THE IMPACT OF THE GLOBAL MACROECONOMIC FACTORS ON THE PIPE INDUSTRY IN THE MODERN GLOBALIZED ECONOMY

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Abstract. Current paper investigates the effects of the global factors on the pipe industry in the modern globalized economy. In this research, we have studied the trends in the global pipe market, the dynamics of manufacturing and exports of pipe products in Ukrainian enterprises. We have identified the main macroeconomic factors affecting pipe industry, which are the demand for pipe products, political decisions, the exchange rates, protectionist measures, world prices for pipe products, price competition coming from low-cost countries. With the use of the PEST method, we have identified macroeconomic factors that affect the production and exports of pipes by Ukrainian enterprises. Macroeconomic factors that led to a decrease in pipe exports from Ukraine in the first half of 2019 are the following: temporary protective measures on imports of steel products into the EU adopted in 2018, the decision of the European Commission to extend the anti-dumping duties on imports of seamless pipes from Ukraine for five years, the introduction by Russia in 2019 a ban on the import of certain types of pipes from Ukraine, in particular for oil pipelines.

Keywords: pipe industry, pipe market, producer price index, pipe exports, import restrictions

JEL: L61, L23, F18

1. Introduction

During the 21st century, the global macro-environment of industrial enterprises in the world, including Ukraine has been characterized by instability and uncertainty. Armed and political conflicts, various economic sanctions, the revival of protectionism, trade and currency wars and other factors have a significant influence on the activity of the enterprises. These factors fully affect the metallurgical complex, which includes the pipe industry. Given the fact that metallurgy plays a strategic role in the economies of the leading countries of the world and the pipe industry is particularly important for the functioning of the

oil and gas complex, automotive and mechanical engineering, construction entities, the research of the influence of the macroeconomic factors on the activity of the pipe entities is a question of a particular relevance. For Ukraine, the significance of such studies is determined by the fact that metallurgy provides about 28% of foreign currency inflows to Ukraine and about 70% of pipe products are exported (International Trade Administration, 2019). Thus, the purpose of current paper is to determine the global factors affecting the pipe industry production and exports in the world and in Ukraine particularly.

2. Pipe industry development in the world and Ukraine

2.1. Pipe industry in the leading economies

For the leading countries of the world – USA, EU, Japan, China – the metallurgical complex, which includes the pipe industry, plays a strategic role in terms of national security. It is also a source of employment and income for a large portion of the population. In addition to the direct contribution of metallurgy to GDP, there are also indirect effects from related industries, in particular, to the production and supply of raw materials and energy (ore, coal and scrap), construction, transportation services and other industries. In the EU countries, the gross value added created by the metallurgy, taking into account related industries, is 6.2 times higher than the same indicator calculated for metallurgy only. In the EU, the number of workers employed in the metallurgy including related industries is 6.7 times higher than the same indicator in metallurgy only. Steel production in the world in 2018 increased by 4.6% and reached 1808.6 million tons. The share of the world pipe production among the main types of metal products is about 7.7% (Grand View Research, 2019).

2.2. The development of pipe industry in Ukraine

For a long time, the metallurgical industry has been the basic one for the Ukrainian economy. By the mid-2000s, around 40% of exports accounted for ferrous metallurgy. In 2011, 35 332 thousand tons of steel were produced, but due to the intensification of competition on world markets and crisis phenomena in the national economy, the situation deteriorated significantly. Steel production declined annually and in 2017, only 21.3 million tons were produced, which appeared to be the lowest value since independence. Significant production facilities were temporarily out of control. The share of metallurgy in exports in 2013-2017 fluctuated at the level of 23-25%, and the

share in GDP decreased more than twice from 5.7 to 2.3% in 2016 compared to 2007 (Trading Economics, 2019). However, taking into account related industries, this figure was 11.8%, which indicates that metallurgy retains an important role in the economy of Ukraine. Metallurgy accounts for about 28% of foreign currency inflows to Ukraine, which in 2017 amounted to US$ 12.2 billion. In addition, the mining and metallurgical complex provides 19.4% of capital investment in industry, while metallurgy and related industries provide employment for 9.2% of employees (GMK Centre, 2019).

