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УКРАЇНИ В УМОВАХ АЛЬТЕРНАТИВНИХ ПОДАТКОВИХ РЕЖИМІВ»**

**MODELING THE DEVELOPMENT OF THE RETAIL TRADE INDUSTRY OF
UKRAINE IN CONDITIONS OF ALTERNATIVE TAX REGIMES**

Виконав: студент 2-го року навчання,
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страхування»

Ільків Володимир Євгенович

Керівник: Мертенс О.В.
кандидат економічних наук, професор

Рецензент Ю.М.Зеленін
(прізвище та ініціали)

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INTRODUCTION

Due to the beginning of the full-scale Russian invasion, the majority of Ukrainian entrepreneurs reduced their production - the decline of the Ukrainian economy reached 29.4% (MERT, 2023). This drop is because some enterprises were relocated, some lost their capacities, or employees of these enterprises left Ukraine.

Employees of the retail trade industry also faced the problem of a drop in demand from the population of Ukraine (migration crisis, drop in the solvency of the population, etc.). Major players in the retail market were forced to reduce sales.

The problems of the retail trade sector, such as non-transparent taxation, and difficulty in accessing financial resources, only deepened after the start of the war.

The purpose of the master thesis is to assess the existing problems of the industry and to provide recommendations for government policy on taxation and regulation of retail trade to accelerate the growth of the market. The work also includes international experience and the specifics of the Ukrainian market.

The key problems for retail trade in Ukraine, which will be considered in the work, concern the shadow economy, the quality of institutions, the introduction of tax reforms (Exit Capital Tax and the 10-10-10-3 reform) and the government's anti-corruption policy.

The growth of the shadow economy is a threat to tax revenues for the Ukrainian budget during the war. Also, the growth of the economy slows down the economic development of Ukraine, which is extremely important for the post-war reconstruction of the Ukrainian economy.

Using the methods of System Dynamics modeling, a model was built that describes the main connections between business, the government, and the population.

System dynamics allows you to assess the effect of the introduced policy and conduct a scenario analysis of the effects and determine the optimal policy for the government and provide recommendations to all participants of the retail trade market in Ukraine.

System dynamics allows to consider the interaction of systems and determine the connections between them. This is extremely important to adopt an optimal policy that will include the interests of each stakeholder.

Econometric modeling will be used to analyze taxes, sales, and inflation. The use of econometric methods will make it possible to build forecasts and evaluate the trends of the retail trade segment in Ukraine.

The burdensome tax system, the difficulty of accessing financial resources, and war damage are the main problems of this work.

The relevance of this work is in the analysis and assessment of the scenarios for the development of the retail trade market in Ukraine. Forecasting the development of the market can contribute to the growth of investments in the segment and increase employment.

The scientific significance of this work is in the construction and analysis of the relationships between sales volumes in the retail trade segment, the tax system, the openness of the international market, and the dynamics of investments.

The practical significance of this work lies in the scenario analysis of the development of the Ukrainian retail market and the construction of development scenarios for the segment.

The object of the study was the retail market in Ukraine.

The justification of the impact of the tax system and market conditions on the retail market in Ukraine is the subject of this work.

The purpose of the work is to contribute to the scientific discussion about the losses and benefits of the introduction of tax reforms, institutions reform and changes to business management. Also, the purpose of the study is to try to build a connection between different systems in Ukraine: the labor market, the tax system, the budget system, the informal employment, and state institutions.

The tasks of this thesis work are:

1. Analysis of the dynamics of retail trade development.
2. Determination of development scenarios for the retail trade market in Ukraine.
3. Building a model for assessing the effects of development scenarios.

4. Provision of recommendations on public policy, based on the results of modeling.

The research tools are market expert surveys, business survey analysis, modeling in Stella Architect and Eviews, Excel.

Stella Architect will be used to build a system-dynamic model of retail trade in Ukraine. Also, Stella Architect will allow testing a set of policy scenarios and develop a model that will be a tool for scenario analysis.

Eviews and Excel will be used to analyze time data and build a VAR model to describe relationships in retail trade in Ukraine. Eviews will allow to build a forecast for the constructed model, which will be used in the research recommendations.

CHAPTER 1. LITERATURE REVIEW OF THE RETAIL AND OVERVIEW OF KEY GOVERNMENT TAX POLICIES

1.1 Overview of the retail definition and key market features

One of the definitions of retail trade, which is considered in this work, is the definition of Professor Rudrabasavaraj, which is that retail trade is not only a segment of the economy where customers buy units of products, but a whole socio-economic system.

A retail system involves bringing people together to exchange goods and services for a small fee. The market meets the needs of final consumers, producers and satisfies the basic needs (Hameli, 2018).

In English professional and business terminology, the term "retail" is used to describe the trade market for final consumption. The term comes from the French language and means "to cut off a piece" or "to break off a mass" (Hameli, 2018).

According to the Ukrainian standards for the definition of trade activities: retail trade is a type of economic activity where the recipient of the products is the final consumer. In contrast to retail trade, it is worth noting that wholesale trade involves the sale of goods and services under contracts for the delivery of lots. Subsequently, the intermediary sells these batches to the final consumer. Also, DSTU standards define the following types of retail trade: commission and firm trade (DSSU, 2005).

The main features of retail trade are independent, initiative activity, at one's own risk, with the aim of making a profit (the subject of activity is a Juridical person or an individual). The next feature is that the main essence of retail trade is the sale of goods and services (can include related goods and separate services). The main recipient is the final consumer who buys goods or services for his own non-commercial consumption (Shpyliova & Tsaruk, 2014).

Retail trade segments are divided according to the following classifications: form of ownership, direction of sales of goods, method of sale, level of service, according to the location of the point of sale.

According to the type of ownership, retail trade entities are divided into independent sellers, united trade sellers, manufacturer sales stores, cooperatives, franchises (Hameli, 2018)

According to the method of sale, the market is divided into participants: establishments based on retail trade, retail trade outside the boundaries of establishments (for example, e-commerce, mail delivery, direct sales, etc.), retail trade of services (Figure 1.1).

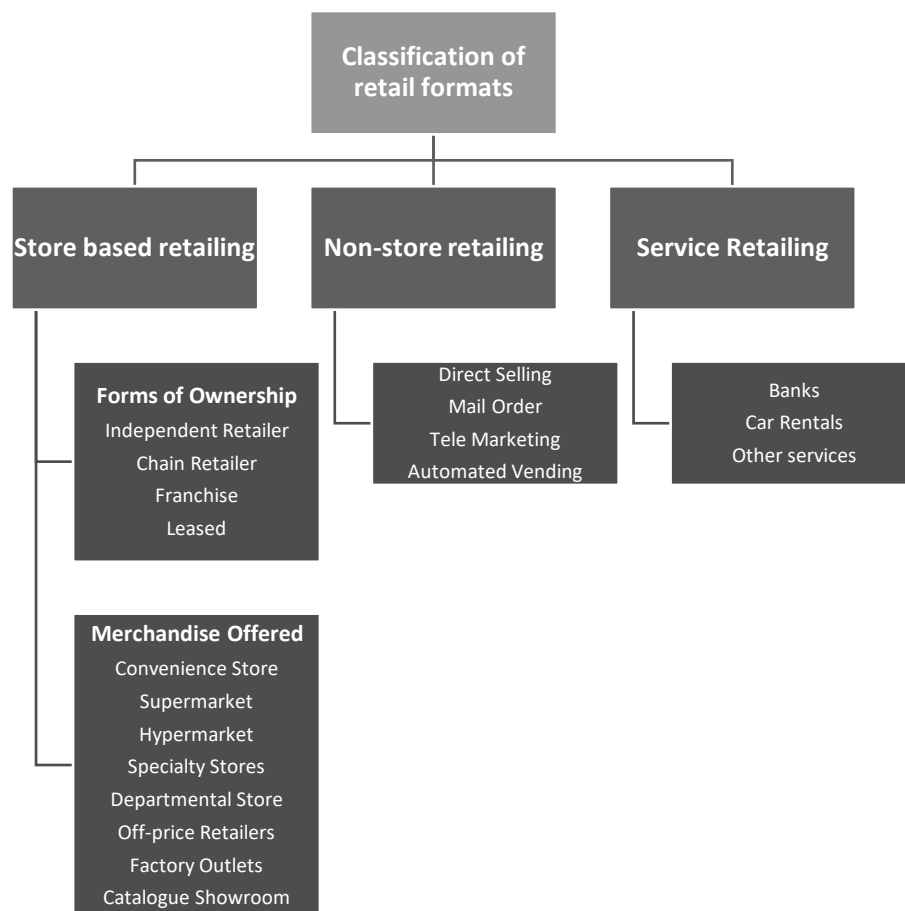


Figure 1.1. Classification of types of retail by method of sale (Rohit, 2020).

It is the retail trade of services that is growing at a rapid pace in the global retail trade market. According to the analysis of the global consulting company McKinsey, the participants of the retail trade market will increasingly sell not just goods on the shelves, but services that will affect many aspects of human life (McKinsey, 2023).

The main forms of trading companies (segment establishments based on retail trade), presented in table 2: supermarkets, cash & carry, discount, hypermarkets, salons, boutiques and corner shop (Careerhub, 2018).

Table 1.1 Comparison table of the main retail companies in Ukraine
(Careerhub, 2018).

Supermarket	is a large store that sells a full range of food and beverages, as well as household items, pet products, cosmetics, tableware, etc.
Cash & carry	stores of this format are self-service stores where both food and industrial goods are purchased for cash.
Discount	(Discount - low price store) - a store in which goods are sold with a minimal markup. It is obtained at the expense of cost savings — renting premises, a wide range of goods, etc.
Corner shop	small, often 24-hour shops near the house.
Hypermarket	a type of self-service store that sells groceries, household goods, and other general-purpose products.
Salons, boutiques	stores that sell fashionable goods or goods in rare demand. Prices in salons and boutiques are quite high, and the product is presented in small batches (sometimes up to several units)

In order to simplify and improve the efficiency of the analysis, segmentation by the method of sale was used in the work, which will allow to determine the trends by segments and the key problems of each segment.

The history of the development of retail trade begins in ancient times, when the first commodity barter took place and there were no monetary units in the modern sense (Jones, 2006).

In the days of Kyivan Rus, trade played an important role in bringing money to the state treasury, there were few trade shops in medieval cities, and products were mostly sold through merchants to local markets (Thrupp, 1989).

Despite the market's century-long dominance, from the 17th century permanent shops began to displace the market's share as the largest part of the city's retail trade. Starting from the middle of the 19th century, classic department stores became widespread in Europe, which changed approaches to retail trade (Koot, 2011).

The impetus for the development of retail trade was the opening of the first supermarket in the world in 1930 (Herrin (Illinois)) (Careerhub, 2018).

In 1954, the first shopping center was opened near Detroit, thanks to the concept of the shopping center, which was developed by the American architect Victor Gruen (Gladwell, 2004).

The development of financial instruments in the middle of the 20th century allowed to simplify the purchase of goods in stores - in 1958, Bank of America first issued a bank credit card (Regan, 2021).

In 1963, the first hypermarket in the world was opened (near Paris, France). Since the 21st century, the main trend in retail trade has been the growth of online sales. This is due to the growth of technology, Internet coverage and communication. This trend is confirmed by the fact that 78% of the population of Ukraine are Internet users and 33% of users regularly buy goods and services in online stores (Selishchev, 2021).

