10% in rest of countries. Some industry representatives explained this phenomenon was caused by the strong influence of the coal mining industry.

Another example refers to the natural gas market where consumers and intermediaries' debts leave the key state sector monopolist – NAK "Naftogaz" – in a risk of insufficient liquidity and inability to operate. The current total volume of debts accumulated by the intermediaries that sell gas and heating to consumers constitutes around USD 3.4 bln. This debt is more than all the value of fixed assets of construction industry or information & telecommunication industry. Although the Naftogas budget gap is covered by transit

money, the financial situation of the company is unhealthy and extremely vulnerable to the geopolitical situation and transit incomes. This also prevents the energy sector from modernizing, increasing efficiency, and eventually expanding the output markets for local industries.

- High value-added markets have high entry barriers **(manufacturing, IT)**

Several respondents from the metallurgy sector mention that entering higher value-added sectors is very difficult and risky due to the barriers existent in these sectors. Firstly, higher value-added production is performed by current clients of the metal products manufacturers, thus making competition at the downstream risky for their major businesses. Secondly, large final products markets are quite dense (f.e, metals and metal products are used in construction, automotive, domestic appliances, energy, transport, packaging), with rather long-term relations between buyers and suppliers and occupied by large and strong companies.

Similar reasoning was used by IT sector representatives. Ukrainian IT companies have strong positions in the IT-services business segment. It is usually thought that the IT-products segment is a higher value-added. However, the contract schemes with global purchasers assume that intellectual ownership for the product stays with the purchaser. This reduces opportunities to implement product-based (vs service-based) business models.

Supply side factors

- Deficit of human capital **(agriculture, manufacturing)**

Almost every respondent from the agriculture and manufacturing sectors referred to the problem of personnel deficit. Large enterprises with high turnover rates spend a lot of time and resources on preparing people for the entry jobs because educational system – especially vocational training schools – don't prepare youth for real business needs. However, the return on this investment is going down with more and more blue-collar workers and engineers emigrating to the neighboring countries.

Metallurgy enterprises – in accordance with the State Statistics Service data – had to respond to this labor market dynamic by increasing the real wages of their workers. Currently, the average wage of a metallurgy worker might range from USD 300 to USD 450 per month – almost twice as high as the country average wage. Some of our respondents mentioned their plans to raise wages to the level of those in Poland by the end of 2019. Some agrisector representatives also referred to possible wage increases to average European level.

- Monopolization and inefficiency of key input markets increase the cost of doing business, cost of production, and puts contracts with buyers at risk **(agriculture, manufacturing).**

Monopolization of fertilizers market. One of the key input markets for agriculture is the market of fertilizers. Traditionally, the Ukrainian market of fertilizers relied mostly on Russian and Belarussian producers, and – to a smaller extent – on inhouse production. 2015-2017 brought a deficit and payments crisis in the fertilizers market, which put many producers at risk of disruption of sowing. The main reason was probably an import ban on Russian products which resulted in the reduction of imports of fertilizers from Russia, and breakdowns in access to natural gas – a core element for nitrogen fertilizers production. Consequentially, Ukrainian producers that enjoyed a monopolistic position on the market used the situation to increase prices in the whole market and were able to charge high prepayments. This strategy, though, didn't allow local producers to ensure undisrupted supplies, leaving several agriholdings both without prepayment and without fertilizers. The situation in the market was further aggravated by the eventual ceasing of operations of the monopolistic producer and an investigation against this industrial group that was led by the antimonopoly committee.

Over many years, the market of fertilizers was hostile to producers outside of Russia, Belarus and Ukraine. Firstly, Ukraine maintained import duties that restricted imports from EU and USA. Fertilizers and agri chemistry are also subject to state registration, unless they come from the list with preferential treatment[24]. Thus, there were certain barriers to entry. In 2017 the government cancelled import duties for foreign fertilizers but introduced anti-dumping measures. At the same time, the government introduced an import ban on ammonium sulfate – one of the types of nitrogen fertilizers which was traditionally imported from Russia. At the beginning of 2018, the situation has been mixed: although the largest local producers relaunched production in 2017 and started concluding contracts with agi-producers, and an increase in imports was noted, many agri-producers were still claiming that the deficit on the market remained, and producers were financially constrained.

Lack of localization in agricultural equipment production results in higher total cost of ownership and sub-optimal leasing schemes. Other inputs of agriculture production – equipment and agrichemistry – are more competitive markets. Agrichemistry is either imported or bought locally from the foreign companies which localized production in Ukraine. Equipment is primarily imported – foreign producers prefer not to locate production capacities in Ukraine – and mostly leased. Some agri-producers argue that the lack of localization of equipment and machinery production leads to a higher total cost of ownership because of the weaker technical support and the need to administrate long-term leasing agreements. At the same time, the governmental program which subsidizes agri-producers that buy equipment and machinery of the local producers didn't achieved popularity.

One of the critical metallurgy inputs market – scrap metal – is inefficient, experiences deficit, frequently exposes buyers to legal investigations from control bodies. Volumes of the scrap metal have been falling over the years. Deficit internal scrap metal market is losing large chunks of exports to Europe, primarily Turkey. The market is black and insecure and imposes compliance risks on enterprises. Scrap price in the internal market is lower than price of imports. Several respondents mentioned that they considered the situation in the market unfair and strategically damaging for Ukraine. Some industry representatives promoted introduction of exports duties to restrict outflow of the scrap metal from Ukraine. Proponents of this measure suggested that without this measure, Ukrainian companies suffer double disadvantage: firstly, buying scrap at higher prices due to market deficit caused by exports outflows to some EU countries, secondly, paying imports duties on metal products in EU and other countries. Opponents suggest that metallurgy industry is interested in keeping prices low to earn higher margins. Putting trade measures aside, inefficiency of the scrap metal market is a significant bottle neck for the value-added metallurgy.

Being under pressure of global price reduction, companies will have to leverage their costs and improve technology. In this regard, inefficiencies of the scrap metal market will bight the chunks of salaries fund.

- Long-term loan from the bank is difficult to get, and it is very costly **(agriculture)**. Lack of instruments that can support usual business cycle of IT companies (post-payment schemes) **(IT)**.

There are mixed reflections of the market participants about the access to finance. While some are saying that the agrisector is overloaded with the loans that were received before the last crises, others feel the lack of access to the long-term loans. Access to long-term loans is said to be restricted by the inability to use the major asset - land – as a collateral and by the high cost of loans in Ukraine. According to the majority of our respondents this is a primarily bottleneck for higher value-added businesses development.

IT sector representatives mention that there are no financial services in the market that meet their needs and are open to them. Banks loans are usually not an option for IT firms because they would rarely have

[24] The law of Ukraine 867-19 as of 08.12.2015 "On Amendments to Certain Legislative Acts of Ukraine Concerning Deregulation in the Agriculture". Source: http://zakon3.rada.gov.ua/laws/show/867-19

any collateral. Access to quick and affordable short-term loans could possibly improve the vitality of the IT firms that experience cash deficit while implementing long-term projects with ex-post payments.

- High cost of administration and handling regulation in several jurisdictions **(agriculture).**

Interviewees made some reference to the cost of administration and the specificities of managing a corporation containing a large group of companies, but the context of references differs. Some noted high costs of administration, which influence the cost of production. This stems from the need to maintain financial accounting, bookkeeping, security, management of lease agreements and lawyers for every legal entity in Ukraine and for authorities in other jurisdictions (where group` companies are registered) along with the group` financial and managerial accounting for the shareholders and top-management. Administrative mark-up in the cost of produced goods might also include costs related to managing numerous interactions with the control bodies and law enforcement agencies. "While in US, the number of persons employed per 1 thousand ha of land is 2-4, in UA it is around 10" – said one top-manager.

Others noted the high cost of administration in relation to the cumbersome rules of financial reporting and dealing with the banking sector and financial regulation. It is said that Ukrainian procedures misrepresent business performance and expose "unreasonably high" proportions of costs and revenues to taxation. Considering that most agriholdings have some degree of international exposure, financial reports of all legal entities would need to be consolidated and translated to the "language" of international financial standards.

All interviewees mention corruption and poor property rights protections as big issues. Poor property rights protections hinder the possibility of exercising ownership and management of the assets, shareholding, and wealth holding and thus they are important reasons to use jurisdictions like Cyprus for commercial transactions and storing wealth, ownership rights and companies' profits. It seems that large companies try to "outsource" the English law for commercial transactions worldwide, cheap services related to having a company, and certain reluctance of Cyprus authorities to share sensitive information with post-Soviet states. Off course, equally important are tax advantages provided by the double tax treaty (DTT) with Cyprus and many other DTTs (Mylovanova, 2014).

Critical infrastructure

- Deficit of infrastructure, high transportation cost through railways, low capacity of river routs **(agriculture, manufacturing).**

Rail-road is frequently called a bottleneck. It is said that the state monopoly "Ukrzaliznytsia" lacks the wagons and the locomotives to transport the commodities to the seaports and customs points. Some agri-producers consider the railway tariffs to be too high. Many argue that the capital investments were extremely low in the recent years, while the load was growing. To find an alternative to the railway, traders or producers use roads or search for customized solutions, for instance, buying their own wagons or building transshipment terminals on the river and building ships[25]. Access to railway differs by geographical locations. Transportation from the Southern regions of Ukraine is most frequently carried out by the roads which results in their destruction.

The river is said to be underused. It could in principle become a cheaper alternative to railways and roads, but it is not. There have been limited attempts of the government to develop the river, business solutions

[25] "Nibulon" agroholding has built two transshipment terminals on the Dnipro River in Zaporizhzhia and Kherson regions, an elevator complex in Svatove town (Luhansk region), enlarged the capacities of the transshipment terminal of "Kozats'ka" branch in Kherson region. The company implements its shipbuilding program and carries out modernization of shipbuilding and repair yard.

are lacking as well. Perhaps, the cost of damage caused (or expected to be caused) by the infrastructural bottlenecks is not that significant to make it more profitable to invest in the development of the alternatives.

Several producers mentioned the problem with the capacity of the sea-ports infrastructure, lacking coordination between the technical characteristics of the adjacent routs, lacking capacity to accommodate large vessels.

Trade barriers

- Trade barriers **(agriculture, manufacturing)**

Many interviewees mention unfair trade barriers against Ukrainian agri-producers. Important questions are whether these barriers correspond to international agreements, and whether they put Ukraine in a disadvantaged position asymmetrically.

Frequently Ukrainian producers find themselves in a weak position even on open markets like MEA when competing with subsidized producers from Europe (eg. France). This is competitive market, so subsidies decrease the margins, which is also not certain because of the other costs elements that might be lower.

Metallurgy industry manufacturers also mentioned trade barriers as an obstacle for further development of their businesses. Non-tariff barriers in this sector include measures that were imposed by the countries or even specific companies unilaterally outside of international trade discussion table. Thus, Ukrainian producers mentioned behavior of Ukrainian government as rather reactive and poorly informed which made position of the country weak on the global arena.

Other interviewed manufacturers (food) didn't mention trade barriers explicitly, but they mentioned country "landed costs", total price of a product once it has arrived at a buyer's door[26], which characterizes total costs related to trade with the country. Some manufacturers appeared to be even more advanced and opened companies in EU counties to trade with the EU from the EU.

Almost every interview mentioned a week country position in negotiations, poor country reputation. IT refers to the lack of government support in competition with neighboring markets like Romania or Belarus. Such situation is especially problematic due to the high mobility of personnel. From the perspective of some IT industry players Ukraine is losing an opportunity to create a global hub for high-tech services and products.

2.3. Competition: small de-monopolization

The Ukrainian economy is commonly perceived as a having a high degree of monopolization. For instance, (Gianella & Tompson, 2007), based on data provided by the Antimonopoly Committee of Ukraine, state that the country has a high degree of concentration, especially at the regional level. However, quantitative studies on the topic are scarce.

This study makes a limited effort to estimate the degree of concentration in MAIT sectors given the available data and resources.[27] The Herfindahl-Hirschman Index (HHI) is calculated for 4-digit KVED subsectors of agriculture, manufacturing, and IT. The analysis is limited to MAIT subsectors with annual

[26] The landed cost includes the original price of the product, all transportation fees (both inland and ocean), customs, duties, taxes, insurance, currency conversion, crating, handling and payment fees, etc – whatever is relevant to the jurisdiction and product.

[27] A proper estimation of a degree of concentration requires more precise definitions of markets (of goods and services). It also has to take into account affiliation links between firms, exports, imports, and other data, which is not available.

net sales of more than UAH 1 bln (EUR 35.4 mln)[28] to alleviate shortcomings caused by possible gaps in the data.

The present study has three main findings:

- concentration levels vary greatly across MAIT, with agriculture and IT apparently having mostly non concentrated markets, at least at the national level,
- degree of concentration does not largely depend on subsector's capital intensity, which suggest existence of barriers to entry other than high entry costs,
- between 2010-2016, concentration levels did not change substantially in most of MAIT subsectors; yet, in a number of subsectors concentration decreased, and the quantity of those subsectors is greater than the one where concentration increased,
- unconcentrated subsectors grew faster than concentrated ones, both in terms of sales and employment.

More detailed findings are discussed below.

Agriculture: rather competitive at the national level

Data derived from financial statements shows that most subsectors of Ukrainian agriculture are competitive. 10 out of 13 subsectors had an HHI less than 0.1, which place them in the category of non-concentrated markets.[29] The largest subsector of agriculture by net sales, growing of cereals (except rice) and oil seeds, is also the least concentrated one. Its HHI is only 0.002. The most concentrated subsectors of agriculture are:

- raising of poultry (KVED code 01.47), where the HHI is equal to 0.11,
- raising of non-dairy cattle (KVED code 01.42), where the HHI is 0.19, and
- post-harvest crop activities (KVED code 01.63), where the HHI is 0.45.

Those results, however, do not take into consideration affiliate links between legally separate firms, and the presence of large agricultural holdings, which have been concentrating land plots in Ukraine over the last 15 years. As of 2017, 0.5% largest agri-holdings (approx. 200 agri-producers out of 42 000[30]) control more than 18% of agricultural land (3.5 mln ha) in the country. The two largest holdings, "Kernel" and "Ukrlandfarming", control about 0.6 mln ha each and occupy 12th and 13th positions, respectively, in the ranking of the world's largest land operators, compiled by the Land Matrix Global Observatory.[31] The aforementioned high level of concentration in the subsector of post-harvest crop activities can be explained by the decision of one holding, "Torgagro Solution", to consolidate its financial activity in one firm using an unusual (for such holding companies) industrial code to report the results.

[28] Based on the average official exchange rate for 2016.

[29] This study uses the following definitions:

- unconcentrated market: HHI < 0.1,
- moderately concentrated market: 0.1 <= HHI < 0.2,
- highly concentrated market: HHI >= 0.2,
- small decrease/increase: the HHI increased or decreased by from 0.015 to 0.025, respectively,
- large decrease/increase: the HHI increased or decreased by 0.025 or more.

Those definitions are derived from the definitions from the EU's 'Guidelines on the assessment of horizontal mergers under the Council Regulation on the control of concentrations between undertakings'.
Source: https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=celex%3A52004XC0205%2802%29

[30] According to the data of the World Bank project "Capacity Development for Evidence-Based Land & Agricultural Policy Making" implemented by the KSE: http://www.kse.org.ua/uk/research-policy/land/analytical/?newsid=1939

[31] Source: https://agropolit.com/news/5722-dva-ukrayinski-agroholdingi-u-spisku-svitovih-top-lideriv-za-obsyagami-zemelnogo-banku

Nevertheless, it may be argued that even taking into account affiliation relationships Ukraine's grain-growing industry can still be considered as non-concentrated, at least at the national level. In 2016, the total area of land under cereal and oilseed crops in Ukraine was 20.9 mln ha, and the largest holding's land banks were not sufficient to provide them oligopolistic or monopolistic market power. Based on the Herfindahl-Hirschman Index (HHI), a market can be deemed as moderately concentrated if, for example, one firms control at least 32% of the market or two firms has market shares of at least 22% each. A market is defined as highly concentrated if the largest firm controls at least 40% of the market.

That being said, a few reservations should be made:

- concentration in Ukraine's agriculture is still higher than in the corresponding sector of the EU economy, which is mostly populated by tiny farms,
- concentration can be substantially higher at the regional level,
- high levels on concentration can be present in the agriculture-related markets, such as grain storage market.

In 2016, degrees of concentration in 4 out of 13 agricultural subsectors were substantially lower than in 2010 (the HHI was smaller by at least 0.025 points). In 2 industries, they were substantially higher (Table 8). One subsector moved from the 'moderately concentrated' category to the 'unconcentrated' category (mixed farming). At the same time, three subsectors moved to upper concentration categories (the ones mentioned above as the most concentrated subsectors of agriculture) (See Table 8)

Manufacturing: mixed trends

In manufacturing, degrees of concentration vary widely. As of 2016, 56 of manufacturing subsectors are unconcentrated, 31 are moderately concentrated, and 44 are highly concentrated.

Among the largest subsectors, with 2016 total net sales exceeding UAH 10 bln (EUR 354 m), the least concentrated sectors are:

- operation of dairies and cheese making (KVED code 10.51), with the HHI of 0.03,
- manufacturing of concrete products for construction (KVED code 23.61), with the HHI of 0.04,
- manufacturing of bread, fresh pastry goods and cakes (KVED code 10.71), with the HHI of 0.04.

The most concentrated among the largest manufacturing subsectors are:

- manufacturing of prepared feeds for farm animals (KVED code 10.91), with the HHI of 0.43,
- manufacturing of fruit and vegetable juice (KVED code 10.32), with the HHI of 0.48,
- manufacturing of refined petroleum products (KVED code 19.20), with the HHI of 0.64.

It may be supposed that the degree of concentration depends on capital intensity because barriers to entry are higher in more capital-intensive industries. However, the data show that the relationship between market concentration and capital intensity in Ukraine's manufacturing is weak. Linear (Pearson's) correlation between the HHI and capital intensity (measured as ratio of capital to sales) is statistically insignificant at conventional levels. Non-linear (Spearman's) correlation is statistically significant at 1% level but low (0.24). This suggests existence of barriers to entry other than high capital-related entry costs.

Table 8. Changes in concentration in 4-digit KVED between 2010-2016.

	Large decrease	Small decrease	No change	Small increase	Large increase
			Agriculture		
Unconcentrated in 2010	2	1	5		2
Moderately concentrated in 2010	1	1			
Highly concentrated in 2010	1				
			Manufacturing		
Unconcentrated in 2010	8	5	28	7	
Moderately concentrated in 2010	18	2	5	3	8
Highly concentrated in 2010	28	3	3	2	11
			IT		
Unconcentrated in 2010	1		2		
Moderately concentrated in 2010					
Highly concentrated in 2010	1				

Notes:

- *Unconcentrated market: HHI < 0.1,*
- *Moderately concentrated market: 0.1 <= HHI < 0.2,*
- *Highly concentrated market: HHI >= 0.2,*
- *Small decrease/increase: the HHI increased or decreased by from 0.015 to 0.025, respectively,*
- *Large decrease/increase: the HHI increased or decreased by 0.025 or more.*

Source: authors' calculations, Ruslana database.

In 2016, the degrees of concentration in 54 out of 131 manufacturing subsectors were substantially lower than in 2010. In 19 subsectors, they were substantially higher (see Table 9). Changes were not substantial in 58 subsectors. 25 subsectors moved to lower concentration categories, but 15 transitioned to upper ones. See Figure 10, for more details.

Table 9. Transition of 4-digit KVED subsectors between concentration categories between 2010-2016.

	Unconcentrated in 2016	Moderately concentrated in 2016	Highly concentrated in 2016
		Agriculture	
Unconcentrated in 2010	8	2	
Moderately concentrated in 2010	1		1
Highly concentrated in 2010			
		Manufacturing	
Unconcentrated in 2010	43	3	2
Moderately concentrated in 2010	12	16	8
Highly concentrated in 2010	1	12	34
		IT	
Unconcentrated in 2010	3		

Moderately concentrated in 2010	
Highly concentrated in 2010	1

Notes:

- *Unconcentrated market: HHI < 0.1,*
- *Moderately concentrated market: 0.1 <= HHI < 0.2,*
- *Highly concentrated market: HHI >= 0.2,*

Source: authors' calculations, Ruslana database.

IT: largely unconcentrated industry

The IT sector has four subsectors with 2016 total net sales exceeding UAH 1 bln (EUR 35.4 m). As of 2016, all of them are unconcentrated, although two sectors are close to the limit of moderately concentrated category. The HHI for IT subsectors are the following:

- 0.04 for computer programming activities (KVED code 62.01),
- 0.02 for computer consultancy activities (KVED code 62.02),
- 0.096 for other information technology and computer service activities (KVED code 62.09),
- 0.096 for data processing, hosting and related activities (KVED code 63.11).

In 2010, other information technology and computer service activities were in the category of highly concentrated subsectors but as of 2016 it moved to the category of unconcentrated ones.

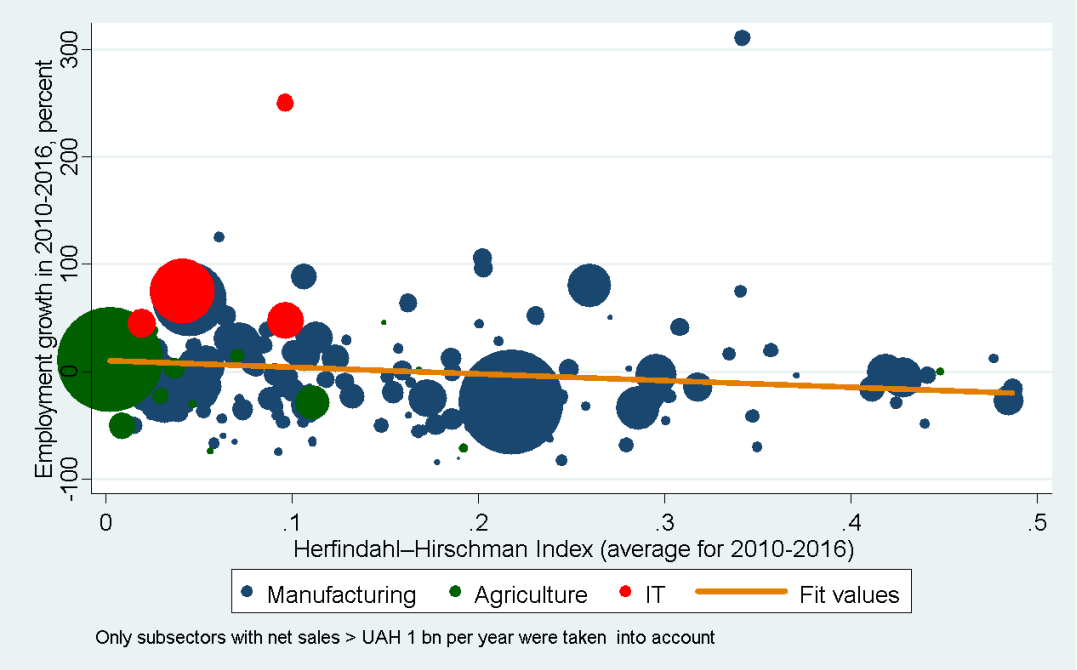
Table 10. Herfindahl-Hirschman Indices for 4-digit KVED subsectors (with 2016 net sales exceeding UAH 10 bln), in 2010 and 2016.