In 2016, Ukraine was among the top ten steel producers in the world, and occupied 12-13 positions among world steel producers (World Steel Association, 2017). In 2018, metallurgical enterprises in Ukraine overcame a long-term downtrend and showed growth. Iron production reached 20.53 million tons (+4% year-on-year), steel production – 21.36 million tons (+ii0.3%) and rolled steel production – 18.45 million tons (+3%) (Trading Economics, 2019). The growth was due to external markets. Exports of ferrous metals grew by 14.6% compared to the previous year, and exports of ferrous metals increased by 23.8% (World Steel Association, 2019). In 2019, growth continued, in January-May steel production increased by 7%, cast iron by 2%, rolled steel by 3% (World Steel Association, 2019). Therefore, the growth of metallurgy is still capable of giving impetus to the entire Ukrainian economy. At the same time, the pipe industry, which exhibits dynamic growth and exports activity higher than metallurgy as a whole, deserves special attention.In Ukraine, pipe production in 2007 amounted to 2.8 million tons, about 70% of which was exported. The decline in the coming years was due to the global financial and economic crisis, insufficient domestic demand for pipes and difficulties in promoting products to foreign markets, including anti-dumping investigations against Ukraine by a number of countries. In 2011, steel pipe production increased by 26% from the previous year to 2.222 million tons due to the post-crisis recovery, in 2012-2013 it decreased by 9 and 20%, respectively, to 1.615 million tons. In 2015, output again decreased to 852 000 tons, and in 2016 – to 620 thousand tons. That is, in 9 years the production of pipes decreased by 78% and to the same amount decreased exports volumes (OECD, 2016; Oxford Business Group, 2007). Growth in pipe production and exports has resumed in 2017-2018, driven by the cessation of a long recession in the national economy and the upward trend in the world market. GDP grew by 2.5% in 2017. The main pipe companies of Ukraine in 2018 increased the production of steel pipes by 5.2% compared to 2017 – up to 1 102 000 tons, 657 000 tons of which were exported (Table 1). Exports of steel pipes increased in value by 29.9% to US$ 737.852 million (State Information and Analytical Center for External Commodity Markets Monitoring, 2019). This is the highest figure in the last four years.

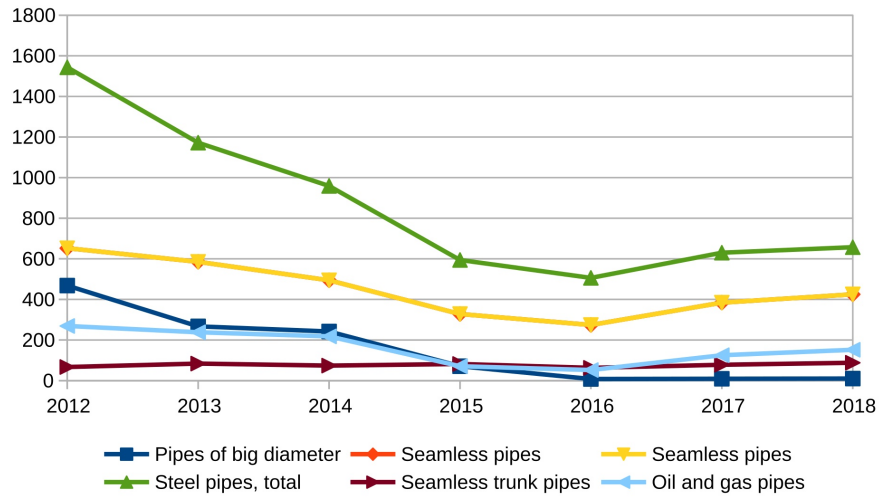
Table 1: *Exports of steel pipes from Ukraine, thousand tons*

Products	2012	2013	2014	2015	2016	2017	2018
Carbon steel pipes	1502,75	1134,02	926,31	565,87	479,13	597,30	624,92
Seamless pipes:	652,16	584,82	494,27	327,87	274,35	384,41	424,89
- trunk pipes	66,98	83,58	73,83	81,98	63,45	78,42	87,83
- drill pipes	1,61	1,23	0,97	1,11	0,19	0,27	0,18
- other oil and gas pipes	269,37	237,82	217,64	70,75	52,05	125,34	152,36
- precision pipes	6,71	8,27	7,92	5,72	7,43	10,08	9,71
- other seamless pipes	307,48	253,91	193,87	168,30	151,23	170,29	174,81
Large diameter pipes:	468,57	267,33	242,73	71,40	7,62	8,71	9,68
- trunk pipes	433,56	242,92	232,71	71,40	7,62	8,71	9,68
- other pipes	35,01	24,40	10,02	2,59	2,40	6,25	5,35
Welded pipes	382,02	281,88	189,31	166,60	197,16	204,18	190,34
Stainless steel pipes	16,83	18,98	22,39	19,88	17,23	19,61	21,70
Pipes of other alloy steel	23,80	19,50	10,40	8,43	9,48	12,99	10,42
All steel pipes	1543,37	1172,50	959,11	594,18	505,83	629,90	657,04

Source: developed by authors based on State Information and Analytical Center for External Commodity Markets Monitoring (2019)

The dynamics of exports of steel pipes as a whole and by major types for 2012-2018 is shown in the Figure 1. Exports of large diameter pipes decreased most of all, which became a leading factor in the reduction of steel pipe exports by almost three times.