The spread of the coronavirus infection and the full-scale russian invasion only accelerated the displacement of offline retail stores in Ukraine (Volosov, 2022).

The growth of social media and the importance of online marketing is driving the growth of retail sales worldwide - 90% of businesses indicated that they use social media to promote their business or serve customers (Regan, 2021).

Today, the retail market is represented by large retail chains, small players, and marketplaces with their own ecosystems.

1.2 Literature review of the shadow economy in retail trade of Ukraine

The shadow economy, according to the definition of the IMF report, is any economic activity that occurs outside of state regulation and taxation (Medina & Schneider, 2018). A more detailed description is provided by the Swiss economist Dieter Kassel: the shadow economy is any economic activity that contributes to the creation of economic values for the country's economy, but at the same time this activity is not included in the gross national product (Dyachenko, 2017).

The study of the informal component of countries' economies (the shadow economy) began after the Second World War, and the research element was developing countries with a large informal sector of the economy. In the middle of the 20th century, the American economist Hart introduced the concept of "informal economy" (Koufopoulou et al., 2018).

The main methods for calculating the shadow economy are the direct method, the indirect method, and the model method. The direct method involves two subtypes. The first subtype uses surveys to determine the level of the shadow economy in countries. Among the disadvantages of this method are the high cost and honesty of the respondents. The second subtype of the direct method involves a tax audit - the definition of the shadow economy as a part of the economy that creates the national product, but these enterprises do not pay taxes to the country's budget (Posteaa & Achimb, 2022).

The indirect method involves using the disparity of consumption, expenditure, and income of the country to estimate the level of the shadow economy. Another subtype of the indirect method involves the analysis of labor market statistics. Economists also use the monetary method to estimate the shadow economy (Posteaa & Achimb, 2022). The use of a model approach involves the use of a MIMIC Model to estimate the level of the shadow economy (Dell'Anno, 2007). Modeling of the shadow economy using the MIMIC model began with the analysis of Frey and Weck-Hannemann in 1984. 17 OECD member countries were studied and the shadow economy was identified as a latent variable (Trebicka, 2014).

Table 1.2. Methods of determining the shadow economy (Posteaa & Achimb, 2022).

Estimation method		Advantage	Disadvantage
Direct methods	Survey based methods	They can deliver estimations to specific sectors and regions;	High costs; Biased sample of the population The honesty of the respondents can be questionable; They offer point estimates at a certain time.

	Tax audit-based methods	They can deliver estimation regarding a specific sector or region;	They are not always random; They reveal a fraction of the informal activity
Indirect methods	The discrepancy between national expenditure and income statistics	The national accounts provide both incomes based and expenditure-based estimates;	There can be other causes for the discrepancy;
	Estimating the shadow economy using employment statistics	They can reveal the structure of workforce at different times, sectors, and regions.	Differences can have other causes, such as an economic crisis;
	Monetary methods	They can reveal useful information regarding the shadow economy activities settled with cash	Not all shadow economy transactions are paid with cash;
	The physical input approach	Very simple and can appear appealing	There are shadow economy activities that do not use energy; They rely on a broad definition of the shadow economy
The model	MIMIC	The use of multiple variables to explain the shadow economy	The results are highly dependent on proper selection of the variables

The Ministry of Economy of Ukraine approved the following methods for determining the shadow economy in 2009: "population expenditure - retail turnover", financial method, monetary method, electricity-based method, loss-making method of enterprises, integral indicator method (MERT, 2009). The Ministry of Economy of Ukraine assesses the level of the shadow economy by the following methods: monetary, electricity-based, unprofitable enterprises and expenses of population (MERT, 2022a).

Among the reasons for the emergence of the shadow economy, it is worth noting the high level of market regulation, low level of public services, low quality of state institutions, lack of willingness and openness to pay taxes, high tax burden, high level of self-employment, high level of unemployment (Enste, 2018; Schneider & Buehn, 2016).

The Peruvian economist Hernando de Soto, in his work "The Mystery of Capital: Why Capitalism Triumphs in the West and Fails Everywhere Else", names the main reason for the shadow economy - a high level of bureaucracy (Soto, 2009).

The reasons for the increase in the shadow economy are divided into socio-economic, political, legal, moral and ethical (Kucherenko & Povstin, n.d.).

Socio-economic reasons: low standard of living of the population, crises in the national economy, inefficient and excessive tax burden. Among the political reasons, it is worth noting corruption and the imperfection of the legislative framework (Kucherenko & Povstin, n.d.). Most of these reasons also apply to the retail segment.

Table 1.3. Types of shadow economy and their definition (Kiani et al., 2014).

	Definition
Illegal economy	Totality of the revenues that are generated by those economic activities that violate the legal status of legitimate forms of trade
Unreported economy	Totality of the revenues that are generated by those economic activities that violate the legal status of legitimate forms of trade
Unrecorded economy	Activities that avoid institutional conventions that define the necessary requirements for the report to governmental agencies for statistics
Informal economy	Economic activities that avoid costs and excluded from the rights and benefits that come along with leasing, work contracts, loan, and social security

Shadow economy is divided into illegal economy, unregistered economy, unreported economy and informal economy (Kiani et al., 2014; Koufopoulou et al., 2018) (Table 1.3).

1.3 Peculiarities of taxation of the retail trade in Ukraine

By definition, a tax is a mandatory payment, the characteristics of which are: paid only to the budget, has no intended use, is exclusively an attribute of the state (Balashova & Roganova, 2016).

According to the economic content, taxes are divided into income taxes, consumption taxes, and property taxes. According to the form of taxation, taxes are divided into direct and indirect. Indirect taxes are a certain proportion of the price of

goods and services, while direct taxes depend on the size of the taxpayer (Tomnyuk, 2022).

Today, the tax burden in Ukraine is one of the largest in Europe (UIF, 2023). The main taxes in Ukraine for individuals are value added tax, income tax, military levy, single tax. For a juridical person, the most important taxes are corporate tax. Also in Ukraine, local communities can introduce and administer local taxes (Rada, 2011). Shadow economy in retail reaches 19% in 2021, no statistics in 2022 (MERT, 2022a).

The Ministry of Economy of Ukraine points out among the main factors preventing the unshadowing of Ukrainian economy: low level of protection of private property and intellectual property, low liquidity of the stock market, imperfection of the law system, high level of corruption in Ukraine (MERT, 2022a). Despite this, the non-transparent system of tax collections and their inefficient administration are also factors that stimulate the growth of the shadow economy in Ukraine (UIF, 2023).

The main features of taxation of the retail trade market in Ukraine in terms of legislation are constant changes in the tax system, contradictions and ambiguous provisions, the complexity of taxation (EBA, 2022). Among the main features of the tax system in terms of tax administration are large time costs for the preparation of reports and payment of taxes, the lack of understanding of the rules and explanations regarding the preparation of reports, the imperfection of the electronic reporting system and the number of payments (EBA, 2022).

Among the features of the tax system in terms of fiscal pressure, it is worth noting unreasonable interpretations of tax legislation, artificial blocking of tax invoices, delays in inspections for VAT refunds (EBA, 2022).

Table 1.4. Table comparing rates in Ukraine and some European countries (CASE, 2019).

Country	Income tax	Corporate tax	VAT
Ukraine	18%	18%	20%
France	From 14 to 45%	31%	20%
Germany	From 14 to 45%	29,89%	19%

Hungary	15%	9%	27%
Poland	18% /32%	16%	23%
Romania	10%	16%	19%

The results of the comparison show a lower tax burden in Ukraine than in European countries. At the same time, it is worth noting that these countries are highly developed countries, where the economies achieve significantly lower growth rates than are necessary for the growth and recovery of the Ukrainian economy after the war (UIF, 2023).

A study of Ukrainian business in November 2022 shows that reforming the tax system is one of the TOP-5 keys to economic recovery. The first three are occupied by the anti-corruption policy, reforming the law system and creating attractive conditions for investors (Gradus, 2022).

A characteristic feature of retail taxation is a simplified system that allows individual entrepreneurs to reduce their tax burden (KSE, 2020).

Table 1.5. Methods of simplified taxation in Ukraine (KSE, 2020).

Group	1 group		2nd group		3 group		4 group
Single tax rate	10% of the living wage		20% of the minimum wage		3% of income - in case of payment of VAT,	5% of income - in case of VAT inclusion.	0.19-2.43% depending on the category of land
The limit of the amount of income	UAH 0.3 million	(1 million UAH according to the new law)	1,5 mln UAH	(5 million UAH according to the new law)	5 million UAH	(7 million UAH according to the new law)	Not limited
Salaried workers	Not allowed		Less 10 persons		Not limited		Not limited (company),
Form	private entrepreneur		private entrepreneur		private entrepreneur, company		private entrepreneur (farmers), company (the share of agricultural production is more than 75%)
Tax period	1 year		1 year		1 quartal		1 year
Allowed	Retail sale of goods from trading places in the markets and/or		Services to single tax payers and/or the public, production and/or sale of		All types of activities		Agricultural producers

	activity of providing household services to the population	goods, activities in the field of restaurant business		
Not allowed	Other	Intermediary services related to real estate, production, supply, sale of jewelry and household items made of precious metals, precious/semi-precious stones	No	Other

Among the main abuses of the system of simplified taxation are registration of full-time personnel, underestimation of the turnover of the company, implementation of smuggling through Natural Persons - Entrepreneurs and Legal Entities, artificial fragmentation of the subject of economic activity (KSE, 2020). Another feature of the taxation system is the introduction of Diya.City residency, which is currently valid only for IT companies in Ukraine (City.Diia, 2023).

CHAPTER 2. ANALYSIS OF THE RETAIL TRADE AND ANALYSIS OF INTERNATIONAL EXPERIENCE

2.1 Analysis of key indicators and problems of the retail trade in Ukraine

According to Ukrstat data, the retail market in Ukraine reached 1.4 trillion hryvnias in 2021 (\$51.7 billion at the hryvnia exchange rate in 2021) (Ukrstat, 2021b).

Volumes of sales, before a full-scale invasion, have a steady growth trend and resistance to crises in the economy. Figure 2.1 shows fluctuations in the total volume of product sales in Ukraine and sales of products in retail trade. But a full-scale war led to the destruction of logistics centers and stores. Seven percent of trade facilities/stores were closed in 2022 (Agropolit.com, 2023). By mid-2022, the total losses from the war for Ukrainian trade networks were estimated at 50 billion hryvnias (Ivanov, 2022).