KVED code	Sector name	Net sales in 2016, EUR m	HHI 2010	HHI 2016	Difference
	Agriculture				
01.11	Growing of cereals (except rice), leguminous crops and oil seeds	10,395	0.00	0.00	0.00
02.20	Logging	372	0.01	0.01	-0.01
01.41	Raising of dairy cattle	611	0.00	0.01	0.00
01.46	Raising of swine/pigs	372	0.04	0.04	0.00
01.47	Raising of poultry	1,007	0.08	0.11	0.04
	Manufacturing				
10.51	Operation of dairies and cheese making	1,379	0.02	0.03	0.01
23.61	Manufacturing of concrete products for construction	486	0.03	0.04	0.00
10.71	Manufacturing of bread, fresh pastry goods and cakes	584	0.03	0.04	0.01
10.41	Manufacturing of oils and fats	2,471	0.07	0.04	-0.02
18.12	Other printing	392	0.09	0.05	-0.04
10.13	Production of meat and poultry meat products	646	0.04	0.05	0.01
10.81	Manufacturing of sugar	395	0.05	0.05	0.01
10.61	Manufacturing of grain mill products	568	0.02	0.05	0.03
22.21	Manufacturing of plastic plates, sheets, tubes and profiles	458	0.12	0.05	-0.06
22.22	Manufacturing of plastic packing goods	420	0.07	0.07	0.00
21.20	Manufacturing of pharmaceutical preparations	848	0.07	0.07	0.00
16.21	Manufacturing of veneer sheets and wood-based panels	466	0.15	0.11	-0.05
11.01	Distilling, rectifying and blending of spirits	514	0.10	0.11	0.01
17.21	Manufacturing of corrugated paper and paperboard	484	0.05	0.11	0.07
24.20	Manufacturing of steel tubes, pipes, and related fittings	617	0.24	0.17	-0.06
11.05	Manufacturing of beer	601	0.27	0.21	-0.06
24.10	Manufacturing of basic iron and steel and of ferro-alloys	5,053	0.20	0.22	0.02

20.15	Manufacturing of fertilisers and nitrogen compounds	842	0.54	0.26	-0.28
10.82	Manufacturing of cocoa, chocolate and confectionery	817	0.26	0.29	0.02
10.12	Processing and preserving of poultry meat	519	0.31	0.29	-0.01
12.00	Manufacturing of tobacco products	754	0.33	0.30	-0.03
19.10	Manufacturing of coke oven products	377	0.34	0.32	-0.02
30.30	Manufacturing of air and spacecraft	574	0.47	0.42	-0.05
10.91	Manufacturing of prepared feeds for farm animals	713	0.20	0.43	0.23
10.32	Manufacturing of fruit and vegetables juice	364	0.34	0.48	0.15
19.20	Manufacturing of refined petroleum products	1,058	0.38	0.64	0.26
	IT				
62.01	Computer programming activities	989	0.03	0.04	0.01

Source: authors' calculations, Ruslana database.

Figure 26. Sales growth vs. market concentration in MAIT subsectors between 2010-2016.

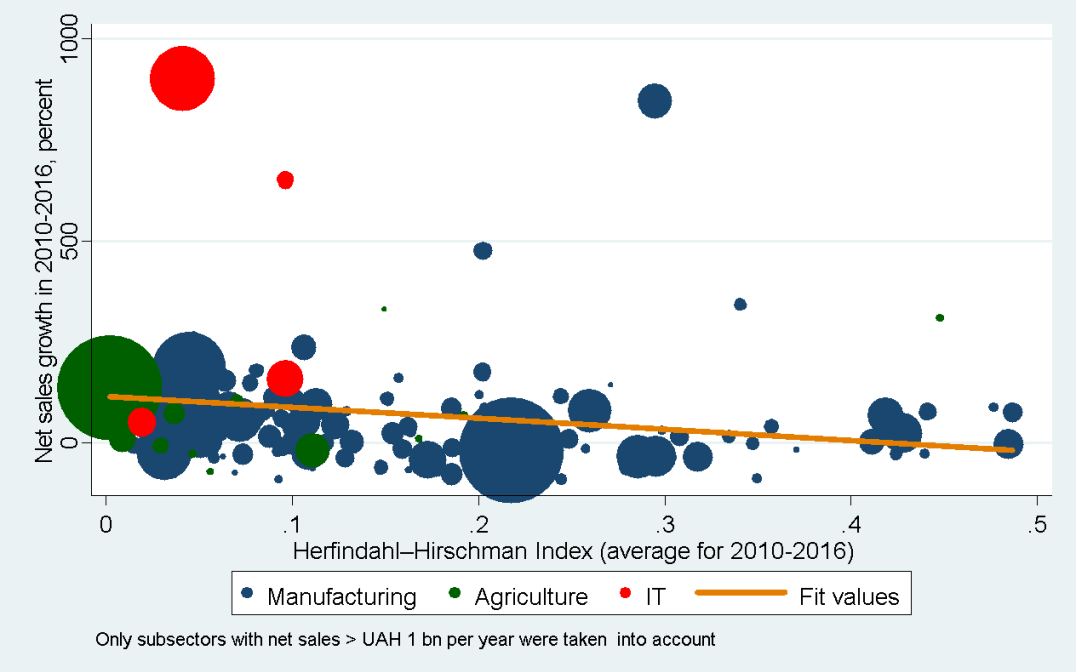


Source: authors' calculations, Ruslana database.

Concentration and growth: competition matters

On average, unconcentrated MAIT subsectors expanded more than moderately concentrated ones, both in terms of sales and employment. Between 2010-2016 the median total net sales in unconcentrated subsector agriculture grew by 81.5% in real terms, while the growth rate in moderately concentrated ones was 25.5%. The corresponding figures for manufacturing were 50.2%, and 3.6%.

Figure 27. Employment growth vs. market concentration in MAIT subsectors between 2010-2016.



Source: authors' calculations, Ruslana database.

But, interestingly, the difference between moderately and highly concentrated subsectors in manufacturing is the opposite. The median growth rate for the latter subsectors was 7.6%, which is more than for former (3.6%). It may indicate existence of factors that favor development of sectors dominated by very large firms.

The median sales growth in the IT sector, which includes only unconcentrated subsectors, was 405%.

2.4. Investment

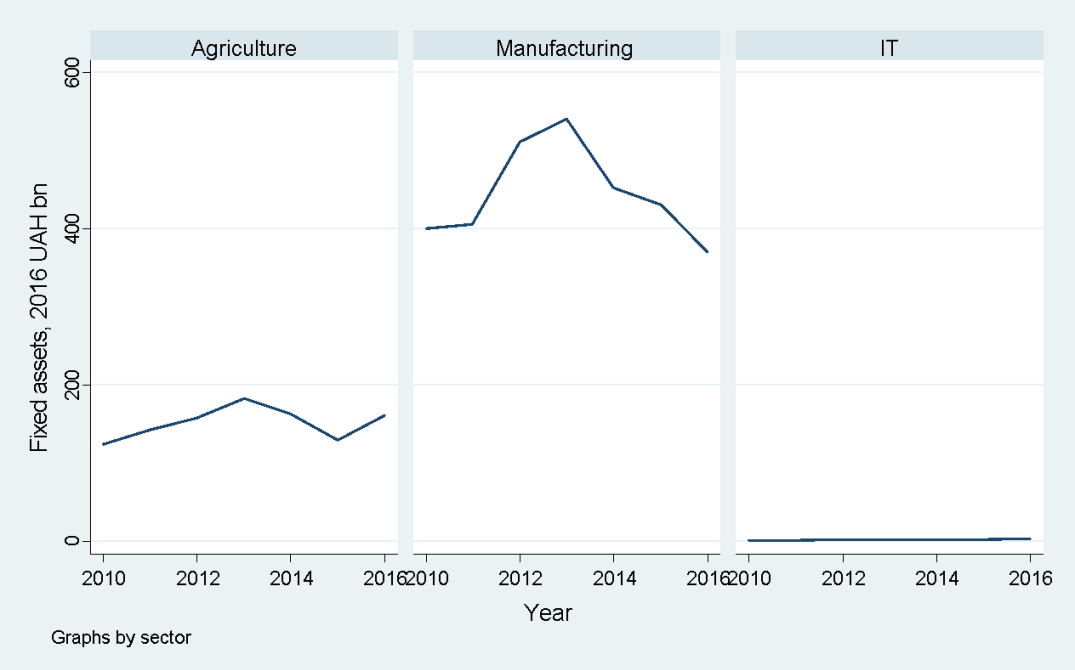
2.4.1. Fixed capital: decline in manufacturing

Capital accumulation trends in MAIT were heavily influenced by the war in Donbas, which started in 2014. In the pre-war period, capital stock was steadily increasing in all three sectors. The pace of capital accumulation was inversely correlated with capital intensity: the growth was the fastest in the IT sector, and the slowest in manufacturing. Specifically, between 2010-2013 capital stock in agriculture, manufacturing and IT increased by 47.3%, 35.2%, and 100.5%, respectively.

The war and related economic shocks influenced capital accumulation negatively, even in the regions that were not directly affected by the war. In agriculture and IT, capital stock decreased between 2014-2015 by 29.3% and 15.9%, respectively. In 2016, those industries saw a quick rebound as the capital stock increased by 24.7% in agriculture and by 49% in the IT sector.

However, a decrease in manufacturing lasted through 2016, wiping out 31.6% of the capital stock value.

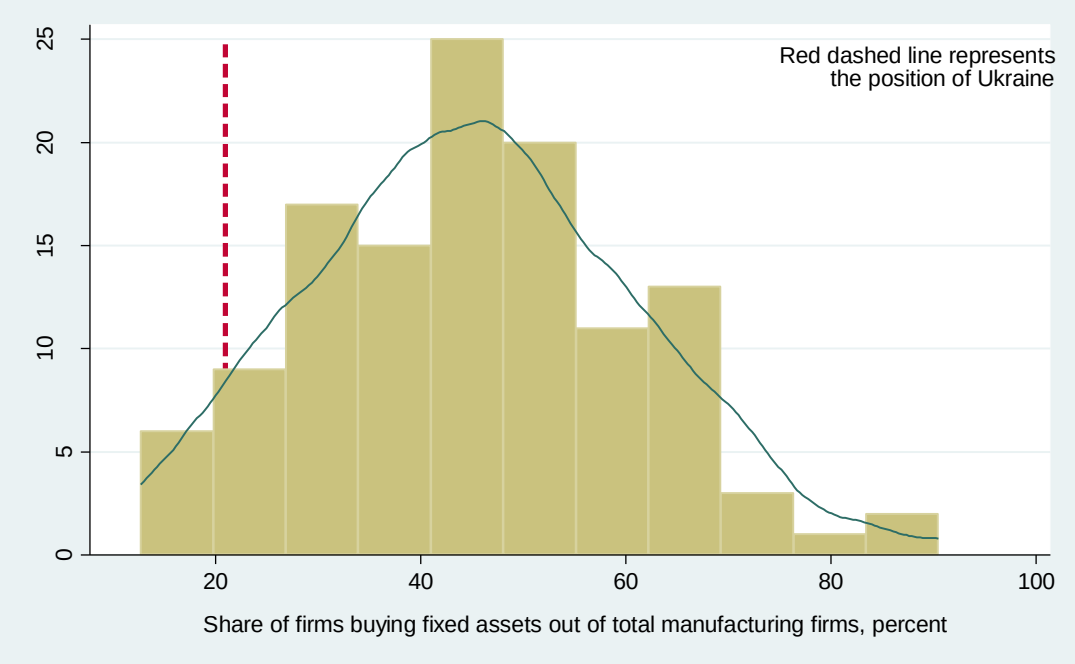
Figure 28. Stock of capital (fixed assets) in MAIT between 2010-2016.



Source: Author's computations based on Ruslana database. Crimea, Donetsk, and Luhansk are not included.

A sharp decrease in the value of fixed assets in manufacturing cannot be explained only by the war in Eastern Ukraine. A survey conducted by the World Bank suggests that investment in fixed assets in manufacturing were insufficient even in the pre-war period. In 2013, only 20.9% of firms declared that they made investments in fixed assets, which is low compared with lower middle-income countries. The rest of the section explores different possibilities for financing.

Figure 29. Distribution of shares of manufacturing firms buying fixed assets in lower middle-income countries.



Note: latest data available for each country, data for Ukraine are for 2013.
Source: World Bank's Enterprise surveys.

2.4.2. Financing: more debt but less loans

In the pre-war period, dependence on external financing was the highest in manufacturing and IT. Between 2010-2013, the debt ratio in the former sector fluctuated in the range of 68.3-70.5%. In the latter sector in grew from 68.6% to 88.1%. The debt ratio in agriculture was lower (45.3-49.7%).

After 2014, the amount of debt soared in agriculture and manufacturing (to 75.9% and 89.4% in 2016, respectively) but decreased in the IT sector (to 67.1%). The increase in agriculture and manufacturing can be explained by a dramatic national currency depreciation, which increased the value of liabilities denominated in foreign currencies, and by other effects of war-related economic shocks, including possible weakening of contract enforcement.

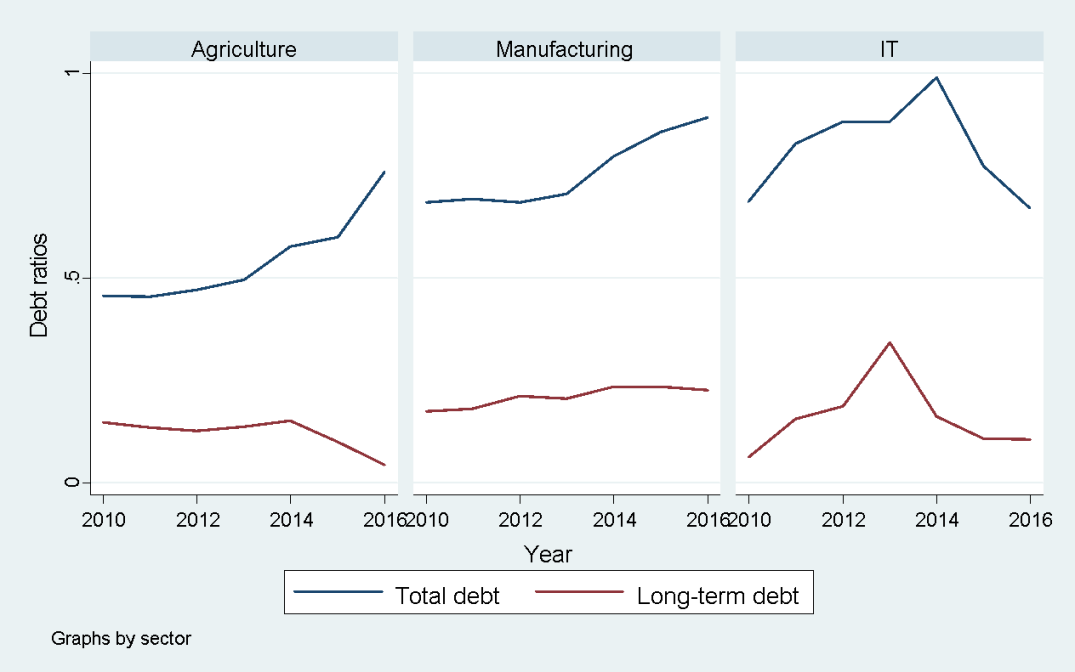
The increase of debt ratios in those two sectors was on the account of short-term liabilities. The amount of long-term liabilities declined.

Debt ratio in the IT sector decreased between 2014-2016 (to 67.1%), mostly at the expense of a decrease in bank loans, especially long-term ones.

In the pre-war period, neither agriculture nor manufacturing depended heavily on bank financing. The share of bank loans in the total amount of liabilities fluctuated, on average, in the range of 20-25%.

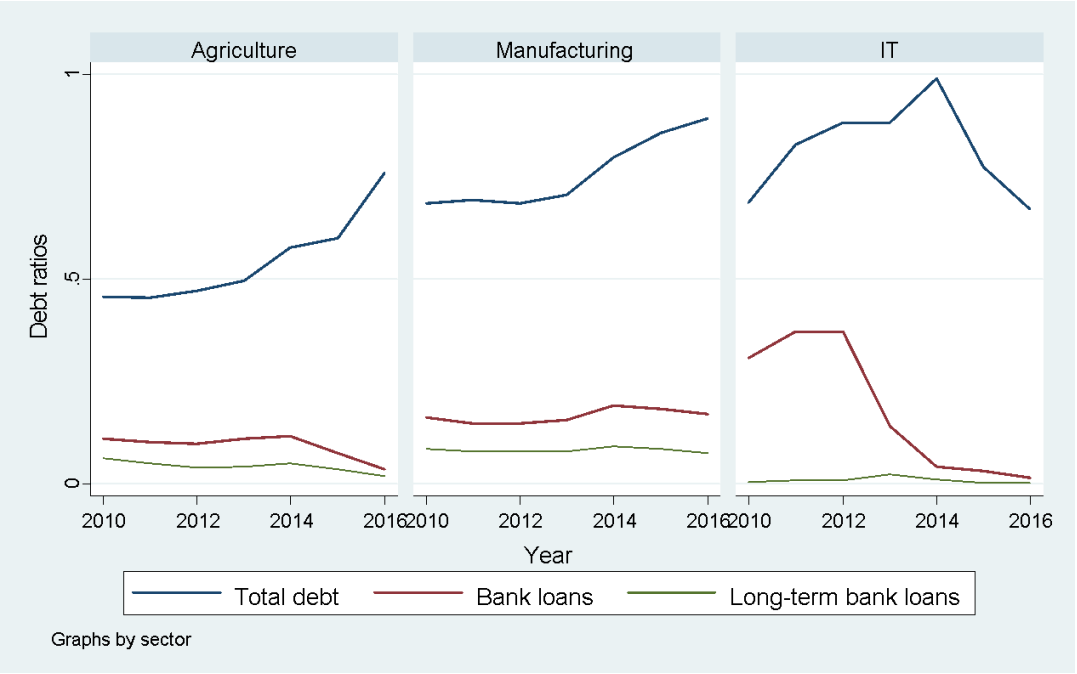
After 2014, the share of liabilities to banks drastically decreased in agriculture and IT (to 4.7% and 2.1% in 2016, respectively) but only slightly decreased in manufacturing (to 19%).

Figure 30. Debt ratios (debt to total assets) in MAIT between 2010-2016.



Source: Author's computations based on Ruslana database. Crimea, Donetsk, and Luhansk are not included.

Figure 31. Bank loan ratios (bank loans to total assets) in MAIT between 2010-2016.



Source: Author's computations based on Ruslana database. Crimea, Donetsk, and Luhansk are not included.

2.4.3. Profits: only manufacturing was heavily affected by the war

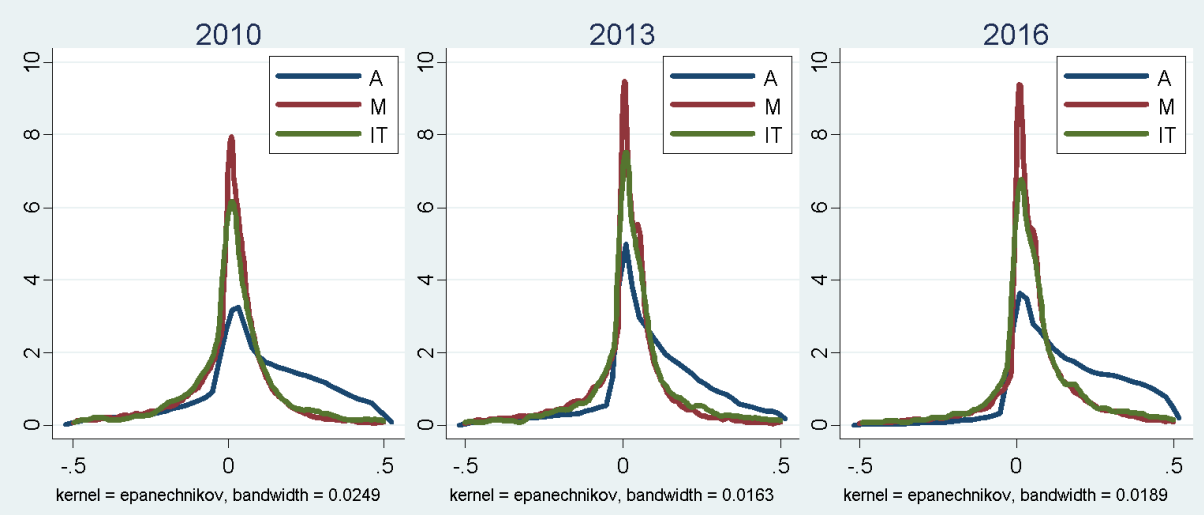
Agriculture is the most profitable sector among MAIT sectors. In the pre-war period, its average profit margin fluctuated in the range of 10-21.1%. Apparently, the war and related economic shocks did not have a substantial negative effect on the sector's profitability. Between 2014-2016, the average profit margin was between 16.9% to 31%. It is likely that those profits helped agricultural firms to increase their fixed assets in 2016 (as discussed earlier).

The generally higher level of profitability in agriculture can be due, among other reasons, to the existence of special taxation for agricultural firms (they may opt for not paying the corporate tax, and therefore can be less motivated to conceal their profits).

The situation in manufacturing and IT was the opposite. Profitability in both sectors was substantially lower than in agriculture. Between 2010-2013, the average profit margin was 0.7-2.3% in manufacturing, and 3.5-8.2% in IT). In 2014 and 2015, the average profit margin in manufacturing became negative (-3.1% and -2%, respectively). In 2016, it returned to the positive side (0.8%). In the IT sector, the average profit margin between 2014-2016 was also lower than in the pre-war period (1-6.5%), although to a lesser extent than manufacturing.

In 2014 and onwards, the share of loss-making firms decreased, especially in agriculture, which may be an indication of some improvement in the business climate (taking into account, for example, temporary restrictions on tax and other inspections for small firms).

Figure 32. Firm-level distribution of profit margins in MAIT sectors in 2010, 2013, and 2016.