Figure 1: *Exports of steel pipes, thousand tons, 2012-2018*



Source: developed by authors based on State Information and Analytical Center for External Commodity Markets Monitoring (2019)

Exports of seamless pipes, including oil and gas pipes, is gradually reaching the level of 2012, while exports of seamless trunk pipes throughout the period did not show significant fluctuations. In January-May 2019, the production of pipe products increased by 7% and amounted to 480 thousand tons (Grand View Research, 2019). At the same time, pipe exports declined slightly compared to the same period in 2018. The share of pipe exports in Ukraine's foreign trade is 1.41% (State Fiscal Service of Ukraine, 2019). In foreign markets, 60% of manufactured pipe products have been sold. The main consumers of Ukrainian pipes are the USA, Germany, Russia and Poland.

The main manufacturers of pipes in Ukraine are Interpipe Niko T'yub, Interpipe NTZ, Interpipe NMTZ, MMK im. Illicha, DMZ Kominmet, NVO Trubostal, Sentravis (PrAT Sentravis Prodakshn Yukreyn), Dniprovs'kyy trubnyy zavod, Pavlohrads'kyy trubnyy zavod Slavsant. The majority of pipe production and exports is implemented by the the enterprises of the industrial company Interpipe. As of 2018, the company provided 60.6% of production and 74.4% of exports of metal pipes in Ukraine. Sales of pipe products by Interpipe in 2017 increased by 31% compared to 2016 and amounted to 595 thousand tons. The supply of pipes to the Ukrainian market increased by 29%, up to 148 thousand tons. In 2018, pipe sales increased by 12% compared to 2017 and amounted to 668 thousand tons, while pipe deliveries to the Ukrainian market increased by 22% and amounted to 179 thousand tons (GMK Center, 2019b).

The company sells more than 70% of pipe production in the markets of the USA, Europe, CIS, Middle East and Asia. Ukraine's share in the company's pipe sales structure for 2018 increased by 2% compared to the previous year and reached 27%. The share of Europe was 25%, the USA – 19%, the CIS – 17%, the Middle East and Asia – 12%. The shares of Europe and the USA increased by 2 and 6% respectively. In turn, the share of the CIS decreased by 6%, the Middle East and Asia by – 2% (GMK Center, 2019b). It should be noted that 90% of "Sentravis" products are sold in foreign markets – one of the largest specialized corrosion-proof pipes in Europe, which ranks 1st in the CIS, 4th in the EU and 9th in this segment in the world (GMK Center, 2019a).

Thus, the exports orientation of the leading manufacturers and exporters of pipes caused a high dependence of the pipe industry in Ukraine on the market conditions of the pipe industry, in particular on the prices of pipes. Therefore, in order to develop industry-level strategies and individual exporting companies, it is necessary to analyze the major development trends, as well as to understand the key factors that deteramine the global pipe market. In this context, it is necessary to consider the global economic factors affecting the pipe industry and the global pipe market.

3. Global economic factors affecting the pipe industry and the global pipe market

First, it should be noted that among global economic factors affecting the pipe industry and the global pipe market is the demand for pipe products. Consumers in the global pipe products market are the enterprises operating in the sectors of industry shown in the Table 2, which also shows the percentages of pipe consumption by each sector.

Table 2: *Industry sectors – consumers of pipe products in the world*

Industry sector	Share, %
Oil and gas	51
Automotive	15
Engineering	9
Construction	5
Energy	1
Petrochemical	1
Other	18
Total	100

Source: developed by authors based on (Gunther Voswinckel, 2019)

The largest consumer is the oil and gas complex, whose enterprises create demand for the pipes of the OCTG (oil country tubular goods) – drilling, casing, pump and compressor pipes used in oil and gas installations for drilling, equipment and operation of wells for oil and gas production. Hence, the consumption of OCTG pipes depends on the number and capacity of the oil and gas installations in specific countries and in the world, as well as on the depth of drilling. In turn, the researchers point to the dependence of the number of oil and gas installations on the price of oil (Gunther Voswinckel, 2019).