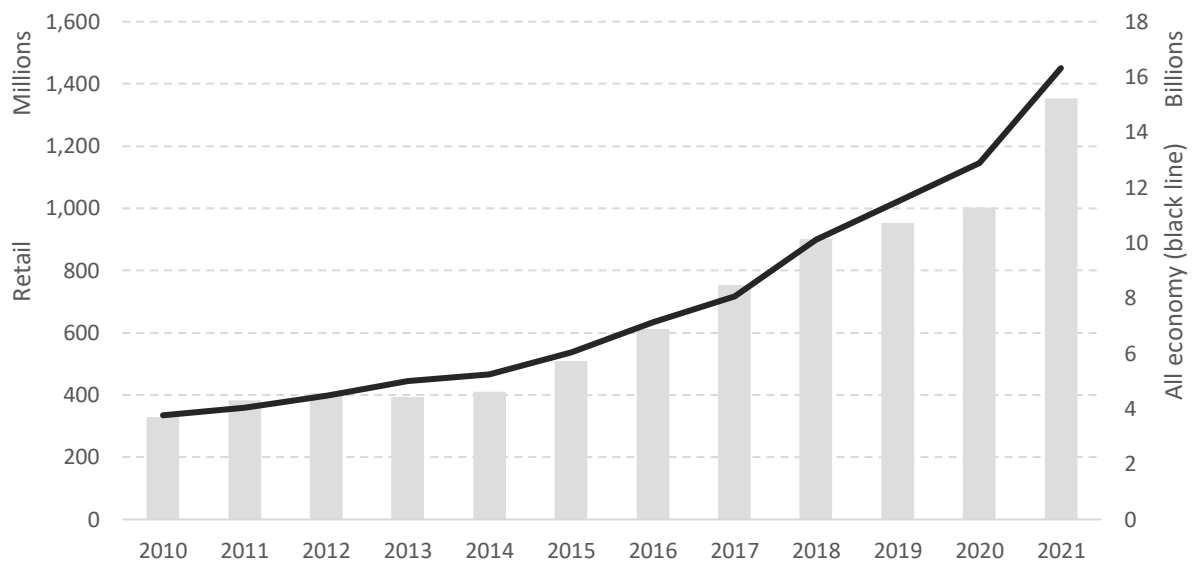


Figure 2.1. Dynamics of the volume of products sold in retail trade and the Ukrainian economy in general, in thousand UAH, 2010-2021 (Ukrstat, 2021b)

The main changes for Ukrainian trade in 2022 were the increase in food prices, the costs of restoring stores and logistics centers, and the shortage of construction materials (UA-Retail, 2022b). The increase in prices and the decrease in purchasing power have a negative effect on the sale of products. In 2022, Ukrainian business called the lack of solvent customers in the domestic market the main obstacle to business recovery during the war (Advanter.Group, 2022).

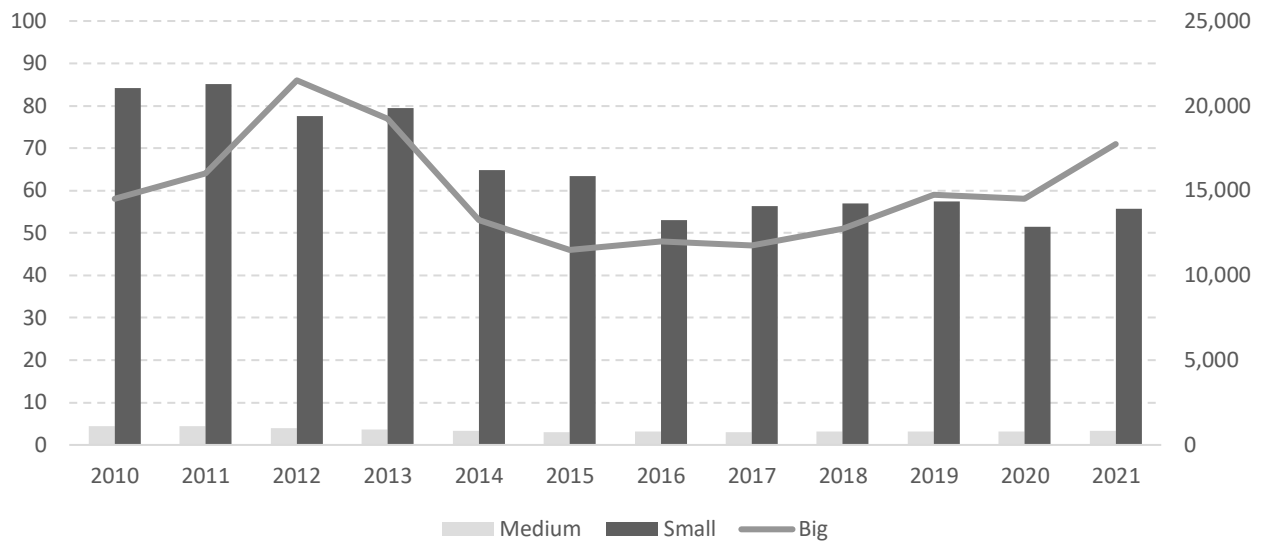


Figure 2.2. Distribution of the labor force in the retail trade market in Ukraine, by enterprise size.(Ukrstat, 2021b)

The number of large enterprises in the retail market for 2021 has not reached the number of large enterprises in the pre-war year 2013. As of 2021, there are 610 (71 in retail trade) large enterprises, 17 thousand (812) small enterprises and 304 (12) thousand micro enterprises operating in Ukraine.

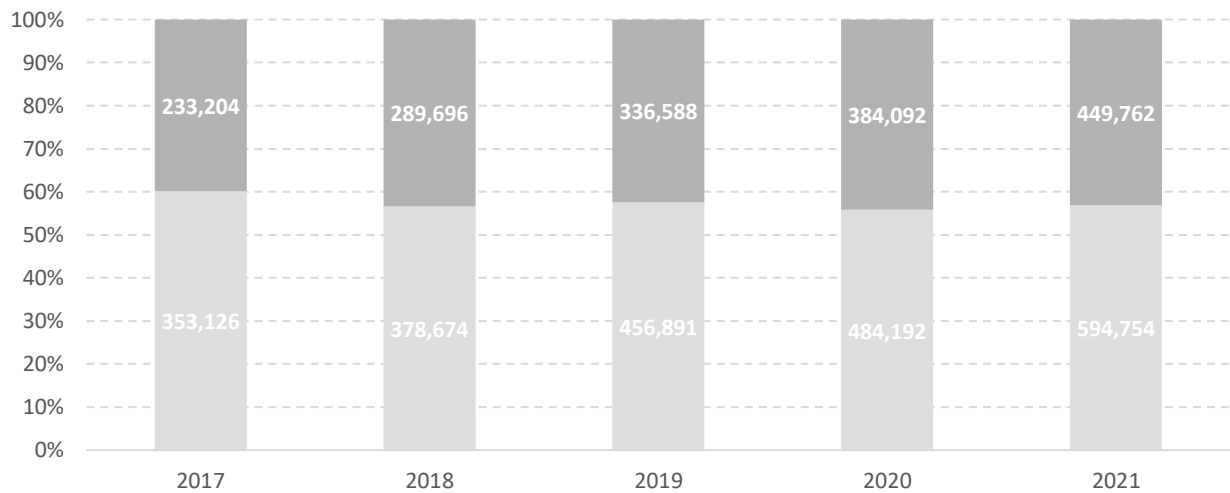


Figure 2.3. The ratio of non-food and food products on the retail market in Ukraine, 2017-2021 (Ukrstat, 2021b).

Most of the products are non-food products (594 billion hryvnias in 2021). The first five food products with the largest turnover include alcohol, meat products, dairy

products, bakery products, and tobacco products. The largest share is occupied by alcoholic beverages.

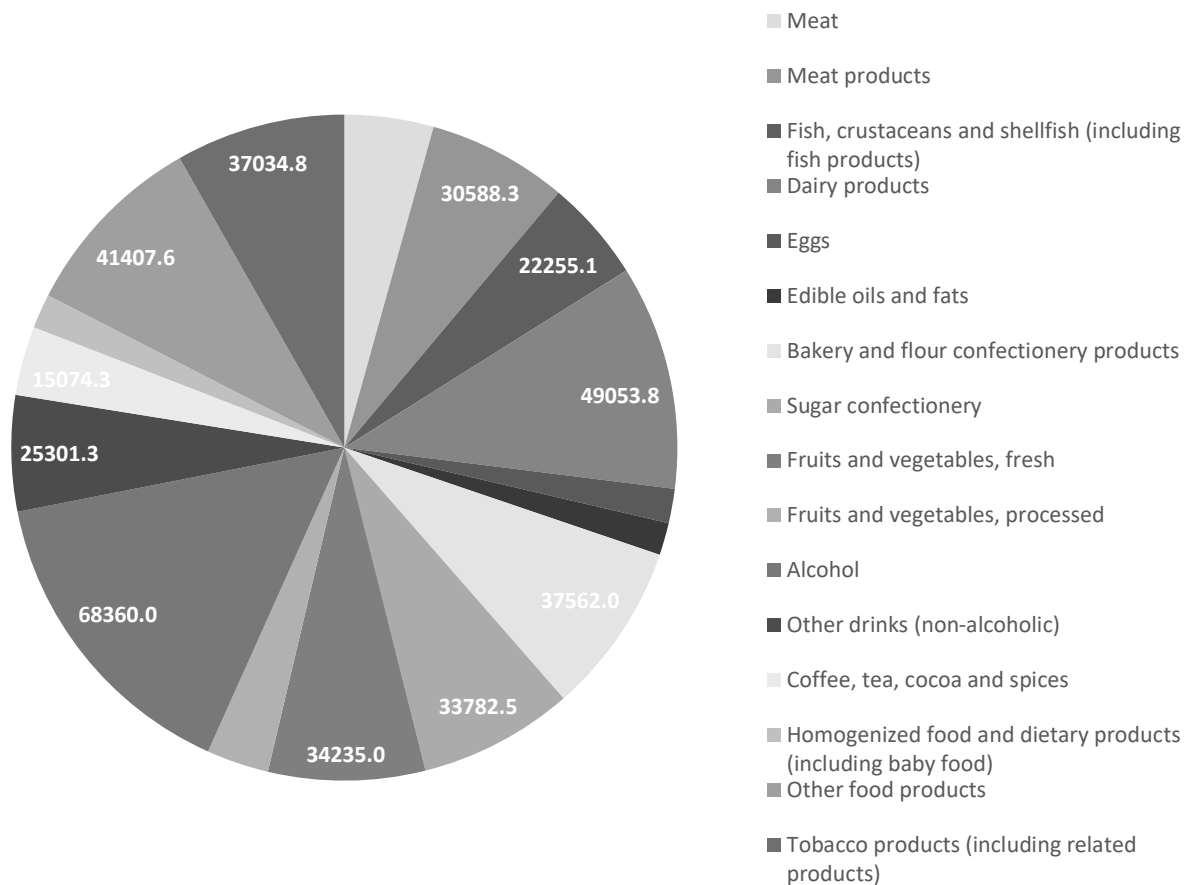


Figure 2.4. The ratio of non-food and food products on the retail market in Ukraine, 2017-2021 (Ukrstat, 2021b)

Of the food products, in the first months of the war, the segment of the sale of alcoholic products experienced the greatest decline, however, in most regional centers, the sale of alcohol was allowed from April, which led to a rapid recovery of the market (1st place among the segments of retail trade in terms of growth in April 2022) (UA-Retail, 2022a).

It is food products - food products and alcoholic products that have the highest inflation rates for 2022 - 36% compared to 2021 prices (RAU, 2022). Among non-food products, retailers mostly sell pharmaceutical products, cars and spare parts, motors, fuel, lubricants materials.