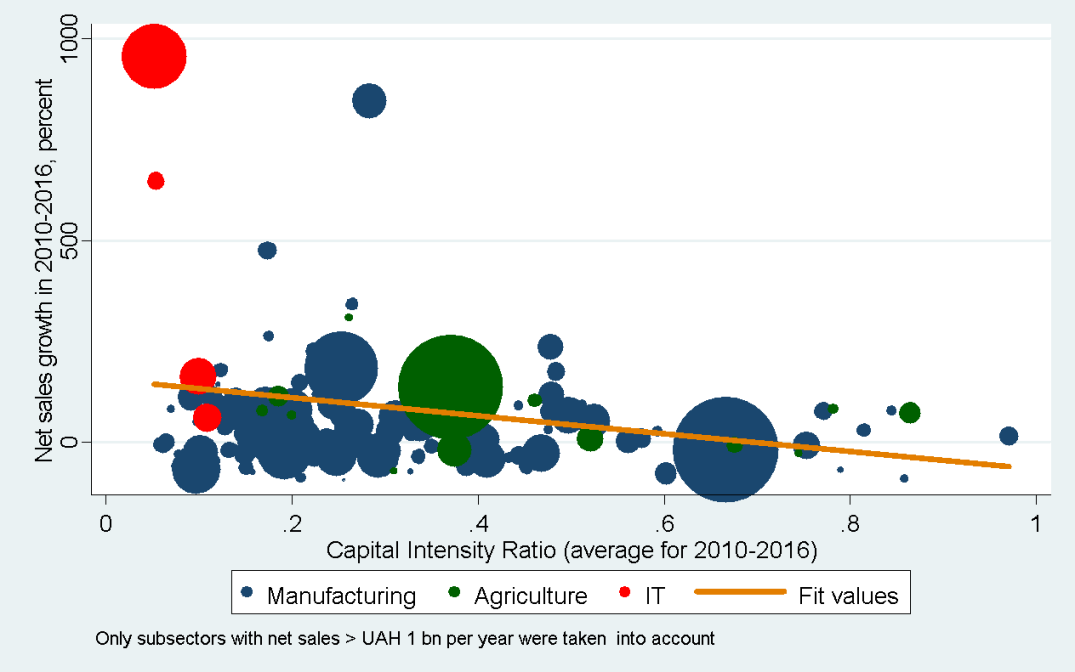


Source: Author's computations based on Ruslana database. Crimea, Donetsk, and Luhansk are not included.

2.4.4. Adaptation: rise of less capital-intensive industries

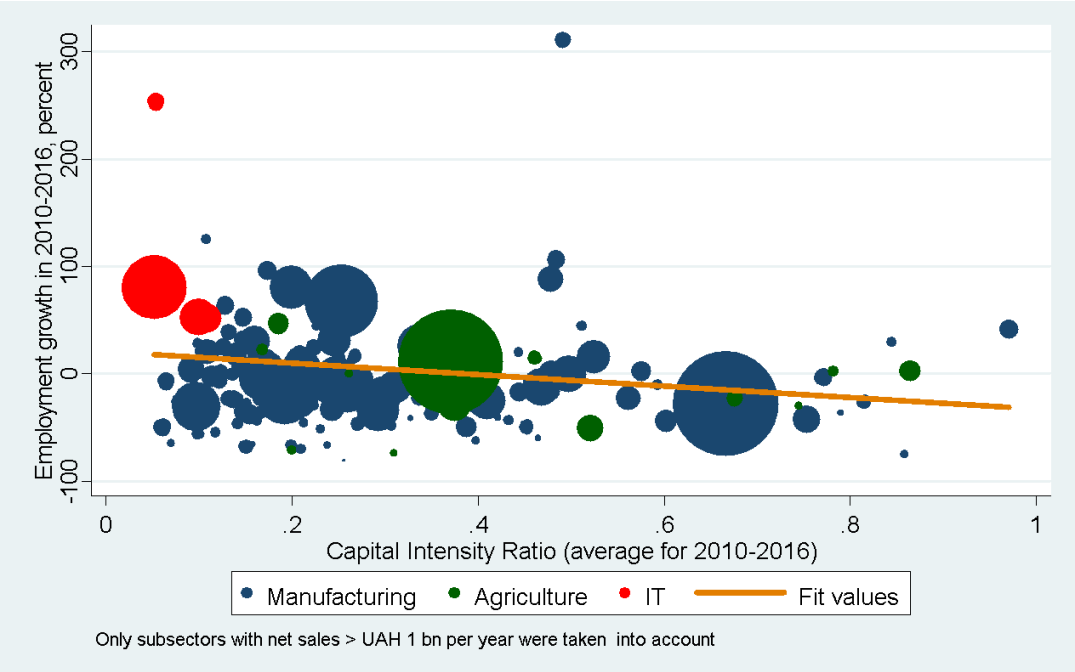
Apparently, a lack of investment contributes to the restructuring of Ukraine's economy. The data show that between 2010-2016 less capital-intensive industries grew faster, on average, in terms of output than more capital-intensive ones. The same is true for growth in employment.

Figure 33. Sales growth vs. capital intensity in MAIT subsectors between 2010-2016.



Note: Capital intensity is measured as fixed assets to sales ratio.
Source: Author's computations based on Ruslana database. Crimea, Donetsk, and Luhansk are not included.

Figure 34. Employment growth vs. capital intensity in MAIT subsectors between 2010-2016.



Note: Capital intensity is measured as fixed assets to sales ratio.
Source: Author's computations based on Ruslana database. Crimea, Donetsk, and Luhansk are not included.

2.4.5. FDI: not useful from offshore countries

The source country of FDI matters for firm performance. We looked at FDI sourced from European Union (EU), Eurasian Customs Union (CU), offshore financial centers (OFC, see Annex F), and the rest of the world (ROW). FDI from EU and ROW countries are strongly associated with higher TFP. Moreover, firms that receive FDI inflows increase their productivity, generate new jobs, and reduce job destruction rate. FDI inflows from CU countries do not seem to robustly increase productivity, still they generate net job creation (Table 11). FDI from OFC countries are associated with lower TFP and negative (while not significantly negative) TFP growth, while they still contribute to labor productivity growth, job creating and lower job destruction, which is at considerably lower rate than the FDI from other sources.

Table 11. FDI, productivity, and job creation

Dependent variable	TFP	TFP growth	LP growth	Job creation	Job destruction
	(1)	(2)	(3)	(4)	(5)
EU FDI	.0598**	2.548*	15.66**	8.645**	-3.903**
	(.007)	(1.141)	(2.449)	(.666)	(.477)
CU FDI	.0455**	1.561	1.900	4.671**	-1.785*
	(.017)	(2.356)	(4.718)	(1.027)	(.836)
OFC FDI	-.0498**	-2.457	9.167**	3.509**	-2.173**
	(.013)	(1.456)	(3.191)	(.764)	(.657)
ROW FDI	.0324**	5.192**	16.93**	6.572**	-2.263**
	(.010)	(1.432)	(3.331)	(.847)	(.638)
Years	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes

Observations	550934	428335	510414	768468	768468
R^2	.527	.026	.128	.045	.054

Robust standard errors in parentheses.
* $p < 0.05$, ** $p < 0.01$

Notes: In column (1) dependent variable is ln TFP and EU, CU, OFC, and ROW FDI are indicator variables taking value of 1 if a firm has FDI capital stock from a country that belongs to the corresponding group. In columns (2) – (5) the dependent variables are growth rates in percent. The EU, CU, OFC, and ROW FDI are indicator variables taking value of 1 if a firm received capital inflow from a country that belongs to the corresponding group in the corresponding year. We also include other controls, including firm age, size, industry, and year Models (2)-(5) are estimated in first differences to remove firm fixed effects.

2.5. Innovation: not a priority

Information on innovations by Ukrainian firms is scarce. The available data suggests that a relatively small number of firms are engaged in innovations, but the general level of innovative activity is low.

On the one hand, data shows clear signs of some dynamic innovation activity. In 2016, the number of grants for direct patent applications in Ukraine[32] totaled 1,403, or 3.1 per 1,000 inhabitants. It is much lower than in the leading innovative countries such as South Korea (171.2), Japan (122.8), and USA (75.7), and lower than in some European countries, for example, Germany (17.3), Poland (9.1), and Czech Republic (6.5). But Ukraine's level exceeds the ones of some other more developed countries. For instance, the number of grants for direct patent applications in Slovakia, Romania, and Hungary are 1.8, 1.8, and 1.2, respectively (see Figure 35)[33].

Figure 35. Number of grants for direct patent applications in selected countries in 2015 and 2016.

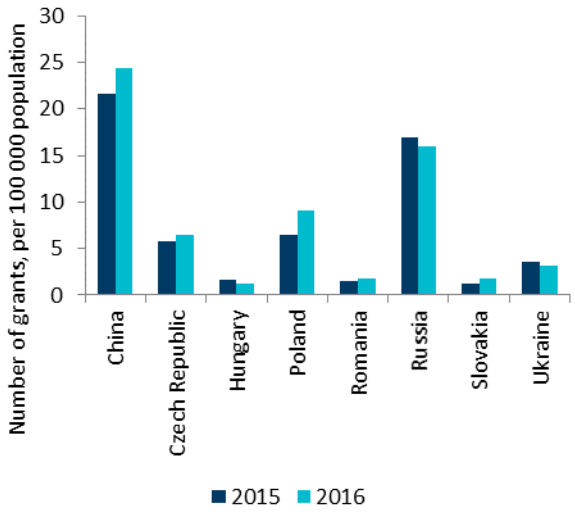
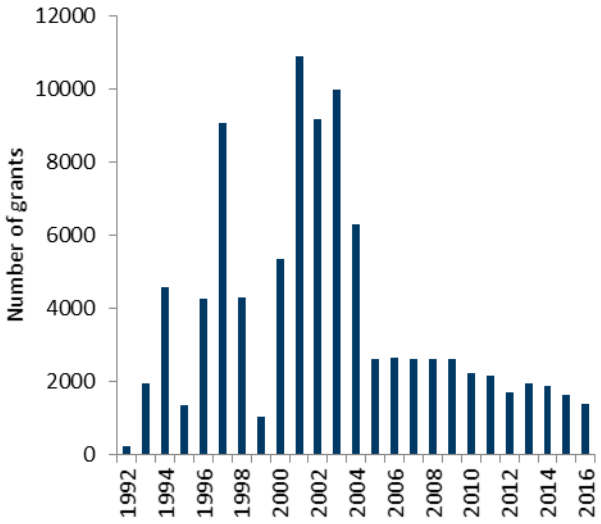


Figure 36. Number of grants for direct patent applications in Ukraine in 1992-2016.



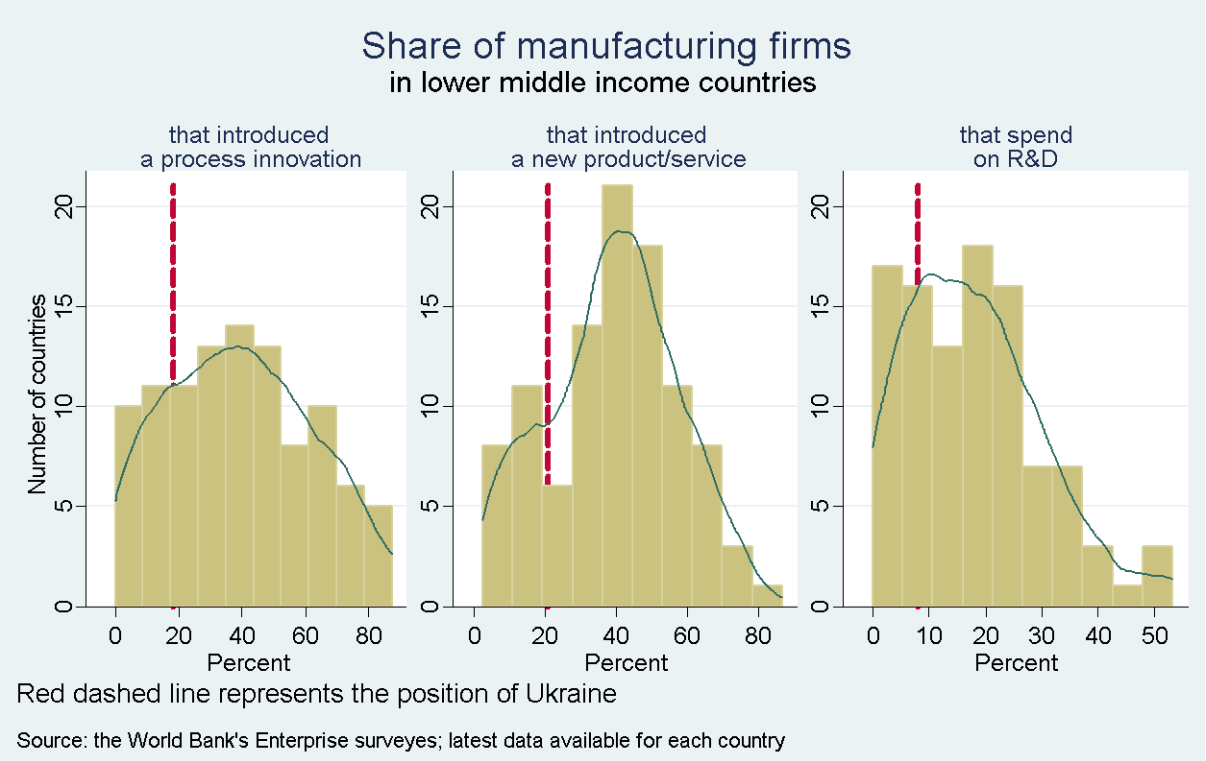
Source: authors' calculations, World Intellectual Property Organization, World Bank.
Note: the data for 2004 and 2007 were calculated through interpolation.

On the other, the level of innovative activity in Ukraine was much higher in late 1990's-early 2000's. In that

[32] A grant here is exclusive intellectual property (IP) rights conferred to an applicant by an IP office.
[33] Source: The World Intellectual Property Organization (WIPO) IP Statistics Data Center. https://www3.wipo.int/ipstats/index.htm (retrieved in March 2018).

period the number of grants was between 4,000-10,000 per year, which is close to the current level of Germany (controlling for population) (Figure 36).

Figure 37. Distribution of the number of innovative firms in lower middle-income countries.



Moreover, surveys show that a small share of firms is engaged in innovative activity. According to the World Bank's Enterprise Surveys, 20.9% of Ukrainian manufacturing firms introduced a new product or service, 18.3% firms introduced a process innovation, and 8.1% firms invested in R&D.[34] The survey showed that those shares were smaller than in most of lower middle-income countries, which are likely to have similar business environments (Figure 37).

The results of the World Bank's Enterprise Surveys are comparable with the outputs of other surveys. According to a survey conducted by the State Statistics Service of Ukraine, in 2016 only 19.5% of manufacturing firms spend money on innovations. Yet, that number includes 10.7% firms (of the total) that spent funds on software (which is officially considered as an innovation activity). Only 5.2% of manufacturing firms invested in R&D. The highest share of firms engaged in R&D was in manufacturing of pharmaceutical products, electronics, and transport equipment.[35]

Another survey by the State Statistics Service of Ukraine, which covers the period between 2010-2012, provides a breakdown by firm size. It shows that larger firms in manufacturing and mining are more active in innovations than smaller ones. The share of small, medium-sized, and large innovative firms was estimated to be 17.9%, 26.6%, and 50.3%, respectively. Large firms were also more active in technological innovations while small firms focused mostly on marketing and organizational innovations.[36]

[34] The survey was conducted in 2013. Source: http://www.enterprisesurveys.org

[35] Source: http://ukrstat.gov.ua/druk/publicat/kat_u/2017/zb/09/zb_nayka_2016.zip

[36] Source: http://ukrstat.gov.ua/druk/publicat/kat_u/2014/zb/09/zb_nayk_13.zip

The low attention to innovation cannot be explained simply by a lack of funds. It is probably related to the general market environment, as well as firms' internal characteristics. In particular, Ukrainian firms do not perceive innovation as a competitive advantage. For instance, regular business climate surveys conducted by the Institute for Economic Research and Policy Consulting (Kyiv) show that only a small number of manufacturing firms mention outdated technologies as a barrier for their development. The share of such firms was 5% in 2014, and 10.8% in 2017.37

Other hypotheses explaining the low level of innovation include:

- risk averse attitudes by Ukrainian entrepreneurs and managers,
- propensity for rent-seeking, and
- focus on property rights protection and instead of marketing and innovations.

2.6. Trade

Export and import are rare - only 13-16 percent of firms are engaged in external trade. However, the rewards of going international are likely to be very large. Export firms are larger and more productive, which leads to higher profitability and a larger market share. Export and import are quite persistent activities for large firms that have long history of external trade. However, for young firms that go international, there are large risks of failing that peak at 5-7 years since the beginning of external trade. To reduce risk of failure for such companies, government may provide some support by providing export facilitation programs for small and medium enterprises.

2.6.1. How firms that export and import differ from the rest

External trade is rare

Exporting is a rare activity. Table 12 shows that in 2001 only 12.9 percent of all firms in MAIT sectors exported. By 2013, the number of exporters grew by 2.7 percentage points. Exporting is unevenly distributed across sectors. In 2013, 16.1 percent of manufacturing firms, 2.8 percent of agricultural firms, and only 0.8 percent of IT firms exported.[38] There is also substantial variation within the manufacturing sector. In the Tobacco and Basic Metals industries, more than 30 percent of firms exported in 2013, which reflects the comparative advantage of Ukraine in those industries. Importing is also quite rare. In 2001, only 12.6 percent of all firms imported and, by 2013, this share grew by 2.1 percentage points.

Ukrainian firms are not different from their foreign counterparts. According to Bernard et al. (2007), only 18 percent of US manufacturing firms exported in 2002. A similar proportion holds for firms in other developed and developing countries.

Despite their trade with other countries, exporters are still mainly focused on the domestic market. For firms that export, export as a share of total output is 34 percent in both 2001 and 2013. The share of imports in material costs has increased from 35 percent in 2001 to 56 percent in 2013. The latter fact may be explained by the re-orientation of companies towards European markets, which became more open to Ukrainian companies after Ukraine joined the WTO in 2008.

[37] Source: http://www.ier.com.ua/en/publications/articles?pid=4902, http://www.ier.com.ua/ua/publications/regular_products/business_idea_industry?pid=5906

[38] This table report export and imports of goods only. IT firms export and import services more frequently. However, data on trade in services at firm level is not available.

Exporters and importers are different from the other firms

Exporting and importing firms are very different from the rest of the firms. According to column (1) of Panel A of Figure 13, exporters have 9.3 times more workers than non-exporting firms and sell 20 times more output. In terms of performance, exporters produce 2.4 times more output per worker and they have 47.7 percent higher TFP than non-exporters. This advantage is preserved even when we control for industry and firm size – exporters are still 11 percent more productive as column (3) of the Figure report.

Similarly, Panel B of the Figure shows that importing firms are also considerably larger, produce more output in absolute terms and in output per worker. Moreover, they have even larger productivity advantage – after controlling for industry and firm size, importing firms are 25 percent more productive than non-importing firms are.

While this evidence is a general pattern in all countries, there are no good recipes on how to replicate the success of exporters/importers by the other firms, since (roughly) one out of seven firms manage to engage with foreign trade. There are still debates in the trade literature about whether firms learn to be more productive and expand because they start exporting. At the same time, the evidence on productivity boost due to use of foreign inputs is more conclusive – importers achieved higher growth rates in productivity from trade liberalization than non-importers.

Table 12. Exporters and importers in 2001 and 2013

Industry	*Firms, %*		*% of exporting firms*		*Export as % of output*		*% of importing firm*		*Import as % of material cost*	
	2001	*2013*	*2001*	*2013*	*2001*	2013	*2001*	*2013*	*2001*	*2013*
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*
Agriculture, hunting	29.6	23.7	0.8	2.8	19	31	4.0	3.3	17	42
Manufacturing	63.9	64.8	13.2	16.1	33	35	13.6	16.4	41	56
Mfg. food	12.9	9.4	7.4	12.2	23	24	6.9	10.6	25	32
Mfg. tobacco	0.05	0.02	33.3	35.7	13	14	45.5	50.0	45	83
Mfg. textiles	1.6	1.1	10.2	14.9	39	38	13.1	19.6	55	71
Mfg. apparel, fur	3.7	2.9	7.6	11.1	76	77	9.1	11.7	81	88
Mfg. leather, luggage	1.1	0.7	11.6	21.1	52	61	12.3	18.3	48	71
Mfg. wood, cork, straw pdct.	5.2	4.7	12.6	19.2	57	62	4.4	5.8	44	42
Mfg. paper, pulp	0.7	0.9	13.0	20.1	26	22	20.9	26.7	46	63
Publishing, printing	7.0	8.3	1.3	1.5	14	19	4.7	3.0	47	61
Mfg.coke, ref. petrol, nuclear	0.2	0.2	23.8	19.2	34	18	26.8	21.2	46	48
Mfg. chemicals	2.1	2.6	17.2	19.8	30	27	18.4	21.0	38	56
Mfg. rubber	2.0	3.2	10.7	15.9	24	23	15.9	17.0	46	65
Mfg. non-metal mineral	4.2	4.9	8.6	10.6	28	36	6.8	9.6	28	47
Mfg. basic metal	0.5	0.8	29.7	32.3	42	33	24.2	27.7	24	40
Mfg. fabricated metal	3.6	5.4	8.8	12.8	30	31	8.1	11.0	38	55
Mfg. machinery, eqip. nec	6.9	6.7	13.0	19.7	31	38	9.0	14.8	29	51
Mfg. office machinery	0.8	0.4	4.0	5.9	11	9	6.7	11.8	45	57
Mfg. electrical machinery	2.8	3.4	9.7	13.4	29	37	9.0	13.8	35	53
Mfg. radio, tv, commuic.equip.	1.2	0.8	12.6	12.1	32	44	11.5	12.5	43	57
Mfg. medical, precision, watch	1.7	2.2	11.8	13.2	29	32	11.2	13.5	38	54
Mfg. motor vehicles	0.7	0.5	14.3	21.2	36	36	14.3	23.4	36	48

Mfg. other transport	0.8	1.2	22.3	21.4	34	42	18.0	20.1	30	49
Mfg. furniture	3.0	3.4	7.2	12.4	35	41	8.5	8.8	46	54
Recycling	1.2	1.3	12.1	4.4	45	47	7.3	4.3	31	50
IT	5.5	10.0	0.9	0.8	17	19	2.1	1.8	65	61
Overall	**100**	**100**	**12.9**	**15.6**	**34**	**34**	**12.6**	**14.7**	**35**	**56**

Notes: The first two columns of numbers summarize the distribution of manufacturing firms across two digit KVED industries in 2001 and 2013. The next two columns report the share of firms in each industry that export. Columns (5) and (6) report average exports as a percent of total shipments across all firms that export in the noted industry. Columns (7) and (8) report the share of firms in each industry that import. Columns (9) and (10) report average imports as a percent of total shipments across all firms that export in the noted industry.

Table 13. External trade premia in 2013

	A: Export premia		
	1	2	3
Ln Employment	2.23	2.26	
Ln Output	2.99	3.11	0.64
Ln Output per worker	0.86	0.94	0.62
Ln TFP	0.39	0.06	0.11
	B: Import premia		
	1	2	3
Ln Employment	2.21	2.19	
Ln Output	3.25	3.24	0.88
Ln Output per worker	1.11	1.14	0.86
Ln TFP	0.53	0.18	0.25

Notes: All results are from bivariate ordinary least squares regressions of the firm characteristic in the first column on a dummy variable indicating firm's export status. Regressions in column 2 include industry fixed effects. Regressions in column 3 include industry fixed effects and log firm employment as controls. All results are significant at the 1 percent level.

2.6.2. Determinants of export and import

Exporting is more likely when a firm has high productivity. It allows it to grow, enter foreign markets, and survive by continuing exporting. Exporting is more likely for companies that are older, have foreign capital, and import intermediate inputs.