Largely, energy prices are influenced by political decisions, which leads to high volatility of energy prices. For example, after the steady rise in oil prices from the beginning of 2016 (US$ 30 per barrel) to October 2018 (US$ 85 per barrel), the Brent crude oil price declined in two months to US$ 50.5 in December. In April 2019, it was US$ 74. US per barrel. According to the US Department of Energy, at the peak of the price, daily oil production in the US has increased by 400,000 barrels and reached 11.6 million barrels every day. Russia and Saudi Arabia have also increased production by 11.54 million barrels per day and 10.5 million barrels per day respectively f(Whitford, 2016). The world faced the prospect of oil overproduction. In order to prevent this, a

number of policy measures have been introduced. In particular, the United States imposed sanctions against Iran and Venezuela. As a result of the reduction in supply, oil prices have risen and persisted for some time, but in May-June 2019 again showed a downward trend. Therefore, the next political decision was another agreement between Russia and OPEC to reduce oil production by April 2020. Oil price volatility persists, making it difficult to predict the dynamics of energy prices and OCTG market conditions.

Political factors also have a significant impact on the pipeline market for gas and oil pipelines. There are a number of pipeline projects in Europe, America and Asia. Political and environmental content is discussed around them. Thus, the creation of North Stream-2 for the transportation of gas from Russia to Europe is subjected to considerable political pressure. Pipeline projects in Asia, needed to service petrochemical complexes in Malaysia and Indonesia, also raise some concerns. All this makes it impossible to confidently predict the development of pipelines and the demand for trunk pipes.

The second largest consumer of the pipes in the world is the automotive industry with a share of 15%. It should be acknowledged that, despite some declines in sales in 2018-2019, the car market as a whole is stable. Experts predict the growth of the car market during 2020-2021 (Gunther Voswinckel, 2019). At the same time, the growing popularity of electric vehicles has a negative impact on the production of pipes, which are used mainly in internal combustion engines.

Car sales by region vary. The car markets of specific countries, such as Russia, Brazil and India in 2018 grew by 15, 13 and 7% respectively. In Japan, for example, car sales declined by 11%. The largest world car markets – the USA, Europe and China showed “zero” growth (Gunther Voswinckel, 2019). However, the automotive industry is an important area of interest for pipe manufacturers.

The construction sector is attractive and consumes 5% of the pipes production today. The construction sector tends to grow at the same time as GDP grows. Pipes are widely used in the construction of multi-store towers and bridges. Increased construction of high-rise residential and office buildings in emerging economies and developing countries, as well as the development of road infrastructure, in particular the construction of new bridges, is a favorable factor of the development of the pipe industry (Paolini, Kollmannsberger, & Rank, 2019).

An important factor affecting pipe sales in the world is the exchange rates. The devaluation of the Chinese Yuan against US Dollar has caused a sharp aggravation of the trade tension between the PRC and the US. Since the beginning of 2018, the Chinese Yuan has lost 6.5% of its value against the US

Dollar, and when China and the US announced mutual duties, the value of the Yuan dropped another 10%. In October 2018, the Chinese Yuan against the US Dollar dropped to its lowest level in the past 10 years (Vo, Vo, & Zhang, 2019). During 2017, the Euro against the US Dollar rose from 1.05 to 1.25 Euros per US$ 1. From April to November 2018, Euro lost 10% to about $1.13 per US Dollar. This has had a significant impact on the EU and the US exports. The main factors influencing the Euro exchange rate are the elections to the European Parliament and Brexit (Kang & Dagli, 2018).

The change in the Euro against the Chinese Yuan was almost synchronous with the change in the rate against the US Dollar. In 2017, the Euro gained about 21% of the value against the Yuan, and in 2018, it lost 22%, which stimulated imports from the EU to China and reduced the flow of goods back. However, in 2019 the Euro again increased its value by 13% against the Yuan. Therefore, the global pipeline market and pipe prices are highly dependent on US-China relations (Chen, Du, & Hu, 2019).

The development of the above-mentioned sectors of the industry has a positive impact on the production of pipes in the world, which have been growing steadily until 2015 and exceeded 171,000 thousand tons. Reduction of metal pipe production in 2016 to 167,000 thousand tons was noticeable in the USA, CIS countries and the rest of the world. In 2017, growth resumed. All major pipe producers have increased their production, which again reached 170,000 tons in 2018 (Gunther Voswinckel, 2019). Comparison of pipe production by countries and regions showed that China is the leading pipe manufacturer in the world (about 58%). Approximately 6% are produced by the US, EU and CIS countries, 3% by Japan and 1% by India. About 20% of pipe production comes from other countries (Gunther Voswinckel, 2019).