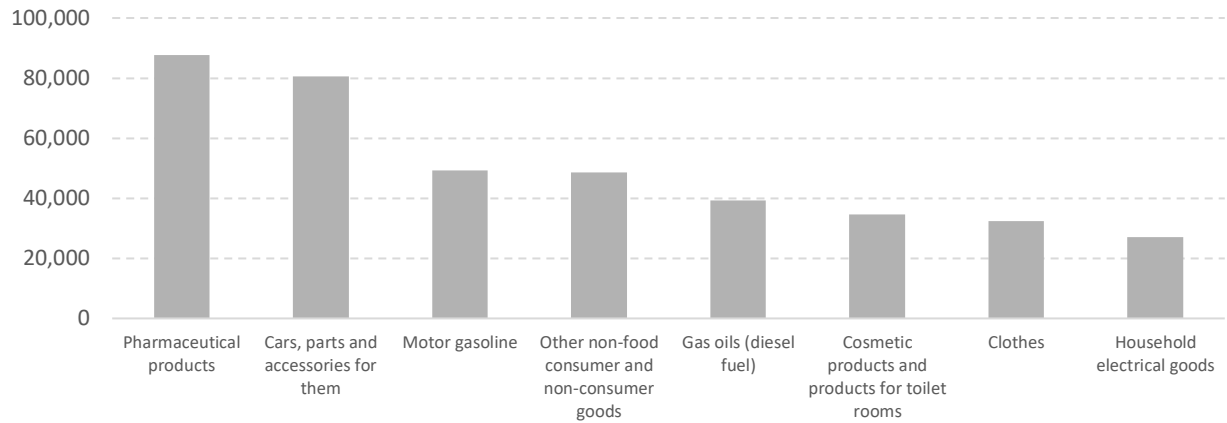


Figure 2.5. Categories of non-food products with the largest turnover in Ukraine, in million hryvnias, 2021 (Ukrstat, 2021b)

Before the full-scale invasion of Ukraine, the number of employed persons in the segment was decreasing and in 2021 total employment in retail trade was 1.45 million persons. According to Ukrstat, in 2020, 17% of employed persons in the sector worked in the city of Kyiv, the highest rate among regional centers was Dnipropetrovsk region (10%). If we analyze the regions where were placed in war battles in 2022, then they account for 49% of employed workers in the retail trade segment in Ukraine (Ukrstat, 2021b).



Figure 2.6. The number of employees employed by business entities (the three main areas of retail trade) in 2010-2021 (Ukrstat, 2021b)

The largest share of trade is trade in non-specialized stores (KVED 47.1). Non-specialized establishments are shopping centers, hypermarkets, supermarkets, etc (Ukrstat, 2010) (Figure 2.7).

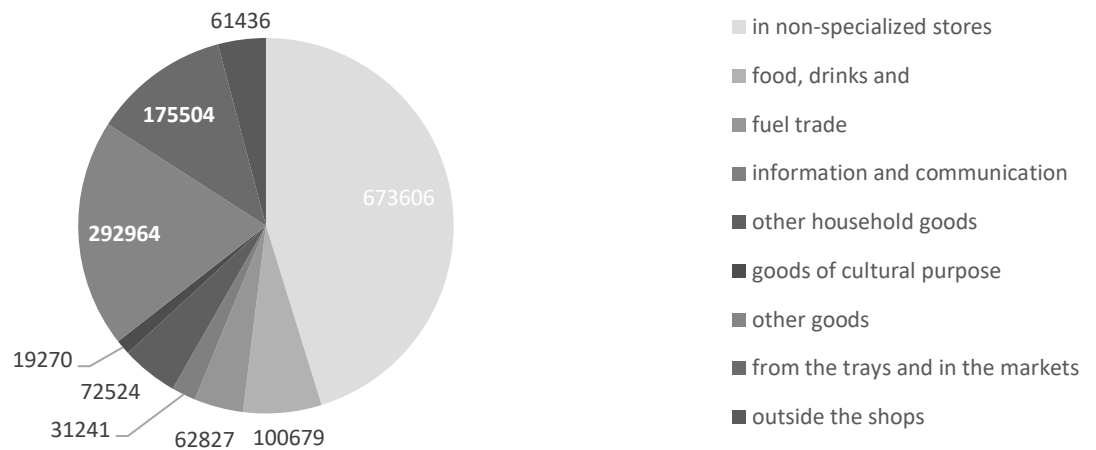


Figure 2.7. Distribution of employed workers in economic entities by types of economic activity in 2021 (Ukrstat, 2021b)

The share of manufactured products in Ukraine in total food products has a negative trend during 2005-2021, during this period the indicator decreased from 90.9% to 77.6% in 2021.

Among food products, the production of eggs, meat and bakery products is the most localized (Figure 2.8).

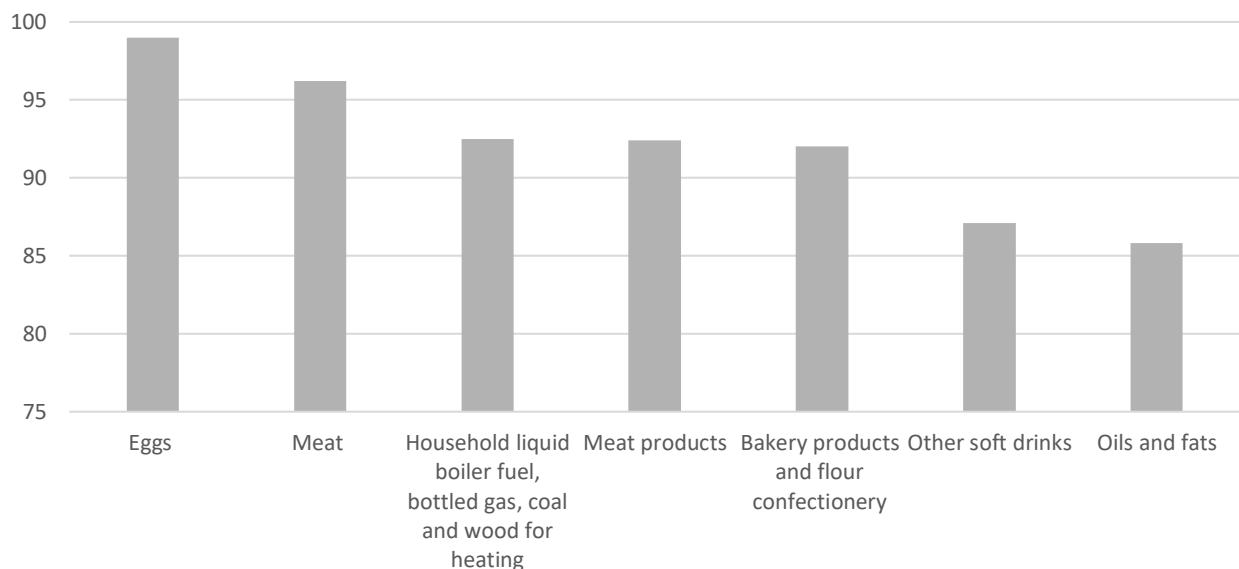


Figure 2.8. Share of sales of consumer goods produced in Ukraine, categories with the largest share of localization in 2021, % (Ukrstat, 2021b)

Fruits, vegetables, homogenized products and diet products, alcoholic beverages, coffee, tea, tobacco products have the lowest level of localization among food products (on average among these categories, localization is 64.6%).

Among non-food products, the lowest share of localization is the production of shoes, clothing, automobiles and parts, computers, software, watches, and jewelry (Figure 2.9).

Among non-food products, the following goods have the highest localization: boiler fuel, coal and wood for heating, lubricating materials, books, gasoline, diesel fuel, car washes, paints. Therefore, products with the highest added value mostly have low localization compared to raw goods.

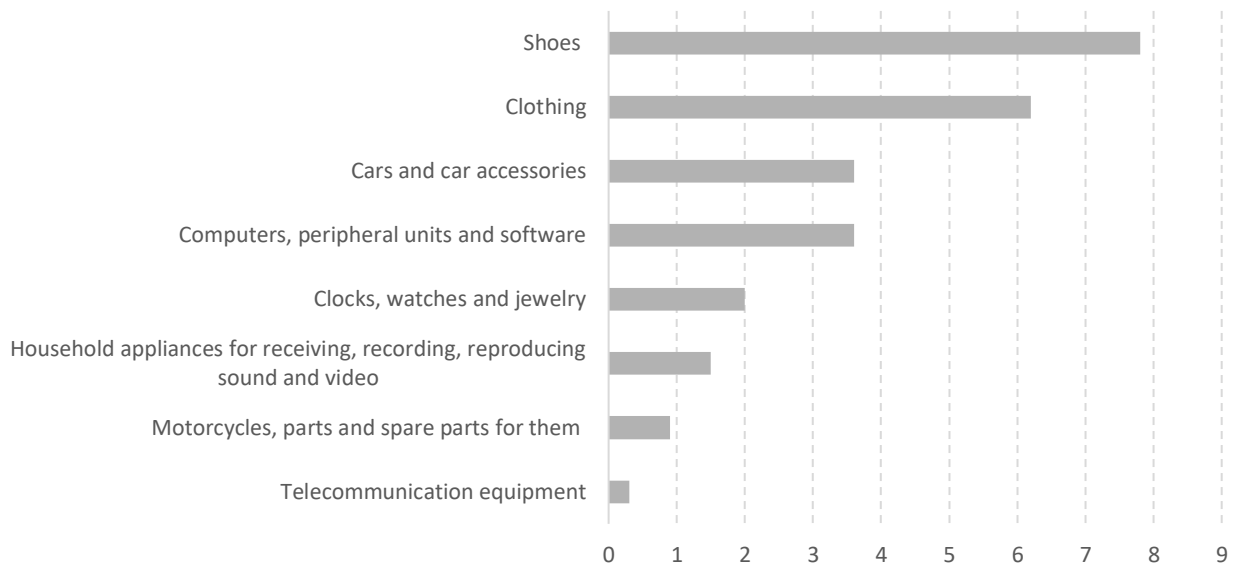


Figure 2.9. Share of sales of consumer goods produced in Ukraine, categories with the lowest share of localization in 2021, % (Ukrstat, 2021b).

Also, the low share of localization leads to risks that the devaluation of the hryvnia may lead to a rapid increase in prices on the domestic market. The main retailers on the Ukrainian market are ATB, Silpo, Epicentr, Metro, Rozetka. The top ten companies are dominated by FMCG companies in the retail trade segment (Table 2.1).

Table 2.1. Ranking of the 10 largest Ukrainian retailers by revenue in 2020 (RAU, 2021)

Company	Revenue 2020	Location
1. "ATB"	UAH 104.9 billion	Dnipro
2. Fozzy Group	UAH 78.2 billion;	Vyshneve (Kyiv region)
3. "Epicenter K"	UAH 45.7 billion;	Kyiv
4. Metro Cash&Carry	UAH 19.8 billion;	Kyiv

5. "Auchan"	UAH 14.2 billion;	Kyiv
6. Comfy	UAH 136 billion;	Dnipro
7. "Foxtrot"	UAH 13.1 billion;	Kyiv
8. Eva	UAH 12.9 billion;	Kyiv
9. Rozetka	UAH 12.2 billion;	Kyiv
10. Varus	UAH 11.3 billion;	Dnipro

Based on the market analysis, the main market problems are:

1. Limited access to external investment, due to the onset of full-scale business invasion, it is difficult to find financing and investment for capacity development.
2. Logistic losses and poor quality of transport infrastructure. The lack of investment in transport leads to the use of outdated vehicles, and the lack of a high-quality transport network increases the final cost of goods.
3. Low wages and mass outflow of labor from the country. This leads to a lack of personnel and increases the level of the shadow economy.
4. High level of corruption and high level of bureaucracy when opening a business. For example, the process of connecting to electricity networks is opaque and difficult for external investors (Orel, 2023).
5. Lack of technological innovations, which does not allow to increase business margins and company revenues. Among the main reasons for the lack of innovation in retail trade are a lack of own funds, insufficient support from the government, high costs for innovation, high economic risk and imperfect legal framework (Simshag, 2020).