What determines exporting and importing activities at extensive (whether a firm export/import or not) and intensive (how much it exports/imports) margins? Table 14 and Table 15 shed some light on these questions. In Table 14, based on customs data for export between 2001-2015, we run series of regression, where the dependent variable is probability of export or natural log of total export at the level of a firm. In the linear probability models (1) - (2), the dependent variable is an indicator of exporting (1 yes and 0 no). Larger and older firms, firms that are more productive, firms with FDI, and importing firms are more likely to export. Once a company is exporting, intensive margins of export positively depend on productivity, firm size and age, importing status and FDI (columns (3)-(4) of the Table 14). Also, if a company exported in the past, it increases its current export values.

Similar regularities are also observed for importing firms as Table 15 indicates. More productive, larger firms are more likely to import. Firms with foreign ownership importing more frequently. Size and productivity also have strong, positive and significant effect on intensive margins of import. However, firm's age has mostly negative effect on its importing activities. Older companies are less likely to import inputs and even if they import, they do it in fewer values.

Table 14. Determinants of export

	(1)	(2)	(3)	(4)	(5)
Dependent variable	Probability of Export			Ln Export	
Ln TFP		.0122**	.684**	.496**	.465**
		(.000)	(.011)	(.018)	(.020)
Ln Employment	.0539**	.0450**	.854**	.759**	.650**
	(.000)	(.000)	(.005)	(.018)	(.020)
Ln Firm age	.0240**	.0200**	.0266**	.149**	-.147**
	(.000)	(.001)	(.008)	(.035)	(.034)
Importer		.387**	.561**	.355**	.246**
		(.002)	(.015)	(.020)	(.020)
FDI		.124**	.493**	.0295	-.00339
		(.003)	(.020)	(.029)	(.024)
Exit			-.0712	-.202**	-.310**
			(.039)	(.041)	(.043)
Lag Ln Export					.298**
					(.008)
Firm FE	No	No	No	Yes	Yes
Year FE	No	Yes	Yes	Yes	Yes
Industry FE	No	Yes	Yes	Yes	Yes
Observations	940584	550934	68802	68802	49683
R^2	.126	.378	.503	.206	.281

Robust standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$
Notes: Dependent variable in (1) and (2) equals 1 if company i exports at time t and zero otherwise, in (3)-(5) is the natural log of export measured in current USD. Models (1) and (2) are estimated by probit, while models (3)-(5) are estimated by OLS. Importer is a dummy variable that takes value of 1 if a firm imports and 0 otherwise. FDI is a dummy variable that takes value of 1 if a firm has foreign direct investments and 0 otherwise. Exit is defined as 1 if a firm exits an industry between periods t and t+1.

Table 15. Determinants of imports

	(1)	(2)	(3)	(4)	(5)
Dependent variable	Probability of Import			Ln Import	
Ln TFP		.0284**	.804**	.370**	.383**
		(.000)	(.012)	(.019)	(.022)
Ln Employment	.0508**	.0388**	.707**	.658**	.642**
	(.000)	(.000)	(.006)	(.022)	(.027)
Ln Firm age	.00880**	-.00528**	-.113**	-.229**	-.327**
	(.000)	(.001)	(.010)	(.038)	(.042)
FDI		.213**	.801**	-.00683	-.0419
		(.003)	(.022)	(.030)	(.028)
Exit			.0911*	-.0878	-.208**
			(.043)	(.047)	(.053)
Lag Ln Import					.237**
					(.009)
Firm FE	No	No	No	Yes	Yes
Year FE	No	Yes	Yes	Yes	Yes

Industry FE	No	Yes	Yes	Yes	Yes
Observations	825008	531050	59189	59189	39505
R^2	.112	.346	.383	.122	.181

Robust standard errors in parentheses

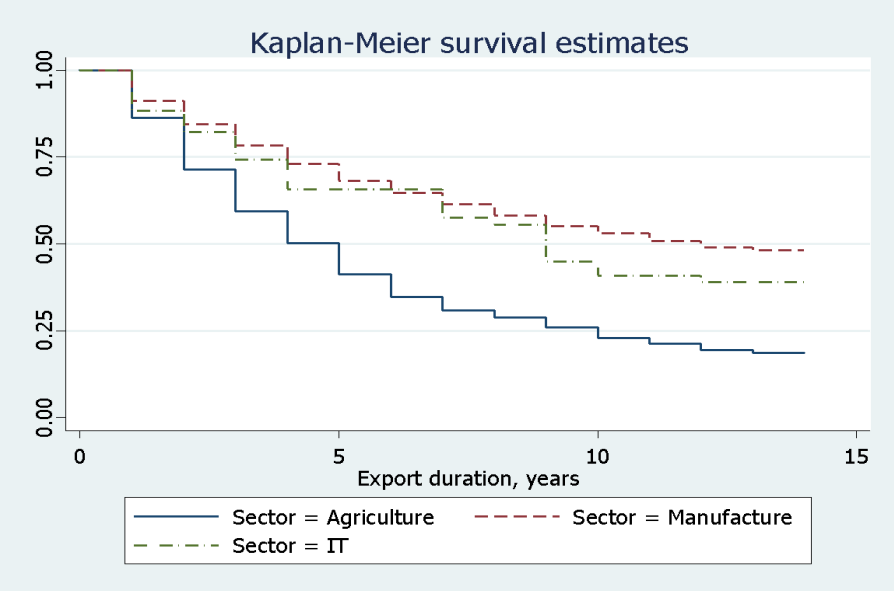
* $p < 0.05$, ** $p < 0.01$

Notes: Dependent variable in (1) and (2) equals 1 if company i imports at time t and zero otherwise, in (3)-(5) is the natural log of import measured in current USD. Models (1) and (2) are estimated by probit, while models (3)-(5) are estimated by OLS. FDI is a dummy variable that takes value of 1 if a firm has foreign direct investments and 0 otherwise. Exit is defined as 1 if a firm exits an industry between periods t and t+1.

2.6.3. Export survival analysis (persistence of exporting)

Exporters in manufacturing have the highest survival rate – roughly half manufacturers continue to export after 10 years, 40 percent of IT firms, while for agricultural firms this rate is only a quarter (Figure 38). Survival rate declines rapidly in the first 5 years of exporting and stabilizes after 10 years. IT firms have a considerable drop in the survival rate after 9 years of exporting, but it may be an artefact of the small sample size of IT exporters.

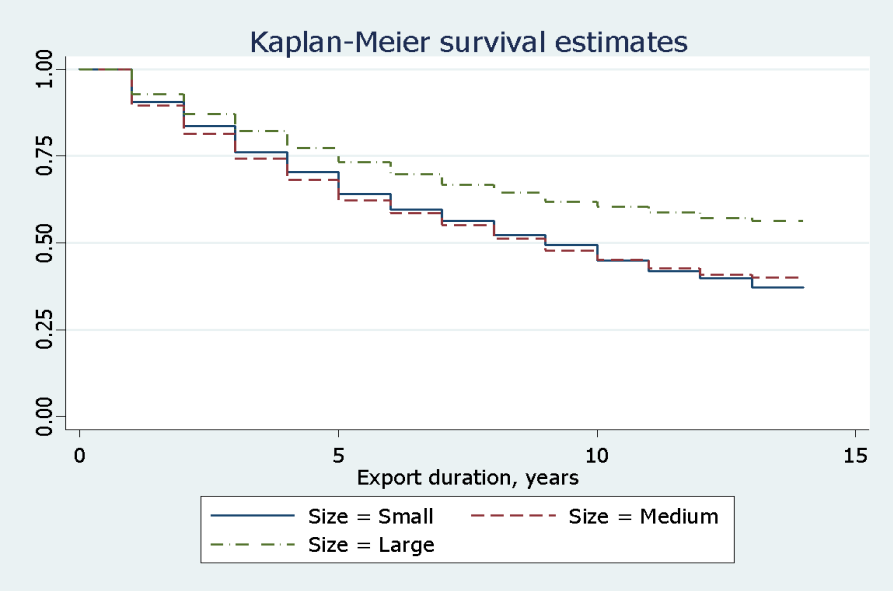
Figure 38. Exporters survival in Ukraine between 2002-2015 by sector



Source: Author's computations based on Ruslana database. Crimea, Donetsk, and Luhansk are not included.

The difference across firm sizes in export survival rates is not as big as across sectors (Figure 39). Still, large companies have a greater chance of surviving as continuing exporters, with roughly 60 percent of large exporting firms still exporting after 10 years. For small and medium firms this rate is 50 percent.

Figure 39. Export survival in Ukraine between 2002-2015 by firm size



Source: Author's computations based on Ruslana database. Crimea, Donetsk, and Luhansk are not included.

Determinants of firm and export survival

Table 16 presents key statistics of firm and export survival. Panel A reports survival statistics for firms. On average, each year 11.4 percent of firms exit, with considerably higher risk for small companies. A typical small firm lasts only for 5 years; only one out of four small firms survives for 9 years.

Panel B of the Table 16 reports survival statistics for exporters. If a firm is an exporter, there is a 5 percent chance that it stops exporting next year. The highest risk of exiting export is experienced by firms in Agriculture, while the risk does not vary too much with firm size.

Table 16. Survival of firms and survival of exporters by sector and size

	Time at risk	Incidence rate	Number of subjects	Survival time 25%	50%	75 %
			A: Survival of firms by sector and size			
Sector:						
Agriculture	241914	0.102	37316	3	7	14
Manufacturing	627467	0.125	102837	3	6	11
IT	74678	0.109	12818	3	7	12
Size:						
Small	549200	0.156	116819	2	5	9
Medium	287475	0.057	61363	5	12	.
Large	83081	0.033	15931	11	.	.
Total	919756	0.114	146660	3	6	12
			B: Survival of exporters by sector and size			
Sector:						
Agriculture	3228	0.120	919	2	5	10
Manufacturing	69180	0.058	12045	4	12	.

IT	374	0.072	117	3	9	.
Size:						
Small	8624	0.076	3348	4	9	.
Medium	32892	0.072	7847	3	9	.
Large	31200	0.046	5031	5	.	.
Total	72716	0.061	12994	4	11	.

Finally, Table 17 reports regression analysis of determinants of survival for firms in columns (1)-(3) and for exporters in columns (4)-(6). Interestingly, productivity is not a significant factor in explaining firm survival. This fact highlights that perhaps creative destruction mechanism emphasized by Schumpeter does not work as strongly in Ukraine as is required for more rapid growth and prevents more productive firms from growing. Survival increases with size and declines with firm age.

Table 17. Risk of exit for firms and exporters

	(1)	(2)	(3)	(4)	(5)	(6)
TFP	1.018	1.027	1.030	.821**	.872**	.864**
	(.053)	(.055)	(.054)	(.037)	(.037)	(.034)
Ln Employment			.813**			.911
			(.028)			(.046)
Ln Firm age			1.050*			.927*
			(.022)			(.029)
Exporter		.850*	.893			
		(.061)	(.055)			
Importer		.855**	.898		.550**	.572**
		(.046)	(.051)		(.032)	(.030)
FDI		1.096*	1.107*		.747**	.743**
		(.045)	(.050)		(.065)	(.064)
Manufacture	.864*	.891	.862*	.523**	.551**	.560**
	(.060)	(.059)	(.063)	(.057)	(.052)	(.055)
IT	.889	.882	.831	.979	.992	.979
	(.145)	(.142)	(.138)	(.157)	(.142)	(.138)
Young	.981	.975		1.460*	1.445*	
	(.125)	(.123)		(.230)	(.226)	
Mature	.984	.977		1.386	1.304	
	(.149)	(.147)		(.243)	(.221)	
Medium	.662**	.678**		.957	1.083	
	(.059)	(.054)		(.075)	(.081)	
Large	.409**	.447**		.597*	.800	
	(.057)	(.043)		(.135)	(.162)	
Observations	464384	464384	464381	62507	62507	62507
R^2						

Exponentiated coefficients; Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$

Notes: Determinants of survival for firms in columns (1)-(3) and for exporters in columns (4)-(6). The proportional hazard model is estimated by maximum likelihood, New firm is defined as a 1 year old frim. Young firm is a firm that is from 2 to 5 year old. Small firm is below 10 people, medium firm is between 10 and 99 people. Exporter is a dummy variable that takes value of 1 if a firm exports and 0 otherwise. Importer is a dummy variable that takes value of 1 if a firm imports and 0 otherwise. FDI is a dummy variable that takes value of 1 if a firm has foreign direct investments and 0 otherwise. The proportional hazard model is estimated by maximum likelihood,

Both exporting and importing firms are more likely to survive, but the effect is not significant once we control for firm age and size. Unexpectedly, FDI is associated with higher risk of exit, as indicated by the

coefficient higher than 1. Factors that are associated with higher export survival rates include higher productivity, import and FDI status, older firms, and firms in manufacturing sector.

2.6.4. How exporting and importing contributes to productivity and employment growth

Exporters grow 2.1-2.6 percentage points faster and importers grow 1.1-2.3 percentage points faster. From the literature, we know that exporting firms are exceptional (Bernard et al. 2007). However, firms that import are also may have productivity advantages, stemming from better and wider choice of intermediate inputs, which are crucial for productivity gains (Amiti & Konings 2007; Amiti & Khandelwal 2013). We estimate how becoming an exporter and/or importer is associated with productivity by regressing productivity on export/import status with firm fixed effects. Firms that start exporting grow 5-6 percentage points more. Firms that start importing grow 1.9-2.9 percent more. Importers create 3-7 percent more jobs than non-importers. Exporters show no robust pattern in job creation.

2.6.5. Trade barriers

Ukrainian exporters are highly exposed to protectionist policy measures abroad. This is primarily because they operate with large volumes and compete in some of the toughest markets – crops and metallurgy. Majority of barriers take non-tariff measure forms, such as subsidies and anti-dumping measures. The drop of iron and steel prices in 2016 stimulated introduction of numerous protectionist measures in many countries, making Ukraine the fourth in the ranking of countries that are the most affected by the largest number of harmful measures concerning iron and steel (Global Trade Alert). In agriculture, however, crop producers seem to be still competitive, because they manage to export even to countries highly protected by trade and non-trade barriers.

Existence of trade barriers is hardly a surprise; however, it is important to understand:

- whether these barriers comply with international agreements
- whether they put Ukraine in a disadvantaged position systemically and non-symmetrically
- whether a complex of existing trade barriers imposes strategic threat to the Ukrainian economy.

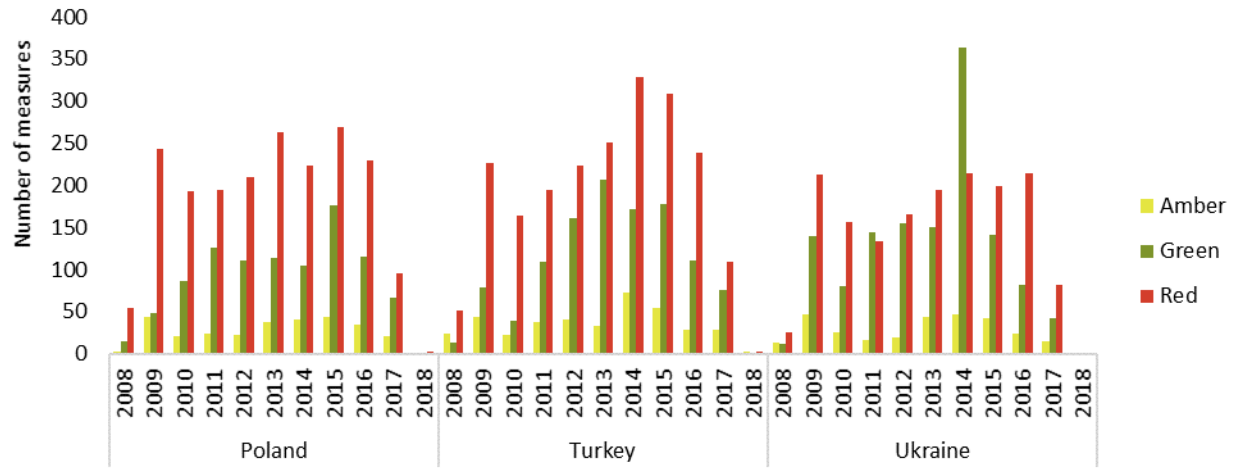
Interviews that we conducted, and review of existing literature do not provide unambiguous answers to these questions. Nevertheless, we have got very important insights. Views of industry leaders suggest that trade regimes and overall economic policy of Ukraine would benefit from more thorough analysis, which could support position of Ukrainian government and diplomats in negotiations with the governments of trade partners.

We can validate some of the arguments, though, with the data.

There are numerous trade barriers against Ukrainian firms abroad. Indeed, according to Global trade Alert, over the last decade there have been approx. 1,598 harmful (red) and 294 potentially harmful (amber) for Ukrainian producer's trade measures implemented globally. 495 harmful measure were implemented over 2015-2018 (Figure 40). However, another 1,307 liberalizing measures towards Ukrainian products were introduced over the same decade. As of March 2018, there have been 928 various trade barriers against Ukraine globally. Introduction of liberalizing and harmful measures is a continuous process which happens to every country, in this regard Ukraine is not unique.

Ukrainian producers suffer from various localization measures and subsidies towards local producers. Indeed, out of all harmful measures currently at place, most common are subsidies, import tariffs, export subsidies, and anti-dumping measures: subsidies and exports subsidies together take 352 cases or more than one third of all harmful measures (Table 18).

Figure 40. Number of liberalizing and discriminating trade measures in time. Red – harmful measure, green – liberalizing, amber – unclear.



Source: Global Trade Alert data

Local content measures and government procurement local content requirements take up 96 cases. But Global Trade Alert tracks only official documents, thus we might not know about cases of a more subtle discrimination towards foreign (Ukrainian, in this case) companies.

Table 18. Harmful measures against Ukrainian products that are currently at place globally

Type of harmful measure	Number of measures
Subsidies (except export subsidies)	203
Import tariff measures	190
Export subsidies	149
Anti-dumping	77
Migration measures	67
Government Procurement Local Content Requirement	67
Non-automatic import-licensing procedures	32
Local content measures	29
Instrument unclassified	23
Export taxes and charges	18
Countervailing measure	8
Export measures, n.e.s.	7
Quotas	6
Prohibitions other than for SPS and TBT reasons	5
Internal taxes and charges levied on imports	5
Government Procurement Market Access Restrictions	5
Finance measures	5
Export prohibition	5
Tariff-rate quotas (TRQ)	4
Licensing- or permit requirements to export	4
Government Procurement Domestic Price Preference	4
FDI measures	4
Export credits	4
General (multilateral) safeguard	3

Sanitary and phytosanitary measure	2
Export quotas	1
Contingent trade protection	1
TOTAL	**928**

Source: Global Trade Alert data

The two largest categories that Ukraine exports – production of iron and steel and cereals – face numerous harmful measures. Indeed, Ukrainian producers of iron and steel and products of it as well as producers of cereals are under constant attack. These product categories are damaged by 283 and 62 measures respectively (Table 19). But these products are also subject to liberalizing measures (Table 20).

Table 19. Product groups in Ukraine most affected by harmful measures

Name	Interventions, Harmful
Products of iron or steel	189
Basic iron and steel	94
Cereals	62
Other fabricated metal products	57
Motor vehicles, trailers and semi-trailers; parts and accessories thereof	56
Fertilizers and pesticides	40

Source: Global Trade Alert data

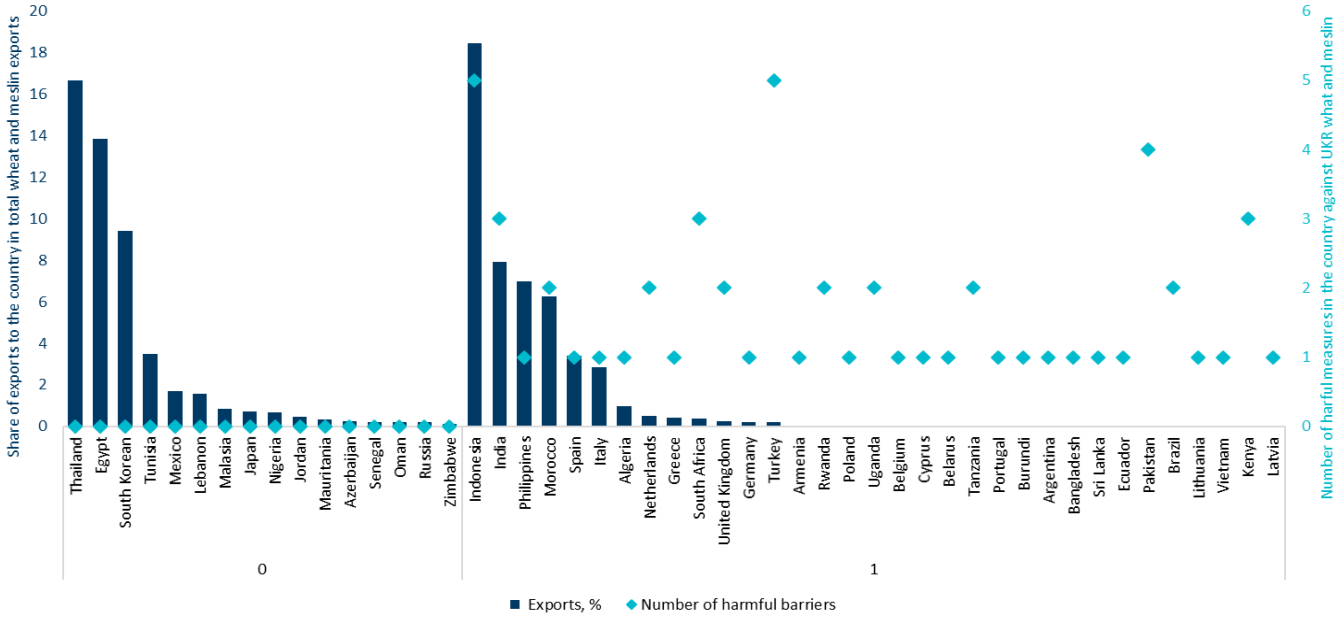
Table 20. Product groups in Ukraine most affected by liberalizing measures

Name	Interventions, liberalizing
Products of iron or steel	52
Cereals	35
Petroleum oils and oils obtained from bituminous materials, other than crude	28
Fertilizers and pesticides	25
Electric motors, generators, transformers	19
Basic organic chemicals	19

Source: Global Trade Alert dat

Export of wheat and meslin (HS4 1001) which was the second largest exports category of Ukraine as of 2016 (7% of total export)) is an interesting example of the ambiguity of the situation. 64% of Ukrainian wheat and meslin export is exported to Asia, 26% to Africa, 8% to Europe, 2% to North America and South America. Ukraine exports both to the countries with and without trade barriers: 51% of exports goes to the countries without harmful barriers, and 49% to countries with some harmful barriers.