Due to the increase in oil production and protectionist measures, pipe production in the United States has increased by 51.6% from 7,845 thousand tons in 2016 to 11,882 thousand tons in 2017, which resulted in the utilization of unused and discontinued old production facilities. In addition, about 7,000 thousand tons of steel pipes were imported into the United States (Gunther Voswinckel, 2019). The growth trend can be reversed if pipe manufacturers invest in the latest technology, productivity improvements and quality assurance. Otherwise, after the barriers get stricter, the pipe companies will not compete and have to reduce production.

In 2018, growth continued, with the largest increase in pipe production of 2500 thousand tons, demonstrated by China, an increase of 1350 thousand tons – by the United States. The largest fluctuations in production volumes occurred

in the segment of seamless pipes. In the period from 2014 to 2016, world production decreased by almost 20% – from 48,000 thousand tons to 38,000 thousand tons. In 2017, growth resumed at a rate of 4% per year. In 2018, growth in seamless pipe production has accelerated at the expense of India (32%) and the United States (17%). Production in Japan (6%), CIS countries (4%) and China (2%) increased at a slower pace. Other countries showed an increase of 15% (Gunther Voswinckel, 2019).

Worldwide production of seamless pipes with a diameter of less than 406 mm, which makes up the largest product segment in the pipe market, with an average growth rate of 5-10% per year, increased by 5% in 2018. This was mainly achieved by the US and China. The largest producer is China – about 60,000 thousand tons per year. The EU and US produce abiout 8,000 thousand tons per year. A smaller share belongs to the CIS countries, Japan, India and others. In turn, the production of welded pipes with a diameter greater than 406 mm, which are used for the construction of large diameter pipelines, makes up a smaller share of the market, annually amounts of which are about 22,000 thousand tons. Of these, almost 35% are produced by China (Gunther Voswinckel, 2019).

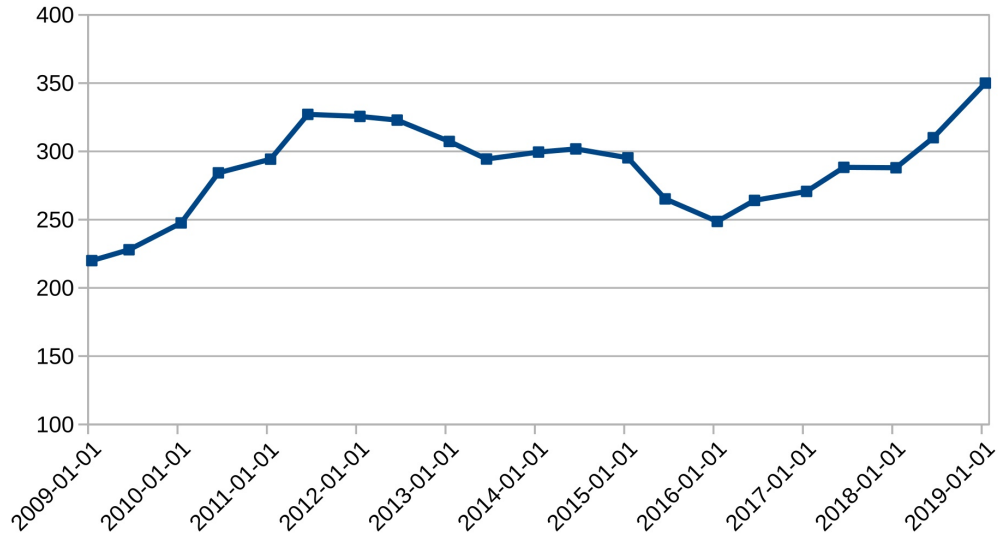
The role of policy decisions regarding the construction of oil and gas pipelines is very significant. In 2018, only US manufacturers were able to overcome the negative impact of political factors and ensured a 19% increase in pipe production. In turn, other countries and regions reduced production: China by 15%, Japan by 7%, the EU by 2%, CIS countries by about 1% (Gunther Voswinckel, 2019). This trend reflects a decline in demand for trunk pipes under the influence of political decisions and the imposition of duties by the United States. The winners are individual manufacturers who provide unique sales offers through the introduction of state-of-the-art technology.

Since January 2018, world prices for pipe products have been rising, which demonstrated by the rise in the producer price index in the ferrous metal and steel pipe sector from 288 to 350 at the beginning of 2019, i.e. by almost 23%. The price level reached is the highest in the last 10 years. Thus, the pipe market is growing. However, both political factors and new technologies for oil and gas production, such as shale oil and gas extraction, deep-sea oil production, sand extraction, etc., are sources of market uncertainty and pose a threat to the pipe industry. The dynamics of the world producer price index in the metal and steel pipe sector for the period 2009-2019 is shown in the Figure 2.