2.2 Analysis of the shadow economy in retail trade of Ukraine and international experience

The level of the shadow economy, starting from 2015, has a tendency to decrease. In 2021, the indicator was from 22 to 33% of GDP (depending on the calculation method). In Ukraine, the assessment of the shadow economy is carried out

by the Ministry of Economy of Ukraine, which publishes reviews of the assessment of the shadow economy by sector and by calculation methods.

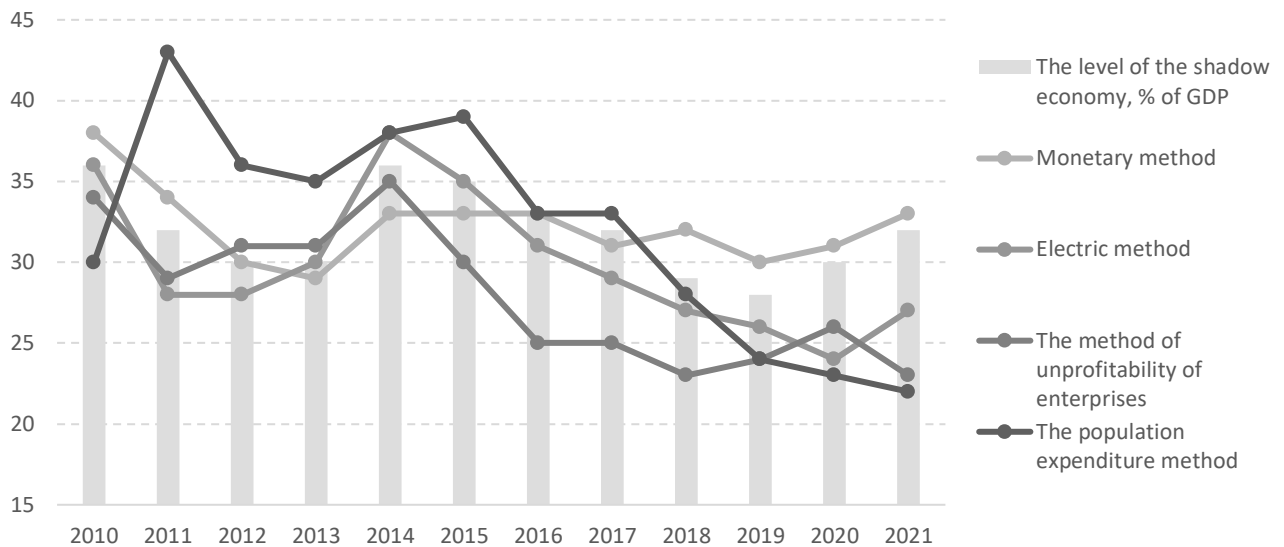


Figure 2.10. The level of the shadow economy in Ukraine according to various methods of calculation in % of GDP (MERT, 2022b).

In 2021, The shadow segment in retail trade was 24%, in 2020, the indicator was 32%. This is, for example, higher than in agriculture, processing industry, transport industry. The segments of the extractive industry and construction have the largest indicators of the shadow economy. The retail trade segment has a lower indicator of the shadow economy than the entire economy of Ukraine as a whole.

In 2021, the government began to develop a plan to reduce the shadow economy in Ukraine to 25% in a three-year perspective (Epravda, 2021). Also, the high level of the shadow economy is defined as one of the main challenges in the Strategy of Economic Security of Ukraine until 2025. Also, in the strategic plan for the recovery of Ukraine after the war, the goal is to reduce the shadow economy to a safe level (KMU, 2022).

Table 2.2. Analysis of the economic plan for the recovery of the Ukrainian economy after the war (KMU, 2022).

3.3. Strategic Expected Results

The stage "Structural modernization and full integration to EU",
2026–2032

- The leap from a transition economy to a developing economy.
- Full membership of Ukraine in the EU and completion of the European economic integration of Ukraine.
- Entry into the world's top 10 exporters of metal, agricultural products, and IT services.
- Reducing the resource intensity of the economy.
- Development of innovations.
- Import substitution in the field of equipment and military equipment.
- Maximum digitization of interaction between the state and business entities.
- Completion of Ukraine's "green" transition.
- Creation of a developed ecosystem of small and medium-sized businesses.
- Achieving full employment of the population.
- Increasing the level of welfare of the population.
- Reducing the shadow economy to an economically safe level.

But due to the full-scale russian invasion, the shadow economy in Ukraine is projected to grow in 2022. This is due to the growth of the shadow economy during crises - according to the estimates of the Ukrainian Institute of the Future - in 2022, employment in the shadow sector increased by 1-2 million people (the labor force in Ukraine in 2021 was 17.4 million people) (UIF, 2022a; Ukrstat, 2021c).

The war caused the growth of the shadow economy - despite this, it is worth noting the measures of the government, which were launched in recent years to unshadow the Ukrainian economy: (USAID, 2022)

1. Reduction of the tax burden. In 2022, benefits for individual entrepreneurs were introduced.
2. Optimizing the return of VAT to sellers and manufacturers. At the same time, in 2022-2023, delays in the payment of compensation were recorded, which forced enterprises to stop their own production and led to a break in cash flow (Tomashevskaya, 2023).
3. Application of open procurement tender procedures and development of the electronic governance model.
4. Increasing the independence and transparency of the NBU, NABU, the Deposit Guarantee Fund, etc.
5. Reforming the law system in Ukraine.

Table 2.3. The volume of the shadow economy by region in % (Ponomorenko & Olvinska, 2016).

Countries	1989-1993	1999-2000	2000-2001	2002-2003
Developing countries	39,2	32,2	34,9	37,7
Africa	43,9	33,9	37,4	41,2
Central and South America	38,9	34,2	37,7	41,5
Asia	35,0	28,5	29,5	30,4
Countries with transition economies	28,2	31,5	34,6	37,9
Former USSR	32,9	45,5	44,8	47,6
Central and Eastern Europe	23,4	30,0	29,2	31,9
OECD countries	14,2	13,2	15,7	16,8
Communist countries	-	19,8	21,1	22,3
Average value for 145 countries	-	33,6	34,5	35,2

An important aspect of the analysis of trends in retail trade is a comparison with the experience of other countries: Poland, Romania. Regions with lower economic development have a higher level of shadow economy (Table 2.3).

Table 2.4. The main factors of the shadow economy among the economies of developed countries (Ponomorenko & Olvinska, 2016)

Factors contributing to the growth of the shadow economy	Degree of influence	
	(a)	(b)
Increasing tax burden and size contribution to social security	35-38%	45-52%
Quality of state institutions	10-12%	12-17%
Transfers	5-7%	7-9%
Labor market regulation	7-9%	7-9%
State services	5-7%	7-9%
Morality of the taxpayer	22-25%	...
The influence of all factors	84-89%	78-96%

The Polish economy managed to reduce the volume of the shadow economy due to the following policies (LFMI, 2019; UNGC, 2021):

1. Increase in fines and tax payment control (Figure 2.11).
2. Changes in the mechanism of split payments.
3. Cancellation of the mechanism of reverse charge (charge), introduction of online cash registers in selected sectors of the economy and creation of the so-called "white list" of VAT payers (Polskieradio, 2021).

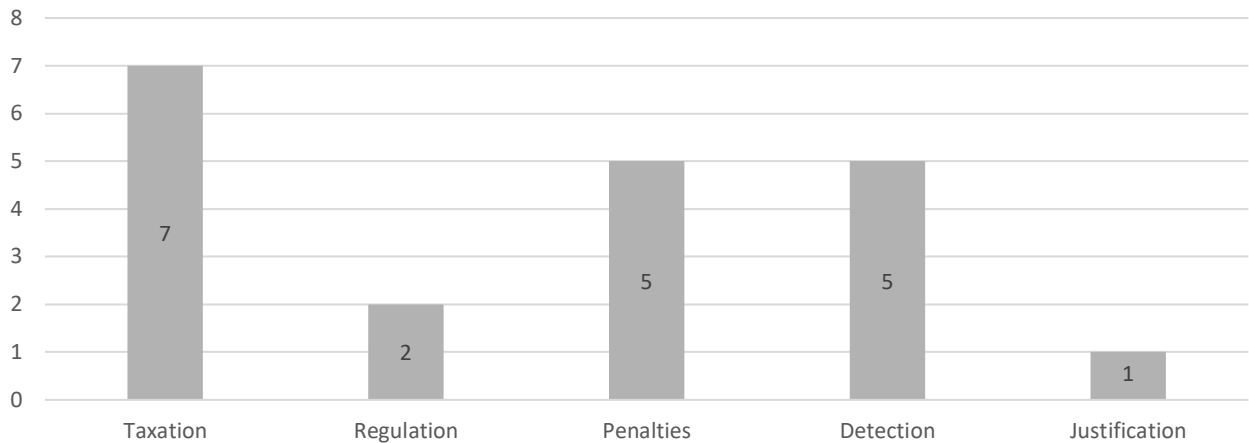


Figure 2.11. Comparison of Polish government policies to reduce the shadow economy (LFMI, 2019).

The Baltic countries (the experience of Estonia was considered) managed to reduce the volume of the shadow economy due to:

1. Digitization of filling out declarations, optimization of the tax payment procedure, introduction of e-tax.
2. Agreements with international companies on the sharing economy (Table 2.5).

Table 2.5. Estonian government policies to reduce the shadow economy (LFMI, 2019).

	Causes		Factors	
	Taxation	Regulation	Penalties	Detection
Goods and services		Online customs declaration ** (2017)		Agreements with Uber, Taxify, Estateguru, AirBNB *** (since 2017, 2018)
				Cash registers automatically sharing information online ** (under discussion)
				Provision of VAT information on counterparties ** (2015)
Labor		Improvements to the state procurements process (2018)		Electronic registration of construction workers ** (under discussion)

Common for all	Modernization of e-services ** (2017-2020)		Tax liability with tax fraud conviction * (2017)	Tax performance indicator ** (2017)
	New online tax filling system ** (since 2019)			

Analyzing the countries of the European Union and their policies to reduce the shadow economy, it is worth determining the connection between the shadow economy and the well-being of the population.