Figure 41. Exports of wheat and meslin to countries with and without harmful trade barriers towards Ukraine



Source: Global Trade Alert data

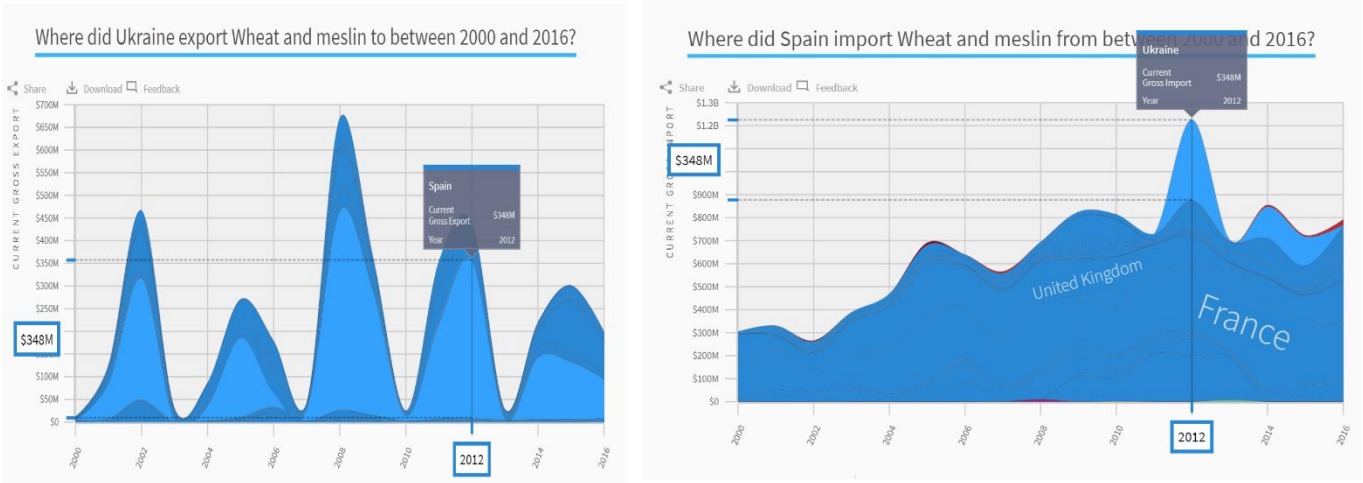
For example, top importing country, Indonesia (18.4% of UA exports in 2016), has several barriers that have harmful or ambiguous effect on wheat and meslin imported from Ukraine. These barriers were introduced between 2010-2013:

- Import rules on organic agricultural products
- Tariff imposition on grain, feed and oilseed
- Registration requirement for imported processed food
- Farmer law on protection and empowerment of farmers
- Import tariff changes in 2013

According to Harvard` Atlas of economic complexity, some European countries are large importers of wheat from Ukraine. For example, Spain (3.4% of Ukraine export of wheat), and Italy (2.9% of Ukraine export of wheat). These countries have some barriers against Ukrainian exports – for example, production subsidies that were introduced with EU Common Agricultural Policy. At the same time, Spain is a large (USD 100 – 320 mln a year) exporter to Europe and Africa.

Ukraine's competitors in exporting wheat and meslin to Spain are other European countries (97% of Spanish imports of the product group as of 2016. Interestingly, while Ukrainian statistics suggests that Ukraine exported a significant amount to Spain, Spanish statistics suggests that imports from Ukraine were 0. This case is not unique but is illustrative of some important phenomenon. First, this is a well-known[39] problem of a widespread asymmetries in bilateral trade statistics. Secondly, this case encourages certain doubts on whether harmful measures discussed above are not bypassed.

Figure 42. Exports of wheat and meslin to Europe, imports of wheat and meslin by Spain 2000-2016



Source: Atlas of Economic Complexity

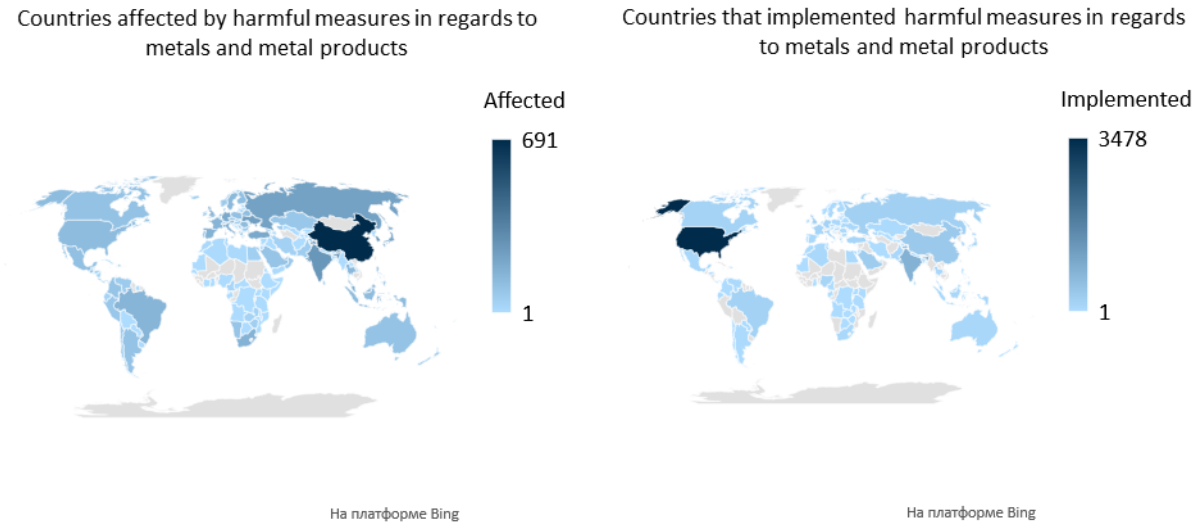
Thirdly, this case demonstrate phenomenon that needs further investigation to answer numerous questions that arise: is Spain really buying Ukrainian products, why Spain which is one of the most geographically distant European countries from Ukraine, is chosen to export production which is than likely to be traded within the EU, etc.

There are many indirect trade barriers against Ukrainian metallurgy producers that are long outdated but are not being replaced because of lobbying inside of respective countries. There are

[39] See for example https://unstats.un.org/unsd/tradekb/Knowledgebase/50657/Asymmetry-in-foreign-trade-statistics-in-Mediterranean-partner-countries

approximately 9,522 harmful measures at place globally that effect trade in basic iron & steel and production of iron & steel (see Figure 43). Majority of them – around one third, 3,338, - were introduced in 2016 and primarily by the USA (2209) when prices of steel and steel products dropped (Figure 44,Figure 45).

Figure 43. Countries most affected by harmful measures regarding iron & steel, and those that introduced most measures, 2018



Source: Global Trade Alert and authors calculations
Note: Measures introduced by a country affect all countries that exported there. Thus, 691 and 3478 are cumulative numbers reflecting all countries affected by all measures under consideration

Figure 44. Introduction of harmful measures regarding iron and steel by year

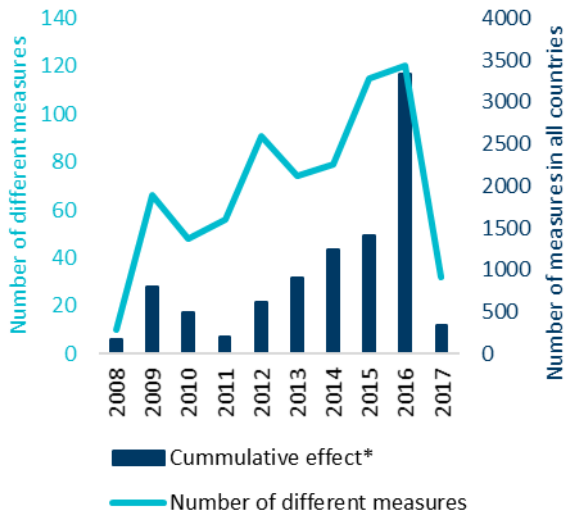
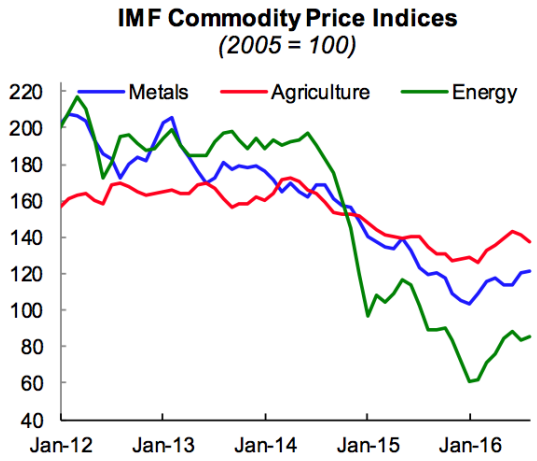


Figure 45. Commodity prices by year



Source: Global Trade Alert and authors calculations
*Note: * Measures introduced by a country affect all countries that exported there. Thus, although in 2017 there were only 32 different measures implemented, they had cumulative effect of 346 country-measures.*

Ukraine is not the only country affected by these measures, but it is one of the most affected. It is the fourth in the ranking of countries affected by the largest number of harmful measures (239 are currently at place), after China (691), Republic of Korea (275) and India (239).

Table 21.Types of harmful measures regarding Ukrainian iron and steel that are currently at place

Type of measure	Number of measures in all countries
Anti-dumping	64
Government Procurement Local Content Requirement	45
Import tariff measures	36
Subsidies (except export subsidies)	26
Non-automatic import-licensing procedures other than authorizations for SPS or TBT reasons	25
Export subsidies	18
Countervailing measure	6
Finance measures	5
General (multilateral) safeguard	3
Local content measures	3
Government Procurement Market Access Restrictions	2
Contingent trade protection	1
Export credits	1
Export taxes and charges	1
Instrument unclassified	1
Prohibitions other than for SPS and TBT reasons	1
Quotas	1
TOTAL	**239**

Source: Global Trade Alert, authors calculations

3. Conclusions: Obstacles and drivers

3.1. Obstacles to growth

This research provides two different but intertwined perspectives regarding obstacles to the growth of Ukraine's MAIT sector. The first one comes from the analysis of quantitative data (financial statements and statistical information) and allows the development of a big picture overview of the obstacles. The second is based on interviews with large, well-established firms and adds very specific details. The two approaches complement each other in yet another sense. Interviews provide the perspective of large 'survivors', which have been able to overcome at least the most critical obstacles and might even be interested in preserving some of them, while the data analysis allows us to look at the situation from the perspective of smaller firms and the ones that could have existed but never did. A comparison of the conclusions from those two approaches can also provide valuable insights.

From the data-based perspectives, the main obstacles to growth can be split into the following groups:

- unfavorable business environment,
- constrained access to finance,
- high level of concentration, and
- the lack of innovation.

Interviewees mostly confirm the existence of these obstacles (except for not paying particular attention to innovation). They also added the following items to the list:

- trade barriers (including hidden ones),
- internal market limitations,
- a labor force shortage, and
- underdeveloped and inefficient infrastructure.

Those obstacles are discussed in more details below.

3.1.1. Data-based perspective

Evidence for existence of obstacles

The basic facts about the distribution of firm in Ukraine's agriculture, manufacture, and IT are the following:

- the number of firms per capita is lower than in the corresponding EU sectors,
- the distribution of firms is skewed in favor of micro-sized ones, while the distribution of employment is biased to the advantage of large firms; small and medium-sized firms are underrepresented (comparing to the EU),
- the entry rate was low in recent years (less than 10% per year between 2013-2016) while the exit rate was volatile.

Those trends show the lack of dynamism in the development of Ukraine's MAIT sectors: firms are not being created in sufficient numbers, their growth rates are subpar, and many of them continue operating even if their performance is lagging behind the market thus hindering reallocation of resources from failed businesses to growing, more successful ones. This indicates a presence of substantial barriers to firm entry, growth, and exit. It also suggests that the process of creative destruction (in a Schumpeterian growth theory framework) does not work to a full extent.

An important implication of the lack of dynamism is that MAIT export potential is underused. The data shows that exporting is rare – only one out of seven firms exported between 2001-2016. Exporters are usually old, large firms. For new, small and medium-sized companies, exporting requires a combination of high productivity and advantageous market conditions (including high demand and good market access for their products overseas). However, obstacles to growth decrease the number of firms that reach a sufficient size and productivity level to become exporters. Therefore, obstacles to firms' growth are also obstacles to export growth (although the latter are not limited to the former).

Unfavorable business environment

The previously described firm dynamics are common for all the three sectors under consideration.[40] Despite technological differences, agriculture, manufacturing, and IT exhibit a relatively low number of firms per capita, domination of large firms, and low entry rates. This suggests a presence of economy-wide obstacles to firm creation and growth that can be defined together as unfavorable business environment.

Based on business surveys and available literature those obstacles encompass deficiencies in the functioning of the government, and political and macroeconomic instability, specifically:

[40] Given the data available.

- poor property rights protection,
- bribery and extortion practices by officials,
- burdensome regulation,
- restricted and costly access to limited resources (land, energy supplies),
- uneven taxation,
- weak contract enforcement,
- unstable macroeconomic situation (high inflation, a volatile exchange rate), and
- unpredictable and insecure political situation (including the war in Donbas).

The data provide indirect evidence in support of the existence of such obstacles:

- domination of large firms can indicate that those firms are more effective at withstanding an unfavorable environment (i.e. protecting their property rights, coping with abusive practices, getting access to resources),
- prevalence of micro-sized firms can be explained by the intent of entrepreneurs to stay 'beyond the radar' of unfavorable regulation, either by choosing not to grow or by splitting their firms into fewer ones (which also can hamper growth, for example, by hindering access to bank loans),
- another explanation for the prevalence of micro-sized firms is tax optimization (micro-sized businesses are eligible for using Ukraine's simplified taxations system, which can be used to save on taxes); the difference in taxation can also prevent firms from growing,[41]
- a difference in the effectiveness of FDI from offshore countries and FDI from the rest of the world (the former has a negative effect on productivity and job creation while the impact of the latter is positive) can suggest that offshore companies are used by Ukrainian entrepreneurs, among other purposes, to hide information on firm's ownership to protect their property rights,
- a high level of debt combined with low level of bank loans can be explained by extensive use of trade credits to finance firms' operations and development, instead of direct investment (again to protect property rights).

Constrained access to finance

One of the findings of the study is a sharp decline in capital stock in manufacturing over recent years. Between 2014-2016, its value plummeted by 31.6% in the government-controlled areas (not including Crimea, Donetsk and Luhansk regions; in constant prices). Over a more extended period, between 2010-2016, the value of capital stock in agriculture and IT increased by 29.9% and 148.3%, respectively, and decreased in manufacturing by 7.5%. As manufacturing is the most capital-intensive industry in MAIT and is the most sensitive to problems with access to financing, especially long-term one, this may indicate the existence of such problems (among others).

This hypothesis can also be supported by facts that document a more successful development of less capital-intensive industries. Specifically,

- between 2010-2016, less capital intensive MAIT subsectors (at 4 digit KVED code level) expanded faster, on average, than more capital intensive ones, both in terms of output and employment,
- reallocation of resources from less productive to more productive firms was very strong in IT, weaker in agriculture and weak in manufacturing.

[41] Source: http://www.ier.com.ua/files//publications/Books/SSO_IER.pdf

Another sector that can have limited access to finance is the IT sector. Between 2010-2016, the ratio of bank loans to total assets fluctuated in the range from 3.2% to 5.7% in the computer programming subsector (KVED/NACE code 62), which implies that software development companies almost do not use bank loans.

Possible reasons for limited access to finance include:

- low capacity of Ukrainian banks, especially for long-term financing (the capacity additionally decreased between 2014-2016 because of efforts of the National Bank of Ukraine to clean up the banking system of insolvent and non-transparent banks),
- high interest rates,
- virtually absent internal capital markets,
- restricted access to external capital markets,
- lack of infrastructure for financing risky ventures (venture funds, business incubators and accelerators).

High concentration

The study found evidence in support of the ideas that the degree of monopolization in Ukraine's MAIT sector is greater than in the corresponding EU sectors, and this monopolization negatively affects growth. One part of the evidence comes from the analysis of the distribution of employment between firms. Specifically, the total share of large firms in Ukraine is larger than in the EU:

- the EU's agriculture is populated mainly by small farms, while in Ukraine industrial-type holdings play the most important role in the sector (as of 2017, 0.5% largest agri-holdings control more than 18% of agricultural land, or 3.5 mln ha, in the country),
- the shares of large firms (with 250 workers or more) in the total employment in manufacturing are 54.2% and 41.7% for Ukraine and the EU, respectively,
- the corresponding figures for the computer programming sector (KVED/NACE code 62) are 47.2% (in Ukraine) and 32% (in the EU).

Several markets for manufacturing goods can be highly concentrated in Ukraine. As of 2016, the Herfindahl-Hirschman Index (HHI) for 56 out of 131 manufacturing subsectors is less than 0.1 (which is considered as unconcentrated by the EU's methodology). For 31 subsectors the HHI is from 0.1 to 0.2 (those sectors can be deemed as moderately concentrated), and for 44 it is 0.2 or higher (those sectors are likely to be highly concentrated).

The analysis also shows that the degree of concentration does not largely depend on subsector's capital intensity, which suggests existence of barriers to entry other than high entry costs. Unconcentrated subsectors grew faster than concentrated ones, both in terms of sales and employment.

Those results can indicate the presence of the mechanism that preserve and reinforce the existing unfavorable business environment, creating a sort of a 'bad' stable equilibrium. Monopolies are likely to be interested in preserving their market power by creating or maintaining obstacles to firm creation and growth.

Lack of innovation

Another element of a mechanism that preserves the existing unfavorable business environment is a low level of innovation (which is also a crucial element of the 'creative destruction' process in the Schumpeterian growth theory framework). Ukraine lags behind its European counterparts in adopting advanced technologies. The share of firms that introduce product or process innovations is smaller even

than in most lower middle-income countries.[42] Only a small portion of Ukrainian firms invests in R&D (5.2% as of 2016). They are mostly large firms working in manufacturing of pharmaceutical products, electronics, and transport equipment.

Those facts indicate that the use of innovation is not a comparative advantage in most Ukraine's MAIT subsectors. The low degree of innovation prevents firms from becoming exporters or expanding their exports and preserves the current export structure dominated by commodities and low technology (and low value added) products.

3.1.2. Firms' perspective: problems of the large exporters

Interviews allow to look at the situation from the perspective of large and well-established firms that could cope with at least of a part of the above-mentioned obstacles (to survive and become large). Basically, they mention the same obstacles (except for innovation) and providing some specific details. However, they also extend the list of obstacles, which also include trade barriers, internal market limitations, a labor force shortage, and underdeveloped and inefficient infrastructure.

Unfavorable business environment

The businesses mention cumbersome regulations and inadequate functioning of the law enforcement system among the major obstacles to growth of businesses in Ukraine.

- the companies confirm that offshore firms are used to protect property rights (among other reasons such as tax optimization); this can be considered as a way to 'outsource' the low enforcement functions to the common law legal system, and foreign law enforcement bodies,
- administrative costs are high; complying with regulations requires more personnel that in the foreign countries,
- poor functioning of the law enforcement system can be exemplified by the scrap metal market, which is largely informal; as a result, transactions with scrap metal bear risks of criminal investigations.

Large exporting firms do not mention some obstacles that are typically conceived as elements of unfavorable business environment, including macroeconomic situation, political risks, costly access to limited resources (land, energy infrastructure). This is likely to signify that they have adopted to functioning in a turbulent business environment and managed to diversify their risks through higher international exposure and vertical integration.

Constrained access to finance

Problems with access to finance are mentioned mostly by the majority MAIT firms:

- some agricultural firms have problems with getting long-term loans because of inability to use the land as a collateral, and a burden of previous periods loans. Yet, access to finance varies even across agri-holdings. Those who were caught under the hold-up scheme with the fertilizers in 2016 are having especially hard times.
- firms also state that loans are expensive,
- IT firms are not able to get loans at all because they have no collateral, which is required by banks; such loans, however, could be beneficial, because IT businesses in many cases can recover their costs only at the end of the service/product delivery when clients pay,
- some companies also pointed out the absence of mechanisms for export financing.

[42] I.e. comparing to countries with limited access to finance for most firms.

Exporters whose revenues are coming primarily from the foreign markets are liquidity constrained to grow further and enter markets with higher value-added. At least 38% of MAIT sector exporters receive more than half of revenues from abroad and might have such problems. Companies that lost Russian market are especially stretched financially.

High concentration

That problem is mentioned only by agricultural firms that complain about monopolization of the fertilizers market. As mentioned in the section 2.2, access of foreign producers to that market was restricted for a long time because of lobbying by Ukrainian producers. Despite some attempts of the government and anti-monopoly committee to stabilize the situation and open up the market for importers, the ability to procure fertilizers at decent prices is still highly uncertain.

Trade barriers

It is widely perceived that trade barriers for Ukrainian agriculture and manufacturing exporters are very low because they export mostly raw materials and low value-added products. However, the interviewed firms experience a different reality with high barriers which frequently don't seem reasonable.

Analysis of Global Trade Alert data suggests that, in fact, Ukrainian exporters are highly exposed to protectionist policy measures abroad because they operate with large volumes and compete in some of the toughest markets – crops and metallurgy (two largest exports categories for Ukraine). Majority of barriers are not the ones discussed at the bi-lateral trade policy table, but subsidies, localization and anti-dumping measures.

For the 2nd largest manufacturing industry - metallurgy - intensification in introduction of protectionist measure abroad is a consequence of as big problem - decrease in prices in the global market. The drop of iron&steel prices in 2016 stimulated introduction of numerous protectionist measures globally making Ukraine the fourth in the ranking of countries effected by the largest number of harmful measures concerning iron&steal. Many barriers were introduced specifically in the most important markets for Ukraine like USA where old anti-damping and localization policies were complemented by Trump` import tariffs.

Crop producers seem to be still competitive and manage to export even to countries protected by trade and non-trade barriers. Yet there is a high probability that this ability is contributable not only to high competitiveness of Ukrainian products but also to certain optimization schemes at the customs.

Internal market limitations

Industry leaders mention two major groups of problems:

1. Inefficiency or small volumes of the internal markets.

F.e, equipment and machinery producers, as well as other manufacturers work on the output markets – mining, electricity, gas supply, water supply, transports - that are very thin in Ukraine because of low capital investments of the respective companies. Average capital investments rate - measured as a ratio of capital investments to total sales - is 3-7%. In some sectors - like energy - these moderate capital investments are not caused by a lack of resources but caused by large deficits that are being accumulated by the clients.

One of the critical metallurgy inputs market – scrap metal – is inefficient, experiences deficit, frequently exposes buyers to legal investigations of control bodies.

2. Monopsony power on the upstream value chain.

77% of production of the manufacturing and agri-sectors are consumed as intermediate products of other sectors, only 23% are bought by final consumers. Thus, MAIT are heavily dependent on the upstream value chains. It is particularly severe problem for energy, utilities, railway and water infrastructure.

Labor force shortage

Human capital market is becoming more and more competitive with the borders opened. Large Ukrainian enterprises who got used to winning global competition on cheap labor are in the scrutiny with more and more workers leaving to neighboring countries. There is also a problem of brain drain. Quality higher education and vocational training are lacking. Large businesses provide in-house training and employ various partnership programs with the educational institutions. Yet, return on this investment is going down with more and more blue-collar workers and engineers are emigrating to the neighboring countries

Infrastructure problems

Waterways, railways and roads don't correspond to the modern needs of the business. Waterways are underdeveloped thus putting higher pressure on the railroad and roads. The speed and the rhythm at which manufacturers and agri-producers can deliver carriage from the ground to the customs point is unsatisfactory for the users due to high transportation costs.

Occupation of Donbass and the war itself destroyed or changed some of the critical railways. These problems have not been addressed so far, thus putting enterprises that use Eastern coal or sub-products along the supply chain in scrutiny.