Price competition coming from low-cost countries requires high-tech solutions from high-cost countries. Countries with large markets, including the

US and the EU, impose duties to counteract importers. Each manufacturer has to improve production and develop effective strategies for better customer satisfaction, increased productivity and reduced production costs, thus, ensuring competitiveness.

Figure 2: *The dynamics of the producer price index in the metal and steel pipes sector during 2009-2019*



Source: developed by authors based on U.S. Bureau of Labor Statistics (1967)

Despite the increase in the world producer price index of the pipe industry in 2019 compared to 2018 value: from 288 to 350, i.e. by 21.5%, the exports of pipes by domestic enterprises slowed down. In the first half of 2019, the exports of pipes did not only increase, but even decreased by 0.1% in comparison with the value of 2018 and accounted 327.5 thousand tons. In terms of value, pipe exports fell by 0.2%, to US$ 359.7 million (State Fiscal Service of Ukraine, 2019).

4. Factors affecting exports of pipe products in Ukraine

In order to identify factors affecting the exports of pipe products in Ukraine, it is necessary to categorize and investigate the global factors of domestic pipe companies.

The global factors that an enterprise is facing could be summarized by PEST analysis. It is a strategic analysis tool designed to identify the political (P), economic (E), social (S) and technological (T) constituents of the global environment that affect the enterprise. For the companies that internationalize their business, when performing PEST analysis, it is necessary to take into

account factors that operate both within the national economy and in the international environment.

The PEST analysis technique is often used to evaluate key industry market trends, and the results are useful to the enterprise in the context of identifying threats and opportunities that are emerging now and can appear in the future. In the Table 3, we outlined the effects of macro-factors on the companies of pipe industry of Ukraine, which sell their products both in the domestic and foreign markets, with the use of PEST analysis

According to the results of the PEST analysis, the following factors pose the greatest threat: political (protective trade policy of the US, EU and other countries, military-political conflict with Russia and imposition of sanctions against pipe companies by Russia); social (demographic trends and migration processes) and technological (introduction of innovative technologies of steel and pipe production by foreign companies, as well as displacement of metal pipes by plastic pipes in separate segments).

Among the economic factors is the devaluation of the Chinese Yuan, as well as the weakening of the Euro against the US dollar, leading to increased international competitiveness of Chinese and European pipe manufacturers, especially against the background of the recent Hryvnia strengthening. The high NBU discount rate causes high rates of corporate lending to commercial banks, which in turn leads to a lack of funds for investment and innovation. The decrease in the industrial production index is the reason for the low demand for pipes in the domestic market.

At the same time, the following factors provide great opportunities for domestic enterprises. Continued US sanctions against Iran and Venezuela, as well as agreements between Russia and OPEC to reduce oil production lead to higher oil prices and, consequently, to increased demand for oil and gas pipes. The development of shale oil fields and the construction of new pipelines and oil terminals in the US have led to increased demand for pipes from US companies. The steady development of automotive, mechanical engineering and construction in the world provides consistently high demand for pipes for these sectors. The cessation of the economic downturn and GDP growth in Ukraine, which in 2016-2017 amounted to 2.3% and 2.5% respectively, could give an impetus to the increase in domestic demand for pipe products.

Table 3: *PEST analysis of the pipe industry in Ukraine*

Factors	**Possible directions for change**	**Impact on enterprise (+ positive, - negative)**
P – Political and legal		
Political tensions in the world have led to the US sanctions against Iran and Venezuela (2018-2019). Decrease in supply leads to higher oil prices	Maintaining political tensions and continuing sanctions. Price increase leads to increased oil production in other countries	+ Increase in demand for oil and gas pipes OCTG
2019: Russia and OPEC agreement on reduction of oil production by April 2020	Creates opportunities for US companies to increase production, including shale oil	+ Reduction in demand for pipes from Russia and OPEC, increase in demand for OCTG pipes from oil companies in other countries, including the US
Protective trade policies of the US, EU and other countries on the pipe market, the introduction of duties and other barriers to trade against imports. 2018 – restrictions on imports of steel and metal products from Ukraine to the EU, introduction of duties 25%	Maintaining protective measures, increase in domestic pipe production for the needs of the economies of the countries that defend their markets, including the US and EU	– Reduced access to markets with high security barriers. Increased competition between pipe manufacturers in the global market
The introduction by a number of countries of anti-dumping duties on pipes of Ukrainian production	Continuation of anti-dumping measures	– Reduced exports volumes
2018 – EU decides to extend anti-dumping duties for 5 years, 12.3% -25.7% on seamless pipe imports from Ukraine	Maintenance of anti-dumping measures	– Reduction of pipe exports to the EU through the introduction of anti-dumping duties
From July 2019 – expiration of US price pact agreement on Ukrainian pipe products	The conclusion of a new agreement is unlikely given the protectionist policies of the US	– Reduction of pipe exports to the US through the introduction of anti-dumping duties
Election of President of Ukraine and Verkhovna Rada. Government's course on reform	Reforms in the area of taxation, customs, currency regime	The nature of the impact will depend on the content of the reforms