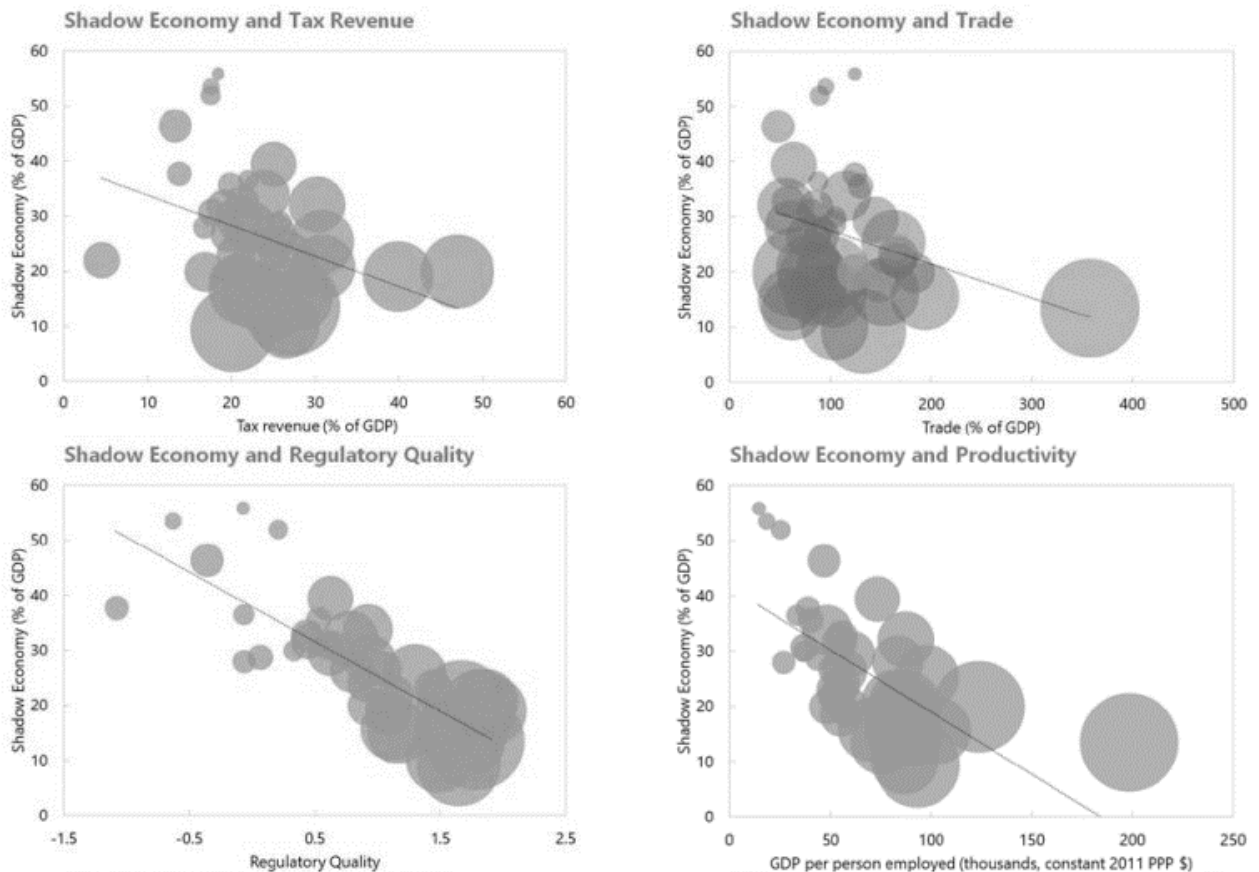


Figure 2.12. The relationship between the shadow economy and economic well-being in the EU (IMF, 2019)

Countries with a larger shadow economy have lower tax revenues, lower quality of government and lower GDP per capita (analysis of European Union member states) (IMF, 2019).

In summary, the main measures to combat the shadow economy have been easing the conditions for paying taxes, digitizing public services, simplifying the tax system, increasing control over tax payments, and giving greater powers to tax authorities.

The integration of Ukraine with the European Union requires strengthening control over the payment of taxes at the same time as simplifying the tax system and optimizing the payment of taxes to the budget.

2.3 Analysis of tax reforms and experience of highly developed economies

Despite the full-scale invasion, Ukrainian retail paid more taxes than in 2021. Despite this, most sectors of the Ukrainian economy paid less taxes to the budget in 2022 than in 2021. The largest decrease was recorded in the household sector, while the state activity sector had the largest growth rate - from 25 to 49 billion hryvnias in 2022 (DPS, 2023a).

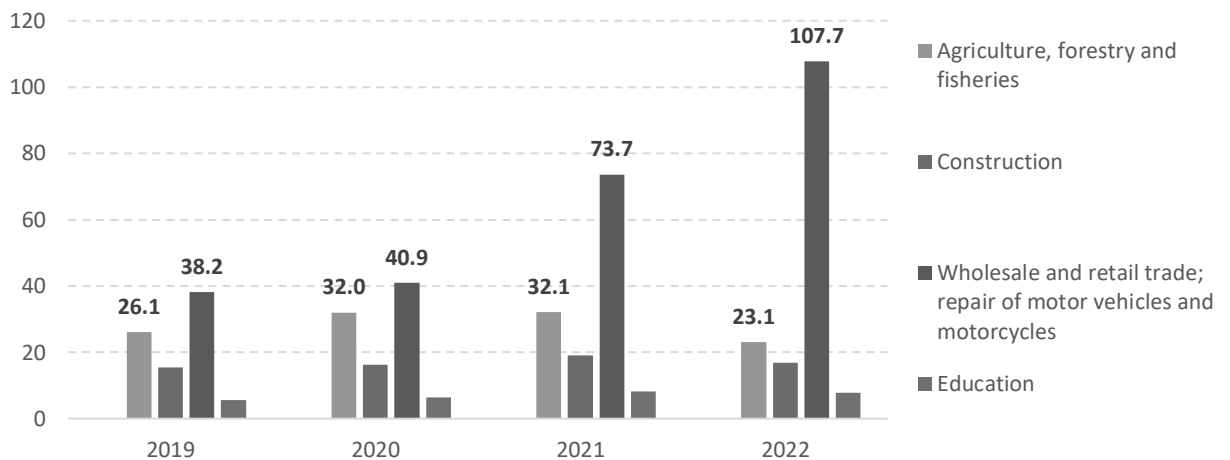


Figure 2.13. The dynamics of tax revenues in the sectors of the economy and retail trade, UAH billion (DPS, 2023a)

Since the beginning of the war, corporate tax revenues have decreased, VAT and personal income tax revenues have increased. The State Tax Service of Ukraine does not provide information on the distribution of types of taxes by specific sectors of the economy (by KVEDs, for example, for 47 retail).

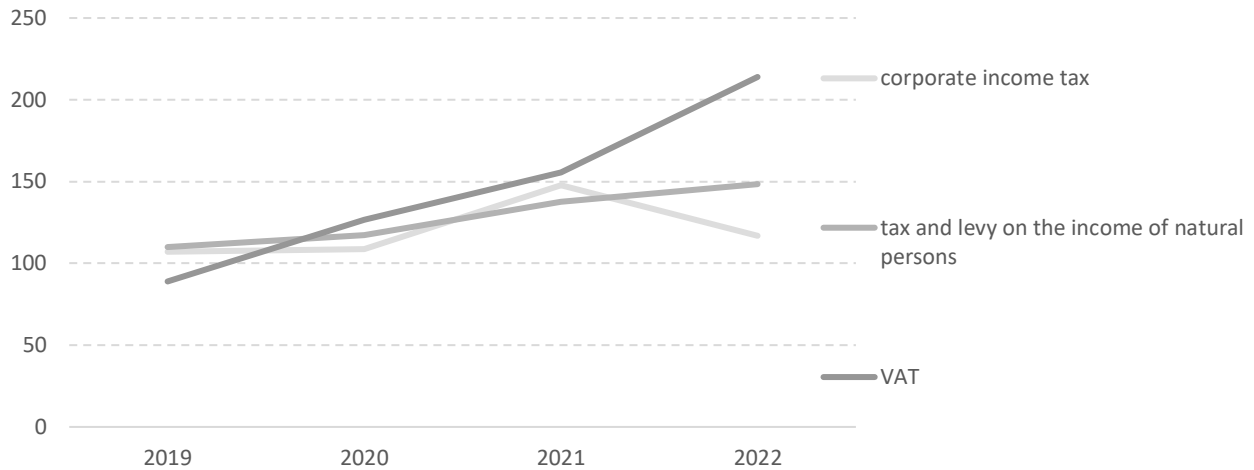


Figure 2.14. Dynamics of tax earning (state taxes), billion UAH (DPS, 2023a)

A survey of the main retailers of Ukraine shows that in the first five months of 2022, 23% less taxes were paid than in 2021. In total, the industry lost 23,000 jobs in the first five months of 2022 (Finance.ua, 2022).

In total, for 2022, Ukrainian retailers paid 56.6 billion hryvnias in taxes. The distribution of tax revenues, in addition to the state budget, also goes to local budgets.

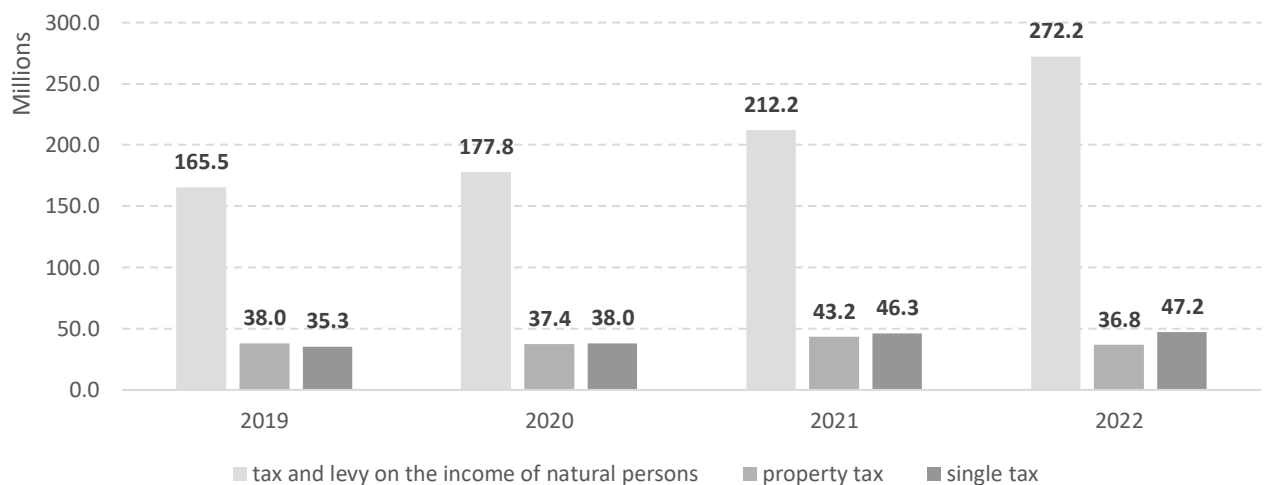


Figure 2.15. Dynamics of tax revenues (local taxes), UAH billion. (DPS, 2023a)

Most of the income from personal income tax is directed to the local budgets of communities. For example, out of the total amount of 56.6 billion hryvnias in 2022, 20.44 billion was paid the most by the company of budget supermarkets ATB. Of this amount, 13.65 billion hryvnias were paid, and 4.32 billion hryvnias were paid to local budgets, the rest to special funds (UA-Retail, 2023).

The largest branches of retail trade in terms of the amount of tax payments are food retail and fuel sales, both branches have a demand for essential goods (UA-Retail, 2023).