Railroad tariffs are a tipping point in the divide between industry and railway. Inefficient services delivered by the railroad causes lost revenues to industry. Paying more for such services sounds like nonsense to industrial clients who don't trust that higher tariffs will equal more efficiency.

3.2. Drivers of growth and best practices

Growth of MAIT industries over more than a decade is contributed to:

3. Solid global trends: growing demand for food and booming construction. Many Ukrainian businesses rightly identified comparative advantage of the country to exports raw materials, metals, agri-products and food. Companies oriented on global markets flourished despite underdeveloped financial sector, low demand inside of the country, high volatility of the economy. Synergy of the favorable conjuncture in the global market – including high demand and favorable terms of trade changes – and ability to adopt good business practices from abroad supported growth of agri-sector, metallurgy, food processing.
4. Strong STEM heritage of the soviet education system has been powering growth of (low capital intensive) IT industry as well as a few high-technology manufacturing firms.
5. Large businesses managed to benefit from the overall low property right protection and rule of low (as well as on political connections) by building vertically integrated financial groups which could rely on the legal practice of the best jurisdictions.
6. IT sector benefited from the loopholes in the burdensome and inefficient taxation and regulations that limit many other sectors.
7. For many years, soviet infrastructure was adequate and well serving the needs of commodity producers.

General business dynamics at the MAIT level was driven by:

1. New firms
2. Internationally exposed firms: exporters and importers
3. Medium-sized businesses

4. FDI from non-OFC countries
5. Innovations

Private sector development strongly depends on firms' ability to create jobs and innovate. Starting a new business is associated with high risk of failure, but rewards may be high. Ukrainian new and young firms were strong job creators, generating more than 300,000 jobs between 2001-2016. Productivity growth was also higher for young, medium-sized firms who grew 0.7-2.1 percentage point faster than old, large enterprises.

Finding good, innovative ideas that boost productivity and deliver new goods and services is a process of trial and errors. It requires high rate of entry of new firms and high rate of destruction of poor performing, obsolete firms. The entry rate was higher at the beginning of the period and reached the minimum in 2013, when it started to pick up again. Between 2001-2016, the entry rate in IT was the highest, while in agriculture it was the lowest for most of the period. The Schumpeterian growth theory also mentions the mechanism of creative destruction (exit of non-performing firms) as an equally important mechanism that reallocates resource from failed businesses to growing, more successful ones. In this regard, our findings show a lack of progress through, which points to the barriers to exit and poor enforcement of the financial mechanisms against non-performing firms. The exit rates were similar in all sectors and experienced spikes between 2009-2010 and between 2013-2015.

Export is an important activity, which opens up new markets and allows companies to grow faster and to increase their productivity through learning-by-exporting and scales economies. For new, small- and medium-sized companies, exporting requires a combination of high productivity, high demand and good market access for its products overseas, and supportive regulatory environment – developed financial markets, stable macroeconomic situation, and good institutions. Exporting is also a fragile state. Our results demonstrate that even if a new firm is successful in going to external markets, its chances of survival are quite small, especially in the first 5-7 years since the beginning of exporting. However, those firms that overcome barriers and hazards, flourish in the long run due to fast grow in output, productivity, and employment.

Import is another important source of productivity increase; it improves composition of intermediate inputs, which has a positive effect on final output quality and quantity. Reduction in trade barriers and liberalization of services are main benefits of the Ukrainian WTO accession, which increased productivity of firms in manufacturing by approximately 9 percent. We also find that firms that start importing increase their productivity growth by 2-3 percentage points, have a 3-7 percentage points higher rate of job creation, and a 5-9 percent lower rate of job destruction. Importing firms are also more likely to export and to stay in business.

FDI are important sources of productivity and employment growth conditional on their origin. FDI from EU and RoW have a positive effect on firm performance, increasing productivity and job creation and reducing job destruction rate. FDI inflows from CU countries do not seem to robustly increase productivity; still they generate net job creation. FDI from OFC countries are associated with lower TFP and negative (while not significantly negative) TFP growth.

Newly created companies are important sources of innovative development. However, they tend to start small; hence, they require right incentives for growth. In 2016, 76 percent of young companies (5 or less years of age) in Agriculture, Manufacturing, and IT sector in Ukraine had 10 or less employees. To develop further, they need good institutional environment – low levels of red tape and corruption, good access to efficient and deep financial markets, good public infrastructure, and stable macroeconomic situation. They

need good access to global markets that would help them to grow by generating external demand for their production.

4. Recommendations

4.1. Guiding principles

The strategy to foster private-sector driven economic growth needs to account for different – and sometimes contradictory – needs of the large globally oriented businesses and needs of the SMEs. In the framework of the study, the policy objectives should aim to:

- Revitalize firm creation and growth, with focus on high technology industries, while ensuring level playing field;
- Provide for global competitiveness and growth of the strongest players, while keeping the interests of large businesses in balance with the rest of the society;
- Increase in investment - especially FDI, which provide better access to innovations and global value chains;

4.2. Environment for healthy business dynamics

Specific measures needed to create conducive business environment would assume:

4.2.1. Fostering institutional changes

- Further modernization of government regulations practice: remove undue intervention and strengthening the rule of law – a prerequisite for capital market development;
- Removal of an abuse of monopoly power in various forms, including access to resources;
- Ensuring political and macroeconomic stability;
- Promoting de-shadowing of the economy, foster and make more accessible businesses transactions through fin-tech instruments;

4.2.2. Building the rules that are supporting businesses with high potential

In a nutshell, good policies and interventions need to:

For the development of innovative SMEs:

- Provide for private-sector financial instruments for exporters;
- Contribute to development of infrastructure for financing of small, innovative firms – including possibly business incubators and accelerators;
- Create vehicles to provide short-term financing to IT firms;

For enhancing SME's capability to work in foreign markets:

- Enhance mechanisms for receiving payments by small firms from abroad (via Paypal or similar tools);
- Contribute to development of post services and other logistic infrastructure for micro-sized and small business exports (for cheap delivery abroad);

- Create infrastructure that facilitate establishment of contacts of Ukrainian SME with buyers and sellers abroad (see an example below);
- Actively promote business interests in the global arena to involve Ukrainian companies to value-added chains. Importantly, Ukraine should proactively use the benefits of her free trade agreements;

This report highlights importance of newly-created small and medium enterprises for dynamically growing industries. While large, incumbent firms constitute the backbone of an industry and are typically have high productivity, their ability to generate additional employment and economic growth is greatly diminished. If in addition there are negative external shocks that hit main industries where Ukraine has a comparative advantage (metallurgy, chemicals), it makes the country extremely vulnerable and may lead to a prolonged period of stagnation. The problems lay in the lack of export diversification and diminishing growth of productivity of mature firms.

In this environment, medium-sized, young enterprises are locomotives of productivity growth and creators of new jobs. The Schumpeterian growth theory emphasizes important of innovations, highlights that strong property rights protection, infrastructure, and access to credit markets promote innovative investments. The role of government in this case is to create a level playing field for all market participants, while in the process of trial and errors the new sources of comparative advantage emerges. This process can be greatly facilitated by FDI/outsourcing of supply chains from the EU to Ukraine. After the signing of FTA EU/Ukraine, it looks promising to attract the EU producers to invest in Ukrainian firms and to cooperate with Ukrainian companies in the arm's length trade. An example of the Ukrainian-Austrian company Fischer-Mukachevo, one of the world leading producers of cross-country and mountain skis that exports its products to EU, US, and more than 100 other countries demonstrates how such cooperation can prove a success. According to Eurosat, in 2016 half of all imported skis and snowboards to EU came from Ukraine.

To support small and medium sized companies, it is important to provide them with access to developed financial sector and business services. Financial constraints prevent dynamic and innovative companies to grow. An important step in a young company life span is a decision to start exporting. From our analysis, small- and medium-sized, young enterprises find it difficult to penetrate foreign markets and are particularly vulnerable to quitting exporting, especially within the first five to seven years. One of the tools that would help to support those firms is export credit – an insurance, guarantee, or financing arrangement – that allows foreign buyer to defer payment over a certain period. A short-term credit (3 months to 2 years) or long-term credit (2-5 years) can be used to address needs of different types of foreign buyers. This tool is actively used by OECD and emerging countries to promote exporting. Yet, there are strong arguments against setting trade finance instruments under the governmental umbrella in developing countries, including low institutional capacity and high governmental debts. Designing trade finance instruments requires careful ex-ante analysis of their impact before the decision to introduce them is made.

Active measures to promote small and medium enterprises abroad should be implemented by agencies and ministries that oversight trade. The common practices developed in the OECD countries are directed towards helping companies to trade. For instance, The Department of International Trade in the UK helps local companies to grow and sell overseas, while assisting foreign companies to find partners in the UK. This work is performed through a network of overseas posts and link businesses to the overseas advisor who can help to give market and sector advice, conduct market research, and support overseas visits.

4.3. Strategy towards the largest export-oriented sectors

4.3.1. Unblock particular bottlenecks

- Specific markets problems
- Resolve problems in Utilities and Energy sector
- Human capital issues
- Harmonizing capital, currency regulations, and harmonizing financial accounting standards with the key trade partners;

Industry-leaders refer to a number of specific and well-known problems: inefficiency of the scrap metal market, monopolization of the market of fertilizers, inadequate and insufficient infrastructure, burdensome regulations, lack of access to finance, and the ban on the sale of agricultural land. Addressing them would unleash the potential of the largest Ukrainian industries.

Importantly, there are distortions in the economy that don't damage MAIT leaders directly but reduce valuable opportunities. This includes bottlenecks in the outputs markets which restrain growth of the internal demand in the country. Specific examples include strategy of low capital investments in the energy, infrastructure and utility sectors, and legitimized possibility of the energy sector intermediaries to accumulate debts to NAK "Naftogaz" thus damaging financial health of the energy sector.

Large exporters are frequently groups of companies with legal entities in multiple jurisdictions - solution that optimizes taxation, helps in attracting capital and puts under protection of laws that are more favorable for commercial transactions and ownership. But these optimization practices come at a cost: both, for the executives in the business and jurisdictions involved. The dark side of this phenomenon is that money which could potentially be invested in the Ukrainian economy are elsewhere. The reasons for these are very complex, but some of them can be articulated and could potentially be resolved. For example, harmonization of the financial reporting and accounting standards, banking and financial regulations with European practices would considerably strengthen capital and financial markets in Ukraine, by giving better access to the lower cost finance.

The future might bring about a turnaround for multi-jurisdiction businesses. The global effort lead by the OECD to tackle Base erosion and profit shifting (BEPS) and introduce the standards for exchange of information on request and for the automatic exchange of financial account information[43] - of which Ukraine is a member - will start to change the way of doing business. These measures are likely to increase tax revenues for the governments and turn global business competition in a more level-playing field. Importantly, other countries, including Cyprus, whose commercial law, cheap services related to having a company, and data protection are benefiting many Ukrainian business-owners, joined these anti-BEPS and data-exchange initiatives as well. Thus, large Ukrainian business groups can face increasing cost of doing business making the cumulative effect of this global effort ambiguous for the country.

A strong free economy requires a constant in-flow of new leaders, innovative ideas and technologies. Universities, research institutes, schools give birth to nation`s values and new ideas. Sustainable economic growth of tomorrow, thus, requires transformation of the educational system and academia: modernization of the educational standards at all levels, changing financial model of the research infrastructure to allow for competition and better opportunities for private institutions. The system of

[43] Ukraine is a member of the Inclusive Framework on Base Erosion and Profit Shifting, and Global Forum on Transparency and Exchange of Information for Tax Purposes. Anti-BEPS package and the standards for exchange of information on request and for the automatic exchange of financial account information (the "Common Reporting Standard") are programs which members of these initiatives are committed to implement.

vocational education and training schools requires comprehensive reforming to establish clear lines of executive and fiscal subordination, and thus clear leadership at the local and national levels. Yet, specific problems of lacking human resources that were mentioned in the interviews might be resolved by the businesses themselves through in-house or outsourced training programs, and by local governments through improvement in vocational education. Joint public-private educational programs could divert currently slacking public resources (e.g. land and buildings) or technologies (e.g. comparative cheap internet) into improved adult-learning opportunities and professional training.

Another looming problem refers to increasing trade barriers in metallurgy, which is combined with reduction in iron&steal prices and upwards pressure on the price coming from transport tariffs and labor costs. These tendencies might lead to the need to drastically restructure metallurgy business by changing technologies and developing new products.

4.3.2. Conduct proactive trade policy

The role of government in promoting trade and defending Ukrainian companies from unfair competition and unfair treatment in the foreign markets should be directed through legal and informational channels. The WTO dispute settlement mechanism – although not always efficient - remains the main tool to resolve international trade disputes. The government should be in touch with Ukrainian business communities and individual firms to be informed about trade barriers and unfair practices established against domestic companies abroad. The big part of this task is to document various business concerns and to raise them in bilateral negotiations at the highest diplomatic level, as well as through the WTO platforms and mechanisms.

Other important tasks of the government trade-related agencies are bilateral trade talks to create new free trade agreements, improve market access for Ukrainian producers through existing agreements, and protect Ukrainian firms in foreign markets. The state capacity in these areas depends on availability of well-trained professionals in the areas of business, economics, and law. This human capital cannot be created overnight and needs to be nurtured and trained. Ukraine can also free-ride on the experience of such trade negotiators as EU to secure new free trade agreements. By harmonizing its norms and regulations with the EU, Ukraine will have easier trade negotiations with countries that already signed free trade agreements with the EU (South Korea, Canada) or with countries that themselves plan to synchronize their standards with the EU (i.e. the UK).

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Annexes

Annex A. Composition of the MAIT industries

Agriculture:

Sector A, kved2 01 and 02, 2010 classifications

Manufacturing:

Sector C, kved2 10-33 in KVED 2010

- Coke
- Computer, electronic and optical products
- Rubber and plastic products
- Fabricated metal products, except machinery and equipment
- Electrical equipment
- Other transport equipment
- Other non-metallic mineral products
- Chemicals and chemical products
- Basic pharmaceutical products and pharmaceutical preparations
- Machinery and equipment
- Motor vehicles, trailers and semi-trailers
- Furniture, other manufacturing
- Products of wood, paper, printing
- Textiles, wearing apparel, Leather products
- Refined petroleum products
- Basic metals
- Food, beverages and tobacco products

IT:

Sector J, kved2 62-63 in KVED 2010

Annex B. Major employment and outputs statistics on MAIT sectors, 2012-16

Table 22. Value added, current UAH bln

	Agriculture	Manufacturing	IT
2012	n.a.	n.a.	n.a.
2013	132.4	169.6	17.5
2014	161.1	194.1	23.4
2015	239.8	236.7	37.5
2016	279.7	291.5	51.1

Source: State Statistics Service of Ukraine

Table 23. Shares in total value added, %

	Agriculture	Manufacturing	IT
2012	n.a.	n.a.	n.a.
2013	9.9%	12.7%	1.3%
2014	11.7%	14.0%	1.7%
2015	14.2%	14.0%	2.2%
2016	13.8%	14.4%	2.5%

Source: State Statistics Service of Ukraine

Table 24. Real growth of value added, % yoy

	Agriculture	Manufacturing	IT
2012	n.a.	n.a.	n.a.
2013	13.0%	-9.9%	n.a.
2014	2.3%	-8.6%	7.4%
2015	-32.8%	-38.9%	21.9%
2016	50.7%	43.8%	28.9%

Source: State Statistics Service of Ukraine

Table 25. Official employment by business sector (business entities)[44]

	Agriculture		Manufacturing		IT	
	Employment, '000 people	Share of the total	Employment, '000 people	Share of the total	Employment, '000 people	Share of the total
2012	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2013	715.0	7.2%	2,049.7	20.6%	127.9	1.3%
2014	723.0	8.0%	1,793.4	19.9%	153.5	1.7%
2015	632.1	7.6%	1,642.1	19.7%	148.0	1.8%
2016	648.5	7.9%	1,600.2	19.4%	163.0	2.0%

Source: State Statistics Service of Ukraine

[44] «Суб'єкти господарювання» (business entities) is a broader category, which includes firms and registered individual enterprises.

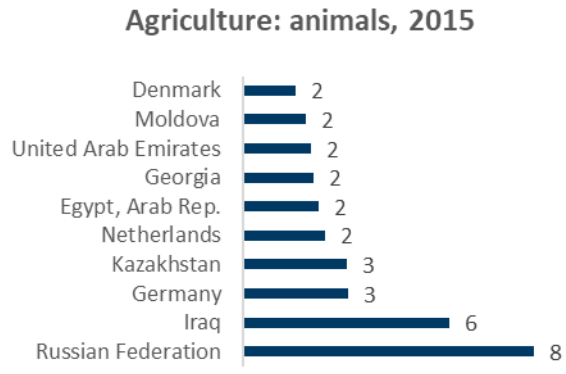
Table 26. Official employment by firms

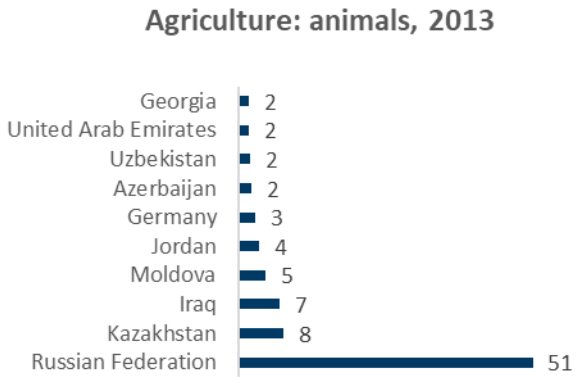
	Agriculture		Manufacturing		IT	
	Employment, '000 people	Share of the total	Employment, '000 people	Share of the total	Employment, '000 people	Share of the total
2012	704.5	8.9%	1,961.0	24.8%	52.7	0.7%
2013	679.7	8.9%	1,874.1	24.5%	58.9	0.8%
2014	623.3	9.6%	1,620.2	24.9%	53.2	0.8%
2015	592.1	9.8%	1,480.2	24.5%	50.5	0.8%
2016	608.6	10.3%	1,429.6	24.1%	49.0	0.8%

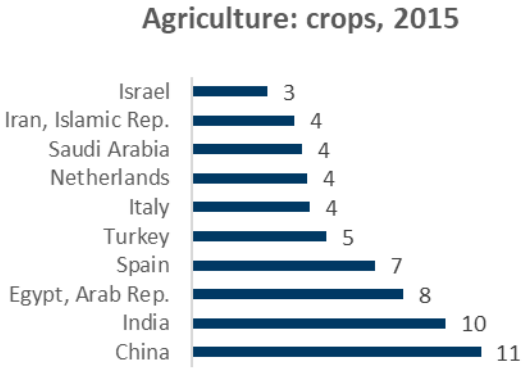
Source: State Statistics Service of Ukraine

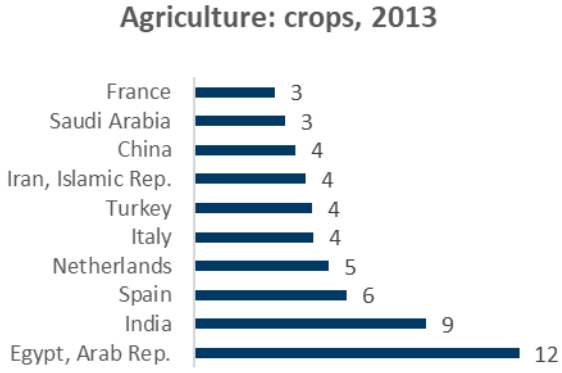
Annex C. Top-10 importers of Ukrainian exports by sector, %

Agriculture



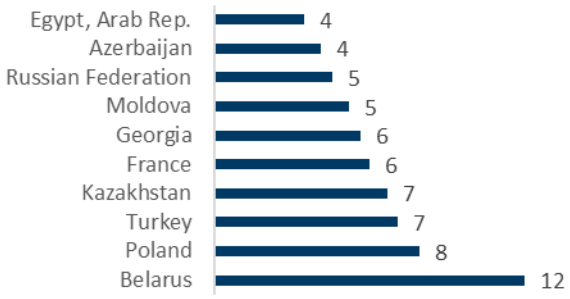




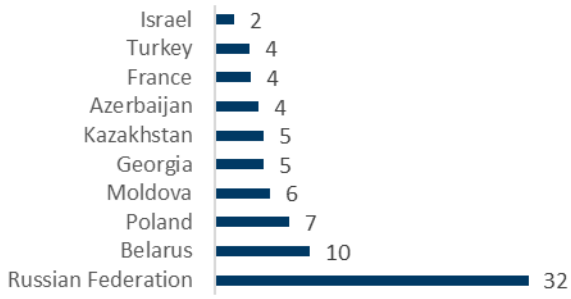


Manufacturing

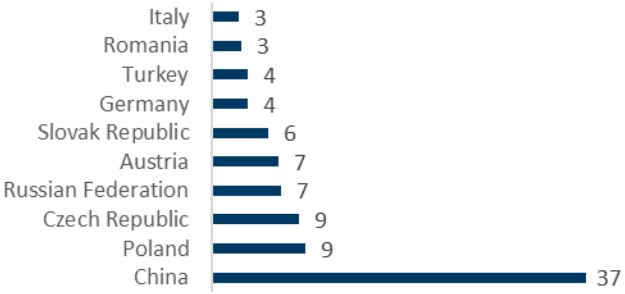
Manufacturing: food products, 2015



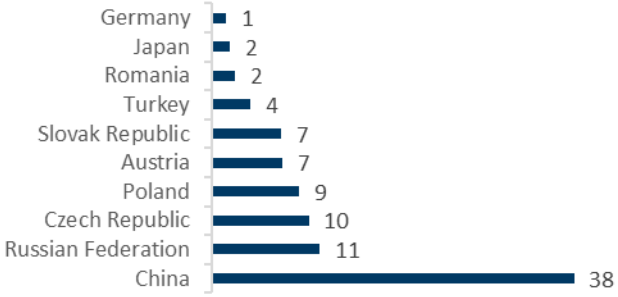
Manufacturing: food products, 2013



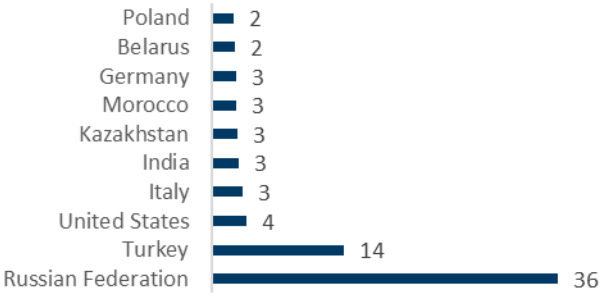
Manufacturing: minerals, 2015



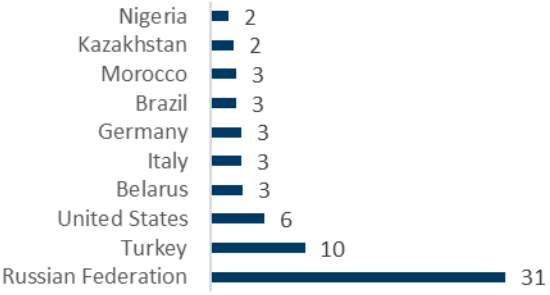
Manufacturing: minerals, 2013



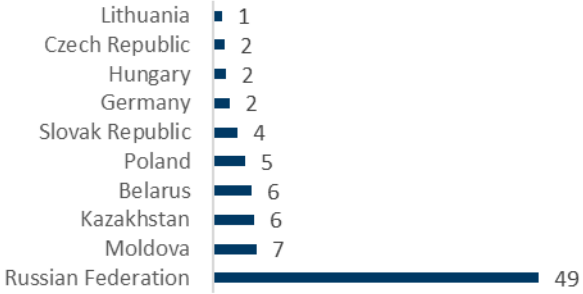
Manufacturing: Chemicals, 2015



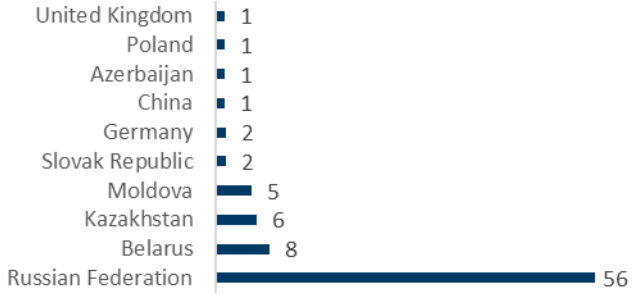
Manufacturing: Chemicals, 2013



Manufacturing: Plastic&Rubber products, 2015

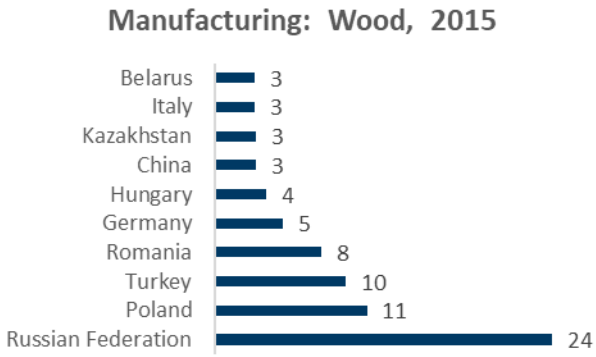


Manufacturing: Plastic&Rubber products, 2013




Manufacturing: Hides, Skins & leather, 2015
Romania 1
Slovak Republic 1
Finland 2
Unspecified 2
Spain 2
Portugal 2
Russian Federation 2
Germany 8
Poland 35
Italy 41