Contination of Table 3: *PEST analysis of the pipe industry in Ukraine*

The conflict between Ukraine and Russia has been going on since 2014. In 2018, Russia imposed sanctions against the holding of EastOne Group, which includes Interpipe. 2019 – Russia's ban on the import of certain types of pipes from Ukraine, including oil pipelines	The resumption of large-scale supply of pipes to the Russian market, as well as the supply of Russian gas at a low price in the coming years is not expected	– Significant reduction in the share on one of the main markets – Russia. Increase in the cost of energy
Temporary occupation of Donbass and loss of significant raw material base (coal) for metallurgy	Coal import at a high price will continue	– Increase in production costs
International economic integration; creation of the EU-Ukraine FTA	According to the terms of the EU-Ukraine FTA, quotas for duty-free import of pipes from Ukraine to the EU are set	+ Ability to exports pipes to the EU within under quotas – Increased competition from European manufacturers
E – Economic		
High volatility of world oil prices	Oil price volatility will continue	– Long-term planning of enterprises activity is complicated
Increase in oil production in the United States	Due to shale oil deposits and protective measures in the US internal market, oil production and demand for pipes will increase	+ Opportunity to increase supply of OCTG pipes to the US
Construction of oil pipelines and oil terminals	Due to increase in the US shale oil production and intentions to increase oil exports, there is a need to build large quantities of oil pipelines	+ Increased demand for OCTG pipes from the US side
Stable development of automotive, construction and mechanical engineering in the world	Stable demand in the global markets for pipes in the automotive, construction and mechanical engineering industries	+ Stable demand for pipes
The development of infrastructure and high-rise buildings in developing countries and “new economies”	Increase in demand for pipes for construction	+ Increase in demand for pipes

Contination of Table 3: *PEST analysis of the pipe industry in Ukraine*

Changes in the exchange rates of the world's leading currencies	The currency wars will continue to create favorable conditions for exports from certain countries	– Increase in the international competitiveness of individual foreign pipe manufacturers
High NBU discount rate, high commercial bank lending rates	NBU discount rate reduction is very slow	– Lack of funds for investment and innovation
Ending the economic downturn in Ukraine. GDP growth in 2016-2017 was 2.3 and 2.5% respectively	NBU GDP growth forecast: 3% in 2019; 2020 3.2%; 2021 3.7%	+ Possible increase in domestic demand
Reduction of industrial production index	Industrial production has no incentive to grow at a high NBU discount rate	– Low demand for pipes in the domestic market
Hryvnia exchange rate	Exchange rate stabilization, hryvnia strengthened	+ Positive impact on production costs –Reduction of the competitiveness of domestic exporters in the world markets
Inflationary processes in Ukraine	Reduction of inflation compared to 2018	+ Increase in real incomes of the population
High prices for gas and energy in Ukraine	Price reductions are not expected	– High production costs
The decline of housing and communal services in Ukraine	Low efficiency of housing reform	– Low demand for pipes from housing side
Dynamics of income of the population of Ukraine	Real household income in 2018 increased by 9.9% compared to 2017. However, according to experts, in the next 3-5 years the volume of housing construction will remain at the existing level +/- up to 15% of the existing volumes	+ Increase in domestic demand for pipes for construction

Contination of Table 3: *PEST analysis of the pipe industry in Ukraine*

S – Social		
Decrease in total population	Decrease in the number of professionals and workers in industrial regions, reduced demand for housing and consumer goods	– Shortage of skilled workers, reduced demand from the construction and other sectors for the products of the pipe industry
Labor migration outside Ukraine	Emigration of skilled labor will continue	– Shortage of skilled labor
Shortage of skilled labor	Increase in the number of young people leaving abroad is the basis of a future shortage of skilled workers	– Increase in the deficit of engineering, management and others labor force
Low prestige of work in the production sphere	Reduction of attractiveness of work at metallurgical enterprises	– Shortage of qualified labor force
T – Technological		
New technologies for oil and gas production	Shale oil and gas exploration, shale oil and gas production and exports to the US, possibly Canada and Mexico	+ Growth of demand for OCTG pipes from the US oil industry and trunk pipelines
Manufacture of electric vehicles	Increased production of electric vehicles	– Reduction in demand for automotive pipes, in particular, for internal combustion engines
Improvement of technologies and materials for the production of plastic pipes	Displacement of small and medium diameter steel pipes with plastic pipes	– Reduction in demand for small and medium diameter metal pipes
Development of innovative technologies for the production of steel and pipe products	Wide implementation of innovative steel and pipe production technologies	– The intensification of competition in the markets for pipe products