The main problems in the collection of taxes in the field of retail trade in 2022:

1. Occupation of several regions - loss of jobs - reduction of personal income tax and corporate tax. In the following regions, less taxes were paid in 2022 than in 2021: Kharkiv, Luhansk, Donetsk, Zaporizhzhia, Ternopil, Kyiv (DPS, 2023a).
2. Destruction of several large enterprises that paid taxes to the budget (Azovstal, Illich Steel and Iron Works in Mariupol).
3. Lack of confidence in Ukrainian business.
4. An increase in the informal economy due to the narrowing of the official segment.
5. Low level of investments in the Ukrainian economy for the development of enterprises.
6. High time costs for paying taxes to the budget and returning VAT.

Despite the destruction of large industrial and logistics facilities, large enterprises increased tax deductions to the budget (DPS, 2023a).

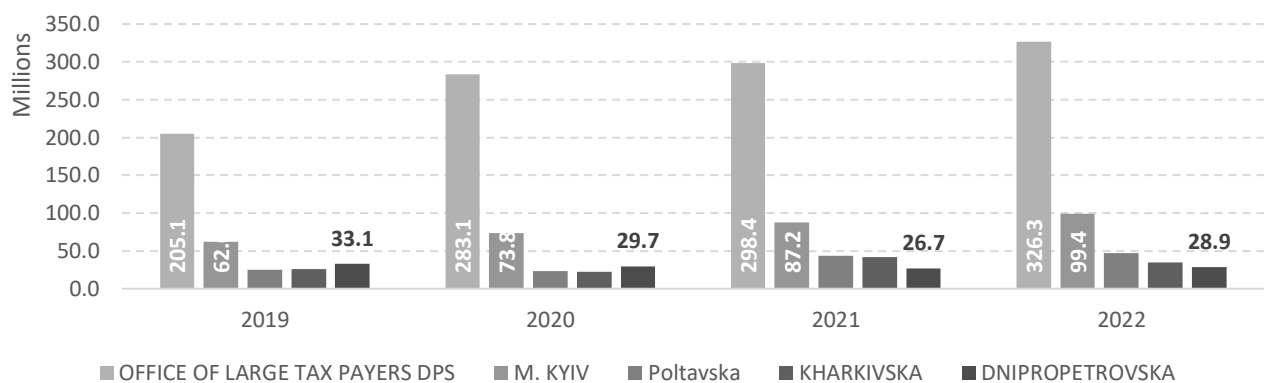


Figure 2.16. Regions that pay the most taxes to the budget and payments of large enterprises in million hryvnias (DPS, 2023a).

Among the leaders of taxpayers, only the Kharkiv region paid less taxes in 2022 than in 2021 (Figure 2.16).

Despite the fact that in 2022, taxes from the retail segment have been increasing for the past years - a change in the tax burden could accelerate economic growth.

The problems of a high level of the shadow economy and tax abuse require reform of the tax system and the business environment.

Government services, including tax services, must be fully optimized and digitized. This will allow the business to reduce money expenses and time costs for paying taxes in Ukraine.

Table 2.6. Comparison of current and potential tax rates in Ukraine (KMU, 2020).

Tax name	Tax rate now	Future tax rate
Corporate tax	18%	-
Exit capital tax for individuals	0%	15%
Exit capital tax for legal entities	18%	0%
Exit capital tax for non-residents	18+15%	15%
Personal income tax (upon payment of dividends)	5% +1,5%	0%

One of the proposed solutions for tax reform is to replace the corporate tax with an Exit Capital Tax. The analysis of countries that have implemented Exit Capital Tax shows that some countries did not receive an increase in tax revenues and there is no clearly confirmed negative impact of Exit Capital Tax on the budget (Cherkashin, 2021).

On the other hand, supporters of the introduction of Exit Capital Tax argue that the replacement of the corporate tax will allow businesses to invest more in their own production and increase income - which can lead to an increase in GDP by +0.5% per year (estimation of the Ukrainian Future Institute).

The analytical center's recommendations on optimizing the tax system also include (UIF, 2022b):

1. Change VAT to retail sales tax.

2. Liquidation of the single social contribution and modification of the simplified taxation system.

Table 2.7. International experience of changing taxation in other countries (Cherkashin, 2021).

Country	Rate	Tax base	Features	Status
Estonia	20% (to 2015 -21%)	the amount of dividends and other deductions from profit + payments in the form of gifts or donations	from 01.01.2019, a rate of 14% is applied to regularly paid dividends	valid (since 2001)
South Macedonia	10%	profit distribution (actual) + non-deductible expenses and understated income (annually)	the presence of two tax bases	a temporary measure repealed in 2013
Mexico	17,5%	delivered income	functioned in parallel with the corporate tax	canceled in 2014
Georgia	15 %	distributed profit + expenses or other payments not related to economic activity + free supply of goods / provision of services or (and) transfer of money	-	valid (since 2017)

The main benefits of the tax are incentives for businesses to invest more in their own production and innovation.

Among the main disadvantages of the introduction of the Exit Capital Tax is a decrease in revenues to the budget - which will stimulate the growth of the budget deficit, which in 2022 reached record values.

Among the difficulties that must be taken into account when analyzing international experience are tax administration, the high level of the shadow economy, the need for funds to rebuild infrastructure and the economy.

CHAPTER 3. MODELING OF THE RETAIL TRADE IN UKRAINE AND RECOMMENDATIONS

3.1 Econometric model for the retail market

Stable tax and non-tax revenues are necessary for the stable functioning of the state and financing of critical infrastructure. The full-scale invasion of Ukraine became a catalyst for the identification of problems in the functioning of the budget system of Ukraine.

This section of the scientific model examines the influence of income factors on economic activity. The indicators of the retail trade market in Ukraine are also taken into account to demonstrate the connection between the payment of taxes and the development of the retail trade market in Ukraine.

To determine the relationship between indicators, the VAR (Vector autoregression) model was initially chosen. This type of financial modeling allows you to assess the relationship between current observations and past observations, and it also allows you to assess the mutual influence of variables (Table 3.1).

Table 3.1. Variables that were used in the model for the analysis of the tax system (created by author).

Name in EViews	Variable
CORPORATE_TAX_SA	Corporate tax earning to the Ukrainian budget, monthly data until the 9th month of 2022.
EXPORT	Export dynamics of Ukrainian manufacturers
INFLATION	Dynamics of the Consumer Price Index
TURNOVER	Turnover in retail trade
INCOME_TAX_SA	Personal income tax earning to the Ukrainian budget, monthly data until the 9th month of 2022.

Variables in the model allow us to assess the effectiveness and significance of the tax system for the economic activity of the government. That is why 5 categories of taxes were chosen for analysis: a single tax, VAT on imports, VAT on domestic goods, personal income tax and corporate tax. In the subsequent model, only personal

tax and corporate tax were included, the data of this indicator are significant for the model.

Table 3.2. Correlation matrix of the variables used in the model (created by author using Eviews).

	CORPORATE_TAX_SA	EXPORT	INCOME_TAX_SA	INFLATION	TURNOVER
CORPORATE_TAX_SA	1.000000	0.261278	0.488235	-0.346845	0.172112
EXPORT	0.261278	1.000000	0.252033	-0.510660	0.768588
INCOME_TAX_SA	0.488235	0.252033	1.000000	-0.534311	0.152630
INFLATION	-0.346845	-0.510660	-0.534311	1.000000	-0.675258
TURNOVER	0.172112	0.768588	0.152630	-0.675258	1.000000

The correlation matrix in Eviews was used to generalize the relationships in the developed model. This allows you to identify regularities in the model (Displayr, n.d.). Inflation has a negative correlation with all variables, other relationships without inflation show a positive level of correlation.

The following methods and sources were used when searching for data:

1. Methods:

A) Request for public information to Ukrstat, Tax administration and the Ministry of Economy. Clarification was received regarding the publication of financial statistics of companies.

B) Collection of primary data on the websites of state structures in Ukraine.

C) Analysis of business surveys (NBU and private companies conducting surveys).

2. The main sources of information were identified as:

A) Ministry of Finance – budget policy analysis.

B) Ministry of Economy - analysis of the shadow economy in Ukraine.

C) Ministry of Finance - budget implementation and expenditures.

D) Tax administration (DPS) - analysis of tax and non-tax revenues.

F) Ukrstat – indicators of the retail trade market in Ukraine.

Despite the use of the above sources, the main source was determined to be the NBU, due to the convenience of data display and their structuring.

Series: CORPORATE_TAX_SA, EXPORT, INCOME_TAX_SA,
INFLATION, TURNOVER
Date: 04/10/23 Time: 10:13

Sample: 2015M01 2022M09
 Exogenous variables: Individual effects
 Automatic selection of maximum lags
 Automatic lag length selection based on AIC: 0 to 11
 Total number of observations: 428
 Cross-sections included: 5

Method	Statistic	Prob.**
Im, Pesaran and Shin W-stat	-1.19037	0.1169

** Probabilities are computed assuming asymptotic normality

Intermediate ADF test results

Series	t-Stat	Prob.	E(t)	E(Var)	Lag	Max Lag	Obs
CORPORATE_							
TAX_SA	-1.5237	0.5167	-1.430	0.852	11	11	81
EXPORT	-4.0363	0.0020	-1.433	0.848	9	11	83
INCOME_TAX							
_SA	0.7196	0.9919	-1.430	0.852	11	11	81
INFLATION	-2.4549	0.1300	-1.528	0.747	1	11	91
TURNOVER	-2.4458	0.1323	-1.530	0.735	0	11	92
Average	-1.9482		-1.470	0.807			

Warning: for some series the expected mean and variance for the given lag and observation are not covered in IPS paper

Figure 3.1. Dickey-Fuller test for testing series for stationarity (created by author using Eviews).

Some indicators in the model had seasonality with different natures of origin: some taxes are paid at the end of quarters and the year, the retail market has the lowest sales in winter and early spring, government spending increases at the end of the calendar year, etc. Seasonality was removed in order to determine the trend of the data variable, rather than seasonal variation.

After adjusting for seasonality, data sets were analyzed using the Dickey-Fuller test for stationarity. When analyzing stationary at levels, it was found that the time series are not stationary in levels.

After reducing the data to the first differences, the time series in the model are transformed into stationary series. A probability of less than 0.05 was determined for income tax, corporate tax, retail trade turnover, inflation, and exports.

Method	Statistic	Prob.**
	-	
	6.2307	
Im, Pesaran and Shin W-stat	4	0.0000

** Probabilities are computed assuming asymptotic normality

Intermediate ADF test results

Series	t-Stat	Prob.	E(t)	E(Var)	Lag	Max Lag	Obs
D(CORPORAT							
E_TAX_SA)	-4.2913	0.0009	-1.430	0.852	10	11	81
D(EXPORT)	-4.2954	0.0009	-1.429	0.853	11	11	80
D(INCOME_TA							
X_SA)	-3.2422	0.0211	-1.429	0.853	11	11	80
D(INFLATION)	-5.2574	0.0000	-1.429	0.853	11	11	80
D(TURNOVER)	-2.9259	0.0468	-1.429	0.853	11	11	80
Average	-4.0024		-1.429	0.853			

Warning: for some series the expected mean and variance for the given lag and observation are not covered in IPS paper

Figure 3.2. Checking series for stationarity (created by author using Eviews).