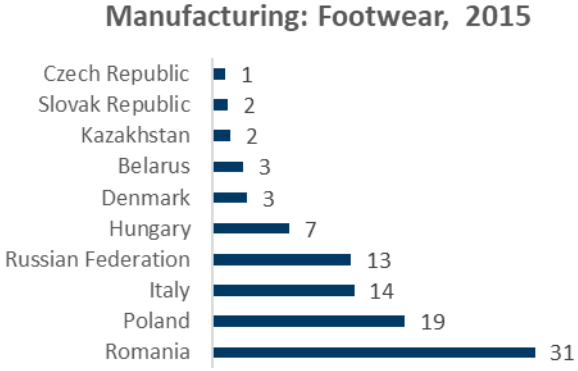

Manufacturing: Hides, Skins & leather, 2013
India 2
Czech Republic 2
Netherlands 2
Hungary 2
Belarus 3
Spain 3
Russian Federation 4
Germany 6
Poland 26
Italy 42

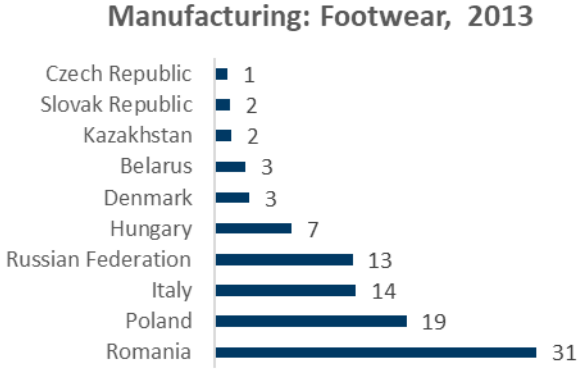

Manufacturing: Wood, 2015
Belarus 3
Italy 3
Kazakhstan 3
China 3
Hungary 4
Germany 5
Romania 8
Turkey 10
Poland 11
Russian Federation 24


Manufacturing: Wood, 2013
Moldova 2
Italy 3
Romania 4
China 4
Germany 4
Belarus 5
Turkey 5
Kazakhstan 5
Poland 6
Russian Federation 42


Manufacturing: Textile & Clothes, 2015
Belarus 3
Belgium 3
Italy 3
France 4
Romania 5
Hungary 6
Denmark 7
Poland 8
Russian Federation 11
Germany 29

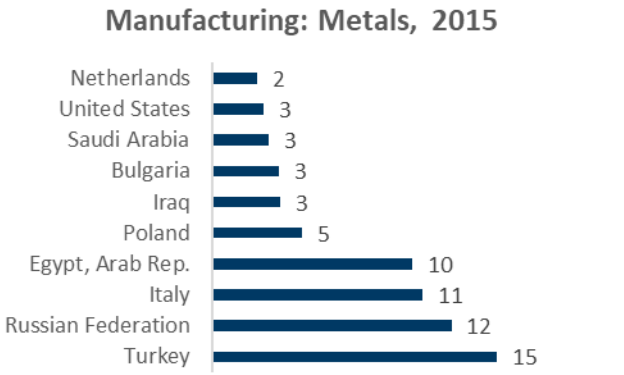

Manufacturing: Textile & Clothes, 2013
Belgium 3
Italy 3
Belarus 3
Romania 4
France 4
Poland 5
Hungary 5
Denmark 5
Russian Federation 20
Germany 26

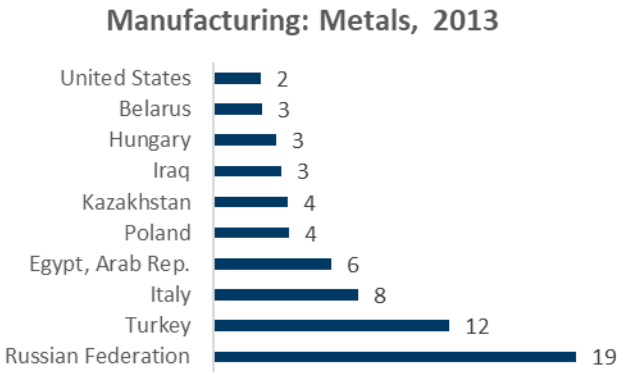

Manufacturing: Footwear, 2015
Czech Republic 1
Slovak Republic 2
Kazakhstan 2
Belarus 3
Denmark 3
Hungary 7
Russian Federation 13
Italy 14
Poland 19
Romania 31

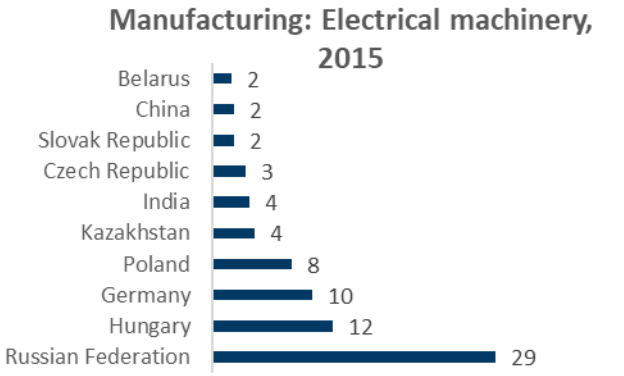

Manufacturing: Footwear, 2013
Czech Republic 1
Slovak Republic 2
Kazakhstan 2
Belarus 3
Denmark 3
Hungary 7
Russian Federation 13
Italy 14
Poland 19
Romania 31

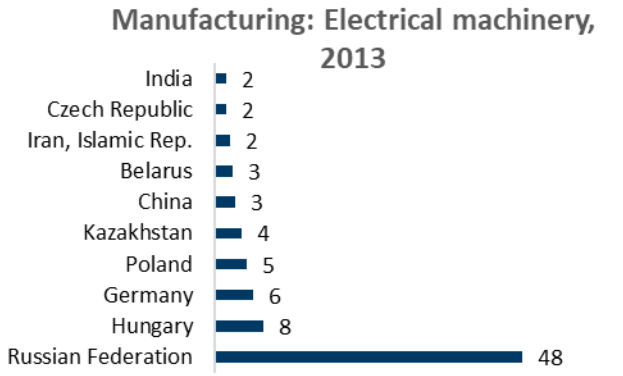

Manufacturing: Stone & Glass, 2015
Lithuania 2
Romania 2
Italy 3
Kazakhstan 5
Moldova 5
Germany 5
Belarus 8
Poland 9
Switzerland 16
Russian Federation 28

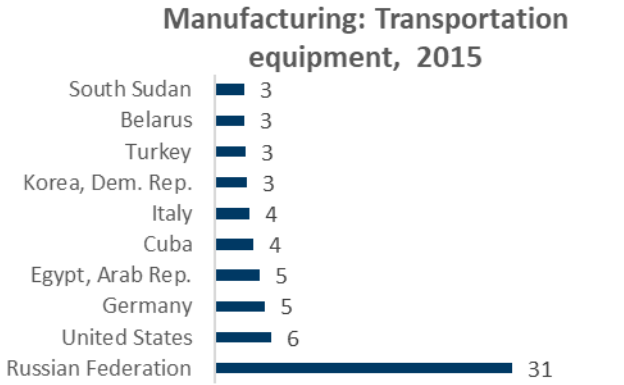

Manufacturing: Stone & Glass, 2013
Azerbaijan 1
United Kingdom 1
Turkey 2
Poland 3
Germany 5
Moldova 5
Kazakhstan 7
Belarus 10
Switzerland 10
Russian Federation 45


Manufacturing: Metals, 2015
Netherlands 2
United States 3
Saudi Arabia 3
Bulgaria 3
Iraq 3
Poland 5
Egypt, Arab Rep. 10
Italy 11
Russian Federation 12
Turkey 15


Manufacturing: Metals, 2013
United States 2
Belarus 3
Hungary 3
Iraq 3
Kazakhstan 4
Poland 4
Egypt, Arab Rep. 6
Italy 8
Turkey 12
Russian Federation 19

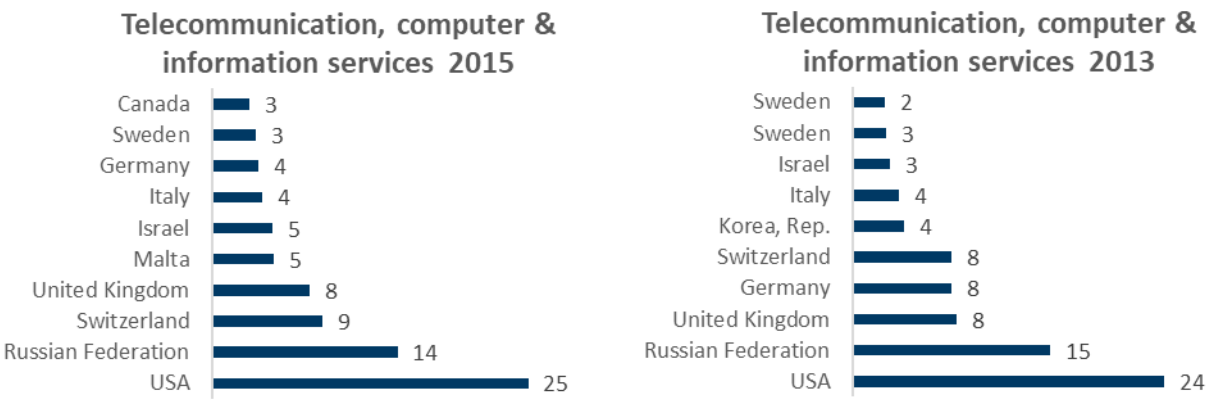

Manufacturing: Electrical machinery, 2015
Belarus 2
China 2
Slovak Republic 2
Czech Republic 3
India 4
Kazakhstan 4
Poland 8
Germany 10
Hungary 12
Russian Federation 29


Manufacturing: Electrical machinery, 2013
India 2
Czech Republic 2
Iran, Islamic Rep. 2
Belarus 3
China 3
Kazakhstan 4
Poland 5
Germany 6
Hungary 8
Russian Federation 48


Manufacturing: Transportation equipment, 2015
South Sudan 3
Belarus 3
Turkey 3
Korea, Dem. Rep. 3
Italy 4
Cuba 4
Egypt, Arab Rep. 5
Germany 5
United States 6
Russian Federation 31


Manufacturing: Transportation equipment, 2013
Latvia 1
Egypt, Arab Rep. 1
China 2
Azerbaijan 2
United States 2
Turkmenistan 2
Cuba 2
Belarus 3
Kazakhstan 12
Russian Federation 61

IT



Source: United Nations Comtrade

Annex D. Total sales and employment of state-owned vs private firms

Table 27. Total sales by private and state-owned companies in real terms, 2016 UAH bln

	Agriculture		Manufacturing		IT	
	Private	State-owned/ mixed	Private	State-owned/ mixed	Private	State-owned/ mixed
2012	369.9	20.4	1,764.4	173.4	30.8	2.5
2013	383.9	21.2	1,647.9	171.7	35.0	2.6
2014	439.1	20.2	1,524.6	168.3	38.6	1.6
2015	533.3	29.5	1,438.6	166.9	47.4	0.9
2016	461.1	25.4	1,293.2	120.6	47.5	0.5

Source: calculations based on data from the Ruslana database.

Table 28. Total employment by private and state-owned companies, '000 people

	Agriculture		Manufacturing		IT	
	Private	State-owned/ mixed	Private	State-owned/ mixed	Private	State-owned/ mixed
2012	588.2	93.9	1,637.0	254.1	38.8	4.4
2013	568.9	87.5	1,554.4	239.2	44.9	4.1
2014	536.8	78.1	1,370.5	202.2	40.4	3.4
2015	510.3	80.4	1,257.4	191.7	39.0	2.6
2016	525.1	94.7	1,248.5	194.8	37.3	5.6

Source: calculations based on data from the Ruslana database.

Table 29. Shares of private and state-owned companies in total sales, per cent

	Agriculture		Manufacturing		IT	
	Private	State-owned/ mixed	Private	State-owned/ mixed	Private	State-owned/ mixed
2012	94.8	5.2	91.1	8.9	92.5	7.5
2013	94.8	5.2	90.6	9.4	93.0	7.0
2014	95.6	4.4	90.1	9.9	96.1	3.9
2015	94.8	5.2	89.6	10.4	98.2	1.8
2016	94.8	5.2	91.5	8.5	98.9	1.1

Source: calculations based on data from the Ruslana database.

Table 30. Shares of private and state-owned companies in total employment, per cent

	Agriculture		Manufacturing		IT	
	Private	State-owned/ mixed	Private	State-owned/ mixed	Private	State-owned/ mixed
2012	86.2	13.8	86.6	13.4	89.8	10.2
2013	86.7	13.3	86.7	13.3	91.6	8.4
2014	87.3	12.7	87.1	12.9	92.2	7.8
2015	86.4	13.6	86.8	13.2	93.7	6.3
2016	84.7	15.3	86.5	13.5	87.0	13.0

Source: calculations based on data from the Ruslana database.

Annex E. Total sales and employment of Ukrainian vs foreign-owned firms

Table 31. Total sales by Ukrainian and foreign owned companies in real terms, 2016 UAH bln

	Agriculture		Manufacturing		IT	
	Ukrainian	Foreign/mixed	Ukrainian	Foreign/mixed	Ukrainian	Foreign/mixed
2012	283.1	80.2	1,119.7	779.7	14.7	15.9
2013	300.3	76.9	1,059.8	721.1	16.9	17.6
2014	331.9	98.4	1,002.3	654.4	14.1	23.2
2015	412.9	114.8	924.7	644.7	15.3	29.9
2016	357.5	87.0	820.5	533.5	13.4	29.6

Source: calculations based on data from the Ruslana database.

Table 32. Total employment by Ukrainian and foreign owned companies, '000 people

	Agriculture		Manufacturing		IT	
	Ukrainian	Foreign/mixed	Ukrainian	Foreign/mixed	Ukrainian	Foreign/mixed
2012	535.4	88.4	1,307.3	511.9	26.8	11.3
2013	513.2	84.5	1,239.4	484.5	28.0	12.7
2014	477.2	82.6	1,083.5	428.1	25.6	12.9
2015	463.2	74.7	990.1	400.6	23.8	12.3
2016	493.1	73.4	981.8	396.5	26.0	11.4

Source: calculations based on data from the Ruslana database.

Table 33. Shares of Ukrainian and foreign owned companies in total sales, per cent

	Agriculture		Manufacturing		IT	
	Ukrainian	Foreign/mixed	Ukrainian	Foreign/mixed	Ukrainian	Foreign/mixed
2012	72.5	20.5	57.8	40.2	44.1	47.8
2013	74.1	19.0	58.2	39.6	45.0	46.9
2014	72.3	21.4	59.2	38.7	35.1	57.6
2015	73.4	20.4	57.6	40.2	31.8	61.9
2016	73.5	17.9	58.0	37.7	28.0	61.6

Source: calculations based on data from the Ruslana database.
Note: the sums do not add up to 100% because of a lack of data for some companies.

Table 34. Shares of Ukrainian and foreign-owned companies in total employment, per cent

	Agriculture		Manufacturing		IT	
	Ukrainian	Foreign/mixed	Ukrainian	Foreign/mixed	Ukrainian	Foreign/mixed
2012	78.5	13.0	69.1	27.1	61.9	26.2
2013	78.2	12.9	69.1	27.0	57.2	26.0
2014	77.6	13.4	68.9	27.2	58.4	29.5
2015	78.4	12.6	68.3	27.6	57.2	29.5
2016	79.6	11.8	68.0	27.5	60.5	26.7

Source: calculations based on data from the Ruslana database.
Note: the sums do not add up to 100% because a lack of data for some companies.

Annex F. Offshore Financial Centers

List of Offshore Financial Centers (IMF, last updated on November 20, 2014).
http://www.imf.org/external/NP/ofca/OFCA.aspx

1. Andorra (AND)
2. Anguilla, Overseas Territory of the United Kingdom (AIA)
3. Aruba, Kingdom of the Netherlands (ABW)
4. Bahamas, The (BHS)
5. Belize (BLZ)
6. Bermuda (BMU)
7. British Virgin Islands, Overseas Territory of the United Kingdom (VGB)
8. Cayman Islands (CYM)
9. Cook Islands (COK)
10. Cyprus (CYP)
11. Gibraltar, Overseas Territory of the United Kingdom (GIB)
12. Guernsey, Crown Dependency of the United Kingdom (GGY)
13. Isle of Man, Crown Dependency of the United Kingdom (IMN)
14. Jersey, Crown Dependency of the United Kingdom (JEY)
15. Liechtenstein (LIE)
16. Macao Special Administrative Region of the People's Republic of China (MAC)
17. Malaysia (MYS)
18. Monaco (MCO)
19. Montserrat, Overseas Territory of the United Kingdom (MSR)
20. Netherlands Antilles, Kingdom of the Netherlands (ANT)
21. Palau, Republic of (PLW)
22. Panama (PAN)
23. Samoa (WSM)
24. Seychelles (SYC)
25. Turks and Caicos Islands (TCA)
26. Vanuatu (VUT)

Annex G. Estimation of production function

Table 35 presents estimates of the production function parameters. We define TFP as follows

$$\ln TFP_{it} = \ln Y_{it} - \beta_L \ln L_{it} - \beta_K \ln K_{it} - \beta_M \ln M_{it}$$

where Y_{it} is revenue less indirect taxes, L_{it} is employment, K_{it} is value of fixed assets, and M_{it}.is material cost. Revenue is deflated with a two-digit industry deflator, whereas material costs and

capital measures are deflated with PPI index, both available from the State Statistics Office. Estimation of production function is performed separately for each industry (KVED2005 2 digit definition).

Table 35. Production function estimation

KVED 2005	Industry name	lnK	lnL	lnM	N
1	Agriculture, hunting	.171	.007	.716	78659
		(.014)	(.007)	(.002)	
15	Mfg. food	-.008	.237	.667	30258
		(.006)	(.005)	(.009)	
16	Mfg. tobacco	.649	.354	.623	155
		(.342)	(.088)	(.16)	
17	Mfg. textiles	-.103	.289	.601	2635
		(.032)	(.018)	(.018)	
18	Mfg. apparel, fur	-.094	.469	.48	5282
		(.034)	(.021)	(.01)	
19	Mfg. leather, luggage	.099	.367	.571	1642
		(.092)	(.022)	(.014)	
20	Mfg. wood, cork, straw pdct.	-.005	.272	.626	7509
		(.038)	(.01)	(.011)	
21	Mfg. paper, pulp	-.066	.211	.594	2682
		(.078)	(.012)	(.009)	
22	Publishing, printing	.016	.49	.458	14153
		(.017)	(.021)	(.009)	
23	Mfg.coke, ref. petrol, nuclear	0	.15	.537	786
		(.108)	(.079)	(.033)	
24	Mfg. chemicals	.153	.26	.571	6411
		(.094)	(.02)	(.024)	
25	Mfg. rubber	.091	.317	.585	7396
		(.018)	(.018)	(.014)	
26	Mfg. non-metal mineral	.062	.211	.656	11186
		(.033)	(.013)	(.007)	
27	Mfg. basic metal	.203	.158	.628	3031
		(.075)	(.039)	(.03)	
28	Mfg. fabricated metal	.157	.302	.562	10345
		(.015)	(.006)	(.005)	
29	Mfg. machinery, eqip. nec	.056	.42	.481	16626
		(.025)	(.011)	(.009)	
30	Mfg. office machinery	.166	.695	.339	1230
		(.149)	(.059)	(.019)	
31	Mfg. electrical machinery	.062	.317	.493	6578
		(.072)	(.017)	(.011)	
32	Mfg. radio, tv, commuic. equip.	.184	.35	.401	2139
		(.02)	(.025)	(.004)	
33	Mfg. medical, precision, watch	.043	.429	.458	3971
		(.05)	(.012)	(.016)	
34	Mfg. motor vehicles	.065	.215	.553	1693
		(.11)	(.054)	(.024)	
35	Mfg. other transport	.034	.4	.465	3163
		(.047)	(.013)	(.022)	

36	Mfg. furniture	.066	.369	.559	6703
		(.053)	(.009)	(.009)	
37	Recycling	.188	.622	.318	2627
		(.028)	(.042)	(.013)	
72	Computer and related	.062	.698	.221	10871
		(.082)	(.043)	(.011)	

Note: Bootstrapped standard errors are in parentheses.

Annex H. Productivity decomposition Foster et al. (2001)

We define subindustry productivity as $P_{st} = \sum_{i \in I} s_{it} p_{it}$, where s is a subindustry according to NACE 2 digit industry classification, t is year, i is a firm that belongs to an industry s , s_{it} is market share of firm i at time t, defined as $s_i = y_{it}/Y_{st}$. y_{it} is output of firm i at time t, Y_{st} is aggregate output of subindustry s at time t. p_{st} is productivity of firm j at time t.