Note: NBU – National Bank of Ukraine

Source: developed by authors

The activity of the enterprises within the market economy is associated with certain risks, the extent of which is quite large in Ukraine. This is due to insufficient level of market relations, imperfection of legislation, socio-political problems and other factors.

In our opinion, the non-price factors that negatively affected the exports of the pipe industry in January-June 2019 in Ukraine include, first of all, restrictions on the import of Ukrainian pipes to the US, EU and Russia. The main restrictions that caused the braking and even the reduction of pipe exports from Ukraine include (Goncharuk & Storto, 2017; Lagodiienko, 2019; Schmidt-Felzmann, 2019):

1. temporary measures on imports into the EU, adopted in 2018, concerning 23 categories of steel products and measures adopted in the form of a duty of 25%;
2. the decision of the European Commission adopted in 2018 to extend the anti-dumping duties for 12 years to 12.3% – 25.7% for imports of seamless pipes from Ukraine;
3. sanctions imposed by Russia on 2018 against the holding of EastOne Group, which includes Interpipe, from 2019 – a ban on the import from Ukraine of certain types of pipes, in particular for oil pipelines.

Bearing in mind that in 2018, the of share of Europe in the sales structure of Ukraine's largest pipe manufacturer – Interpipe – accounts for 25%, the US share – 19%, and the CIS (mainly Russia) share – 17%, it can be assumed that the restriction of the import of pipes from these countries had a critical impact on the volume of exports of pipes from Ukraine and caused a reduction in the first half of 2019 (GMK Center, 2019b).

With regard to the outlook for the future, the elimination of the aforementioned negative factors in the near future seems unlikely, so a rapid increase in exports of pipe products should not be expected. In addition, the strengthening of Hryvnia, which has been going on lately and reduction of the competitiveness of domestic exporters in foreign markets, should be taken into account.

In such a situation, economic stabilization in Ukraine provides certain opportunities to domestic pipe companies. GDP growth in 2016-2017 was respectively 2.3 and 2.5%. According to the NBU forecast, in 2019-2021 the GDP growth will be respectively 3, 3.2, and 3.7% (National Bank of Ukraine, 2019). If, as a result of economic reform, industrial production is given an incentive to grow and the trend of rising real incomes continues, domestic demand for pipe products can be expected to increase.

At the same time, increase in exports of domestic pipe companies requires increase in their competitiveness in the world market. Considering that price

reductions necessitate appropriate anti-dumping measures by many countries, domestic pipe manufacturers should focus on non-price competitiveness factors. Leading exporters, in particular, need to continually ensure the production of a wide range of pipe products that meet international quality standards, through the introduction of advanced equipment and advanced technologies, which will better meet the demands of pipe products consumers in the global market, as well as reduce production costs and, thus, increase the level of competitiveness due to the innovative component.

5. Conclusion

In current paper, we have researched the influence of global factors on the functioning of the pipe industry in the modern globalized economy. According to the results of the research of the dynamics of production and exports of pipe products by Ukrainian enterprises, as well as the tendencies of development of the world pipe market, the following global factors of influence on the pipe industry have been identified. In particular, they include demand for pipes from the oil and gas complex, the state of automobile, machine building and construction as leading consumers of pipes.

With the use of the PEST method, we have identified macroeconomic factors that affect the production and exports of pipes by Ukrainian enterprises. Global factors that led to a decrease in pipe exports from Ukraine in the first half of 2019 are the following: temporary protective measures on imports of steel products into the EU were adopted in 2018, the decision of the European Commission to extend the anti-dumping duties on imports of seamless pipes from Ukraine for five years; the introduction by Russia in 2019 a ban on the import of certain types of pipes from Ukraine, in particular for oil pipelines.

It is proposed to increase the level of competitiveness of domestic pipe companies by employing innovative component, which will reduce the threats and increase the opportunities of the global macro-environment. The development of recommendations for domestic pipe industry companies to enhance innovative competitiveness in the world markets we assume as fruitful area for the further research.

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