Decomposition of industry productivity is as follows

$$P_{st} = \sum_{i \in C} s_{it-1} \Delta p_{it} + \sum_{i \in C} (p_{it-1} - P_{st-1}) \Delta s_{it} + \sum_{i \in C} \Delta s_{it} \Delta p_{it} + \sum_{i \in N} s_{it} (p_{it} - P_{st-1}) + \sum_{i \in EX} s_{it-1} (p_{it-1} - P_{st-1})$$

where C is a set of continuing firms in subindustry s between time periods $t-1$ and t, N is a set of new firms in industry s between time periods $t-1$ and t, EX is a set of exiting firms between time periods $t-1$ and t. The first term is within-firm component, which measures internal growth of productivity in each continuing firm. The second term is between-firm component, which represents productivity growth due to increase in the market share of more productive firms (reallocation). The third term represents productivity growth due to expansion of market shares of firms with increasing productivity. The fourth term measure productivity growth due to entry of new firms. Finally, the fifth term measures contribution of exiting firms towards industry productivity.

Annex I. Determinants of productivity growth and job creation

We follow (Haltiwanger et al. 2013) and introduce firm-level growth rate as

$$g_{it}^k = \frac{X_{it}^k - X_{it-1}^k}{\bar{X}_{it}}$$

where

$$\bar{X}_{it} = 0.5(X_{it}^k + X_{it-1}^k)$$

k={empl, tfp, output}, i is firm, t is year.

We define segment and overall growth rates as

$$g_t^k = \sum_s \frac{X_{st}^k}{X_t^k} g_{st}^k = \sum_s (\frac{X_{st}^k}{X_t^k} \sum_{i \in s} \frac{X_{it}^k}{X_{st}^k} g_{it}^k)$$

Where $X_t^k = \sum_s X_{st}^k = \sum_s \sum_{i \in s} X_{it}$

Annex J. What contributes to labor productivity growth?

Table 36. LP growth without fixed effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
L.gamma_lp_it						-.344**	-.343**
						(.002)	(.002)
Exporter		15.51**			11.21**	11.46**	11.10**
		(.636)			(.715)	(.693)	(.694)
Importer			15.78**		11.35**	10.63**	10.32**
			(.650)		(.738)	(.720)	(.721)
FDI				2.685**	-3.352**	-6.089**	-5.975**
				(.931)	(.959)	(.910)	(.910)
Exit							-37.74**
							(.819)
New	37.11**	37.28**	36.90**	37.08**	37.13**	66.70**	65.01**
	(1.538)	(1.536)	(1.535)	(1.538)	(1.535)	(21.706)	(21.264)
Young	13.93**	13.91**	13.66**	13.87**	13.79**	4.872**	5.438**
	(.461)	(.461)	(.461)	(.461)	(.461)	(.477)	(.476)
Small	-33.14**	-27.65**	-28.00**	-32.93**	-25.74**	-30.14**	-27.70**
	(.576)	(.625)	(.621)	(.583)	(.641)	(.608)	(.609)
Medium	-6.891**	-2.911**	-3.020**	-6.742**	-1.413*	-.190	.288
	(.536)	(.567)	(.567)	(.540)	(.579)	(.539)	(.540)
Years	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Subind.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	520281	520281	520281	520281	520281	397028	397028
R^2	.127	.128	.128	.127	.129	.231	.236

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$

Table 37. LP with fixed effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
L.gamma_lp_it						-.401**	-.401**
						(.002)	(.002)
L.gamma_lp_it							
Exporter		17.67**			16.76**	15.69**	15.36**
		(1.127)			(1.156)	(1.190)	(1.189)
Importer			8.484**		5.380**	4.620**	4.355**
			(1.108)		(1.137)	(1.146)	(1.145)
FDI				-5.833**	-7.040**	-6.584**	-6.735**
				(1.570)	(1.576)	(1.631)	(1.627)
Exit							-28.26**
							(1.191)
Ln of firm age	-75.07**	-75.69**	-75.23**	-75.09**	-75.78**	-60.27**	-57.91**
	(1.150)	(1.151)	(1.150)	(1.151)	(1.151)	(1.663)	(1.661)
Ln Employment	11.99**	11.44**	11.77**	12.00**	11.34**	9.495**	8.218**
	(.355)	(.357)	(.356)	(.355)	(.358)	(.416)	(.419)
Years	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Subind.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	510414	510414	510414	510414	510414	388821	388821
R^2	.145	.145	.145	.145	.145	.265	.267

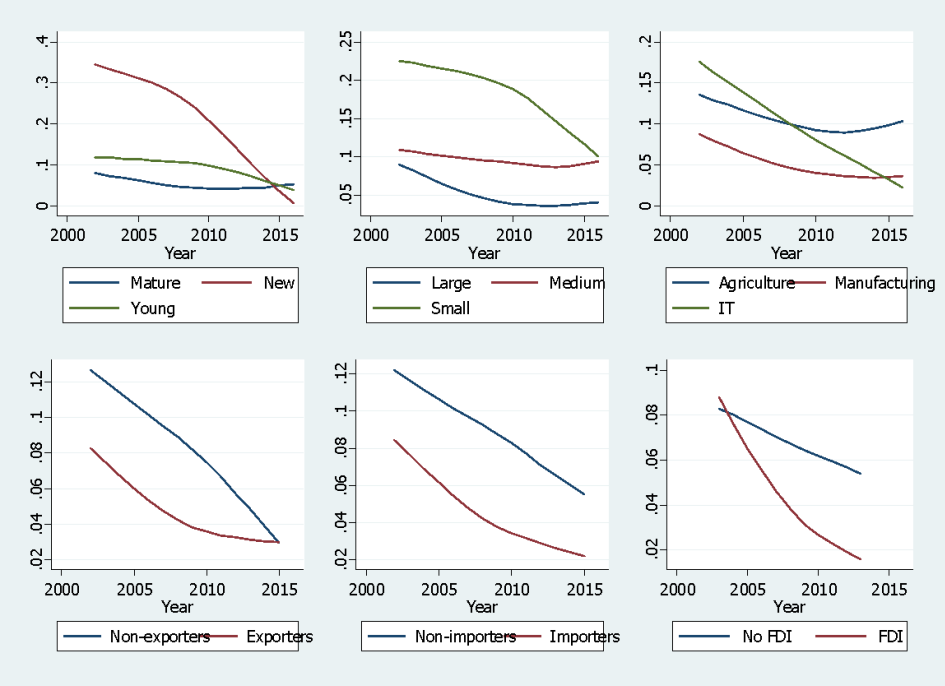
Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$

Annex K. Dynamic tables

We consider changes in total factor productivity (TFP) by firms in different categories (age, size, sector, exporters, importers, firms with foreign ownership) to understand what factors contribute to higher TFP growth. TFP growth rates by industries and other groups weighted by output share are presented in Figure 46. First, new firms had considerably higher TFP growth until 2015, while mature firms did not have considerable productivity growth for the whole period. Second, small companies had higher TFP growth, especially until 2010, while large firms had almost zero productivity growth since 2010. Third, IT firms were drivers of productivity growth before economic crisis, but agricultural firms took the lead after the financial crisis. Fourth, exporting, importing, and foreign-owned firms lagged in productivity growth, while domestic, non-exporting, non-importing firms grew more rapidly

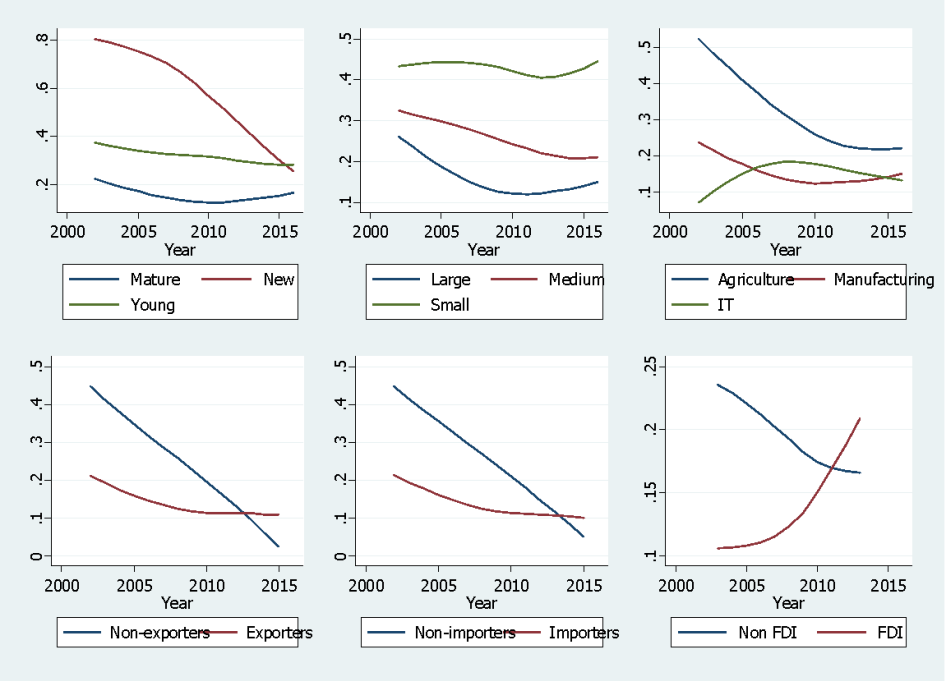
Figure 47 presents similar trends in labor productivity, but with recovery starting in 2011. In terms of output growth manufacturing contributed strongly at the beginning of the period, but agriculture and IT sectors took the lead after 2005 (Figure 48). Finally, Figure 49 shows that in terms of labor growth small firms explain drop in employment. Job creating was the strongest in IT sector.

Figure 46. TFP growth rates between 2001-2016 by different factors



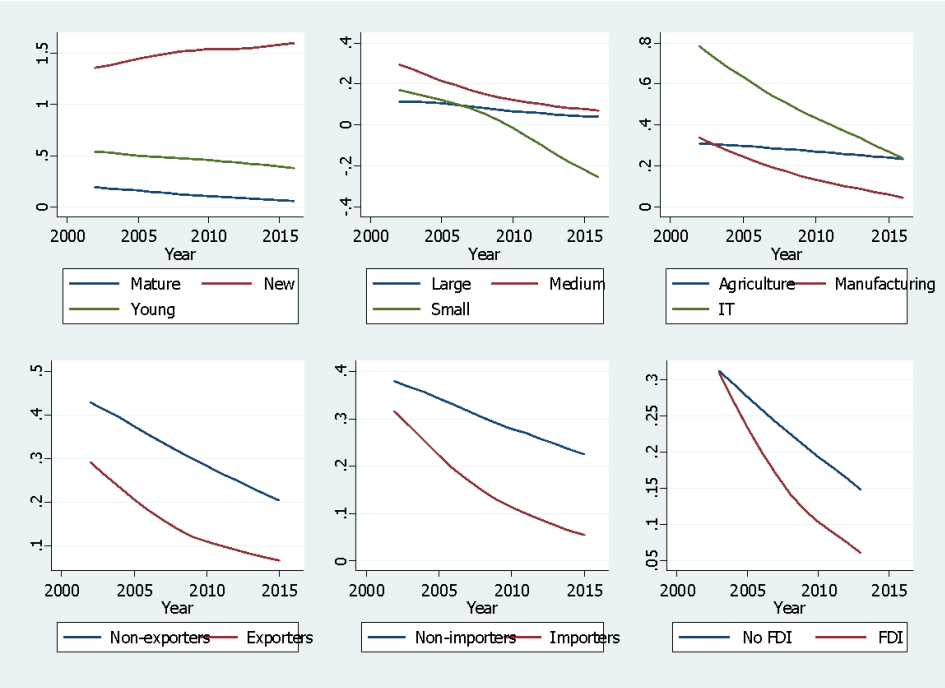
Note: Lines present weighted averages, where weights represent market share. Cyclical components were HP filtered out. Smoothed trends are presented. Crimea, Donetsk, and Luhansk are not included.

Figure 47. Labor productivity growth between 2001-2016 by different factors



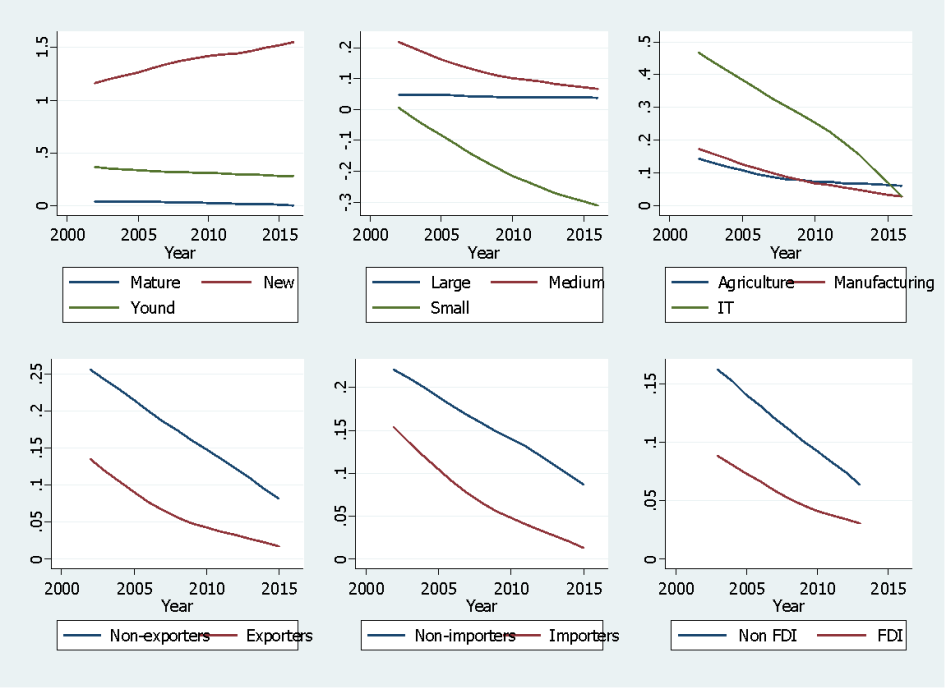
Note: Lines present weighted averages, where weights represent market share. Cyclical components were HP filtered out. Smoothed trends are presented. Crimea, Donetsk, and Luhansk are not included.

Figure 48. Output growth rates between 2001-2016 by different factors



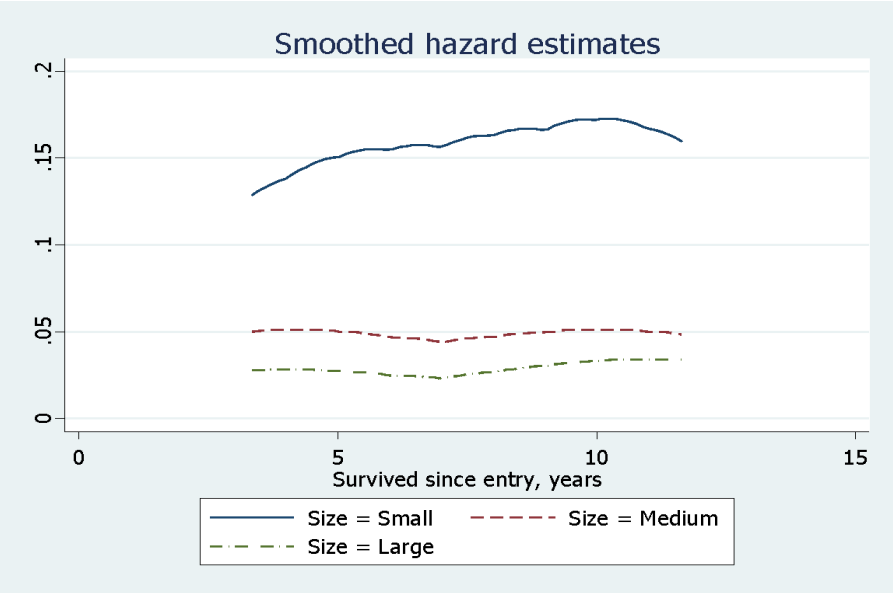
Note: Lines present weighted averages, where weights represent market share. Cyclical components were HP filtered out. Smoothed trends are presented. Crimea, Donetsk, and Luhansk are not included.

Figure 49. Employment growth rates between 2001-2016 by different factors



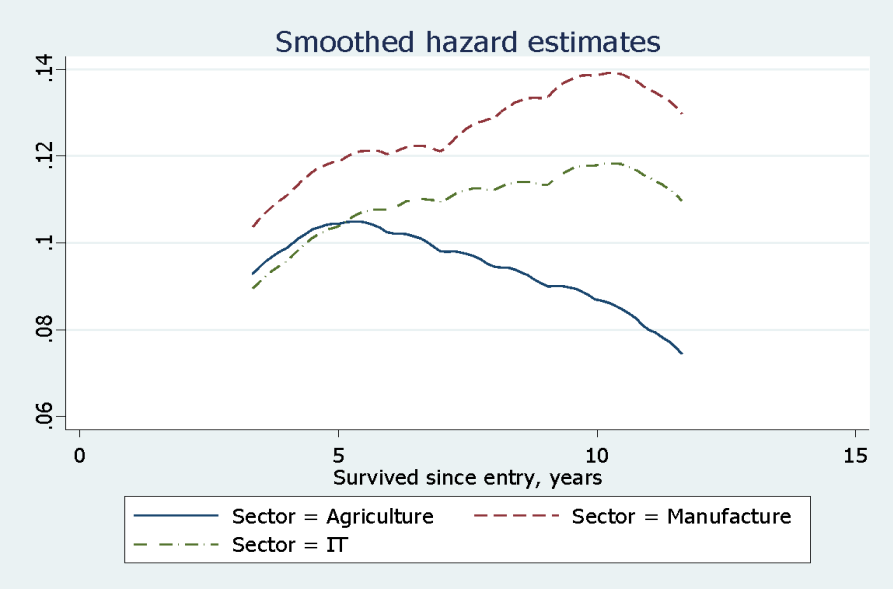
Note: Lines present weighted averages, where weights represent market share. Cyclical components were HP filtered out. Smoothed trends are presented. Crimea, Donetsk, and Luhansk are not included.

Figure 50. Hazard rates of firm survival in Ukraine between 2001-2016 by firm size



Source: Author's computations based on Ruslana database. Crimea, Donetsk, and Luhansk are not included.

Figure 51. Hazard rates of firm survival in Ukraine between 2001-2016 by sector

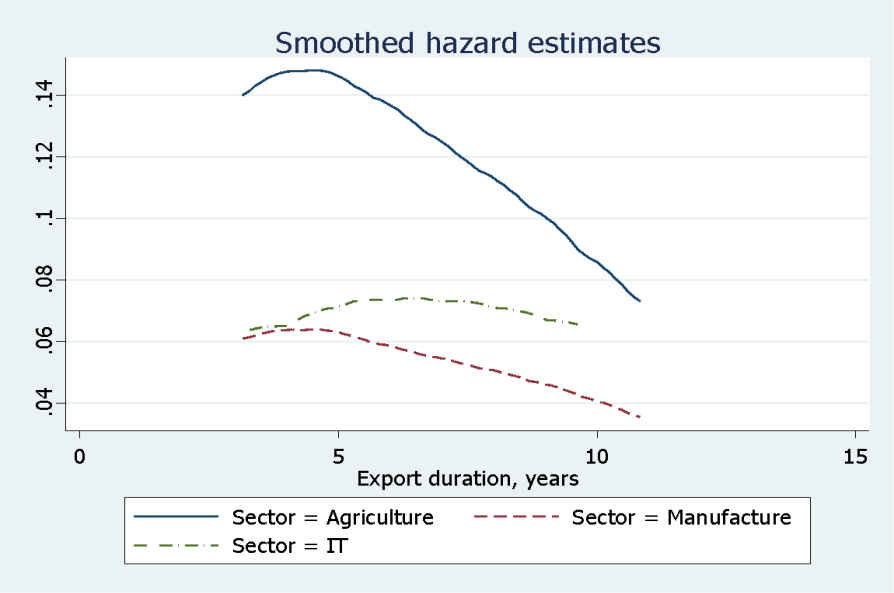


Source: Author's computations based on Ruslana database. Crimea, Donetsk, and Luhansk are not included.

According to Figure 50, firms in agriculture have the highest risk of exit when they are fairly young, and then the hazard rate rapidly drops to the lowest rate of about 7 percent. Firms in manufacturing and IT, on the other hand, have a steadily growing risk of exit, which reaches its peak around 10-11 years, and then starts to sharply decline. This feature, however, might be related to the shock experienced by manufacturing and IT firms in 2013 due to political instability and military conflict in Eastern Ukraine, when large number of firms exited.

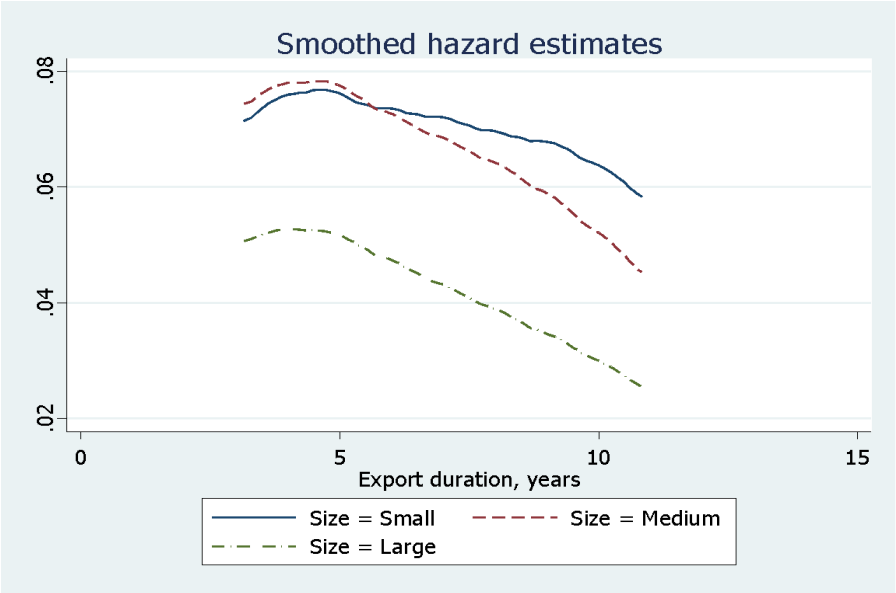
According to Figure 51, which report hazard rates by firm size, small 10-year-old firm has the highest probability to shut down. Medium and large firms have fairly stable hazard rate over their age profiles.

Figure 52. Hazard rates of export survival in Ukraine between 2001-2016 by sector



Source: Author's computations based on Ruslana database. Crimea, Donetsk, and Luhansk are not included.

Figure 53. Hazard rates of firm survival in Ukraine between 2001-2016 by firm size



Source: Author's computations based on Ruslana database. Crimea, Donetsk, and Luhansk are not included.

As Figure 52 demonstrates, the risk of stopping exports is much higher for agricultural firms than for IT and manufacturing firms. Risk has an inverse U-shape for all sectors, but with different timing of the peak rate. Once a firm from Manufacturing or Agriculture survived 5 years of exporting, the risk of stopping exporting activities goes down very rapidly. For IT firms, the risk peaks at 6-7 years.

The 5th year of exporting is critical period for firms of all sizes (Figure 53). Once a firm survives it, the risk of stopping exporting starts to diminish continuously over time.