After analyzing tests, a VAR model was built for time sets. When specifying the model, it was indicated that the series are stationary in the first differences (except for exports, which are stationary in levels).

Figure 3.3. VAR model specification (created by author using Eviews).

After checking for stationarity, a VAR model specification was carried out, where it was indicated that exports are stationary in levels and other variables are stationary in first differences. For the initial specification, a lag interval of 1 2 was chosen. The specification equation was also constructed, allowing to estimate the equation of the relationship between the variables in the model (Table 3.3).

Table 3.3. Specification of equations of relationship between variables (created by author using Eviews).

$$\begin{aligned} \text{EXPORT} = & C(1)*\text{EXPORT}(-1) + C(2)*\text{EXPORT}(-2) + C(3)*\text{D}(\text{INCOME_TAX_SA}(-1)) + \\ & C(4)*\text{D}(\text{INCOME_TAX_SA}(-2)) + C(5)*\text{D}(\text{TURNOVER}(-1)) + C(6)*\text{D}(\text{TURNOVER}(-2)) + C(7) + \\ & C(8)*\text{D}(\text{CORPORATE_TAX_SA}) + C(9)*\text{D}(\text{INFLATION}) \end{aligned}$$

$$D(\text{INCOME_TAX_SA}) = C(10)*\text{EXPORT}(-1) + C(11)*\text{EXPORT}(-2) + C(12)*D(\text{INCOME_TAX_SA}(-1)) + C(13)*D(\text{INCOME_TAX_SA}(-2)) + C(14)*D(\text{TURNOVER}(-1)) + C(15)*D(\text{TURNOVER}(-2)) + C(16) + C(17)*D(\text{CORPORATE_TAX_SA}) + C(18)*D(\text{INFLATION})$$

$$D(\text{TURNOVER}) = C(19)*\text{EXPORT}(-1) + C(20)*\text{EXPORT}(-2) + C(21)*D(\text{INCOME_TAX_SA}(-1)) + C(22)*D(\text{INCOME_TAX_SA}(-2)) + C(23)*D(\text{TURNOVER}(-1)) + C(24)*D(\text{TURNOVER}(-2)) + C(25) + C(26)*D(\text{CORPORATE_TAX_SA}) + C(27)*D(\text{INFLATION})$$

After the specification of the model, the VAR model was constructed, this allows to estimate the relationships between the variables.

Vector Autoregression Estimates
Date: 04/30/23 Time: 13:05
Sample (adjusted): 2015M04 2022M09
Included observations: 90 after adjustments
Standard errors in () & t-statistics in []

	EXPORT	D(INCOME_T AX_SA)	D(TURNOVER)
EXPORT(-1)	0.587374 (0.10909) [5.38448]	26.54107 (12.3848) [2.14303]	0.079892 (0.04906) [1.62855]
EXPORT(-2)	0.301763 (0.11072) [2.72551]	-38.51979 (12.5700) [-3.06441]	-0.148943 (0.04979) [-2.99137]
D(INCOME_TAX_SA(- 1))	0.000151 (0.00091) [0.16598]	-0.711224 (0.10337) [-6.88038]	0.000318 (0.00041) [0.77595]
D(INCOME_TAX_SA(- 2))	0.001844 (0.00093) [1.99248]	-0.094754 (0.10508) [-0.90173]	0.001704 (0.00042) [4.09323]
D(TURNOVER(-1))	0.840705 (0.23862) [3.52324]	81.57131 (27.0907) [3.01105]	-0.063453 (0.10731) [-0.59132]
D(TURNOVER(-2))	-0.098090 (0.23390) [-0.41937]	-30.59722 (26.5548) [-1.15223]	-0.412374 (0.10519) [-3.92047]
C	-0.174275 (1.54975) [-0.11245]	685.3408 (175.947) [3.89516]	-0.340928 (0.69694) [-0.48918]
D(CORPORATE_TAX_S A)	-0.000234 (0.00017) [-1.35956]	-0.051290 (0.01950) [-2.62994]	-0.000102 (7.7E-05) [-1.32271]
D(INFLATION)	0.113260 (0.54137) [0.20921]	88.24549 (61.4625) [1.43576]	-0.365300 (0.24346) [-1.50047]
R-squared	0.762720	0.495508	0.340506
Adj. R-squared	0.739284	0.445682	0.275371
Sum sq. resids	14892.99	1.92E+08	3011.916
S.E. equation	13.55965	1539.456	6.097881
F-statistic	32.54602	9.944695	5.227677
Log likelihood	-357.6021	-783.4898	-285.6780
Akaike AIC	8.146713	17.61089	6.548399
Schwarz SC	8.396694	17.86087	6.798380

Mean dependent	3.637778	336.9568	0.101111
S.D. dependent	26.55614	2067.701	7.163429

Figure 3.4. VAR model for selected data (created by author using Eviews).

A Granger causality test was performed to identify exogenous and endogenous variables, demonstrating that corporate tax and inflation are exogenous variables. This is explained by the fact that inflation is formed in the entire economic system, not only in retail trade.

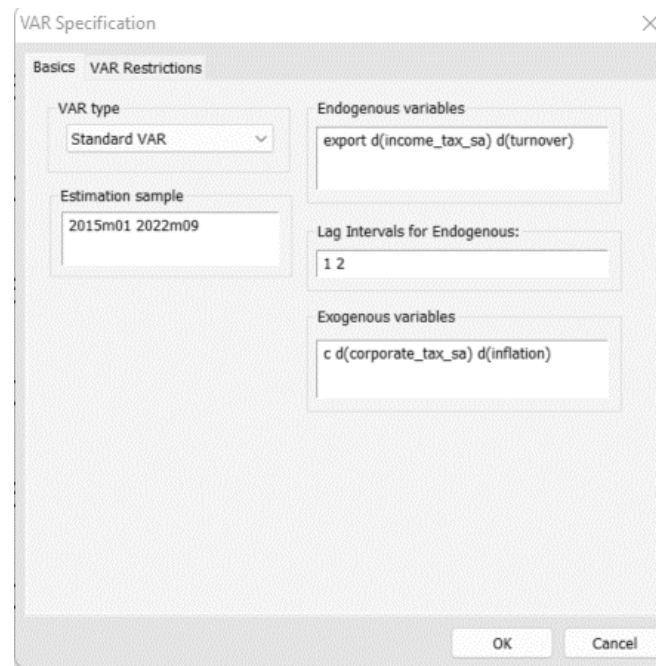


Figure 3.5. Revaluation of the VAR model (created by author using Eviews).

After that, the VAR-model was re-estimated, indicating that inflation and corporate tax are exogenous changes.

VAR Granger Causality/Block Exogeneity Wald Tests
Date: 04/10/23 Time: 10:16
Sample: 2015M01 2022M09
Included observations: 90

Dependent variable: EXPORT

Excluded	Chi-sq	df	Prob.
D(INCOME_TAX_SA)	5.358918	2	0.0686
D(TURNOVER)	13.10623	2	0.0014
All	16.27484	4	0.0027

Dependent variable: D(INCOME_TAX_SA)

Excluded	Chi-sq	df	Prob.
EXPORT	10.38053	2	0.0056
D(TURNOVER)	11.34843	2	0.0034

All	28.68385	4	0.0000
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Dependent variable: D(TURNOVER)			
Excluded	Chi-sq	df	Prob.
EXPORT	12.51742	2	0.0019
D(INCOME_TAX_SA)	20.33385	2	0.0000
All	31.95851	4	0.0000

Figure 3.6. Checking the model for exogeneity of variables (created by author using Eviews).

After that, the exogeneity test was conducted a second time. His results are shown in Figure 3.6.

The endogeneity of the variables in the model demonstrates that the variables are determined based on the relationship with other variables in the model and are not exogenous. After testing for exogeneity, it can be concluded that tax revenues and business activities are cyclically linked and influence each other.

The increase in taxes allows for an increase in government spending on economic activity, which in turn allows for an increase in sales on the retail trade market in Ukraine. The growth of the market and the creation of favorable business conditions for Ukrainian companies in combination with the reform of the tax system leads to an increase in tax revenues for the Ukrainian budget.

The next stage is the exclusion of lags, to begin with, an analysis of the maximum length of lags was carried out (Lukianenko & Zhuk, 2013). Therefore, according to the analysis, lags after 2 need to be excluded (Table 3.4). In the first model, only the first two lags were included, so nothing needs to be changed in the model, because only the first two lags are included in the model.

Table 3.4. Analysis of the length of lags in the VAR model (created by author using Eviews).

Date: 04/10/23 Time: 10:17
Sample: 2015M01 2022M09
Included observations: 84

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1432.224	NA	1.60e+11	34.31485	34.57529	34.41955
1	-1352.942	147.2369	3.01e+10	32.64148	33.16237	32.85088
2	-1325.277	49.40163*	1.93e+10*	32.19708*	32.97841*	32.51117*

3	-1320.481	8.221557	2.15e+10	32.29718	33.33896	32.71596
4	-1316.504	6.533670	2.43e+10	32.41677	33.71900	32.94026
5	-1305.911	16.64721	2.36e+10	32.37883	33.94150	33.00701
6	-1298.715	10.79393	2.50e+10	32.42178	34.24489	33.15466
7	-1293.814	7.001001	2.80e+10	32.51938	34.60294	33.35696
8	-1287.525	8.534569	3.05e+10	32.58394	34.92794	33.52621

After the lag length testing, a lag exclusion test was conducted. During testing, the p-value level for each lag and variable is examined. The test results demonstrate that both lags do not need to be excluded from the model (Figure 3.7).

VAR Lag Exclusion Wald Tests
Date: 04/10/23 Time: 10:17
Sample (adjusted): 2015M04 2022M09
Included observations: 90 after adjustments

Chi-squared test statistics for lag exclusion:
Numbers in [] are p-values

	EXPORT	D(INCOME_T AX_SA)	D(TURNOVER)	Joint
Lag 1	59.93903 [0.0000]	56.74491 [0.0000]	3.211526 [0.3601]	124.5088 [0.0000]
Lag 2	11.98634 [0.0074]	11.79496 [0.0081]	27.83570 [0.0000]	59.80141 [0.0000]
Df	3	3	3	9

Figure 3.7. Analysis of the exclusion of lags (created by author using Eviews).

The next stage is testing the roots of the characteristic polynomial. If all the points lie in the unit circle, it means that the simulation results are statistically relevant. After testing, it can be concluded that the developed model shows statistically relevant results (Figure 3.8).

Inverse Roots of AR Characteristic Polynomial

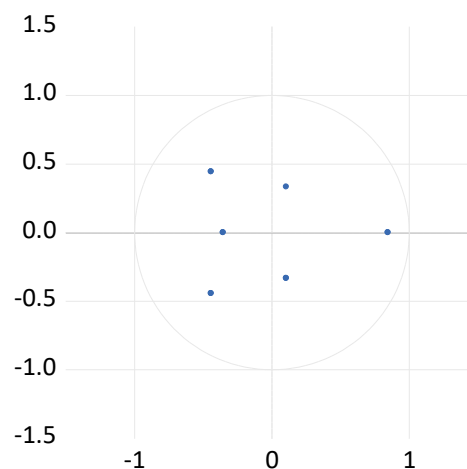


Figure 3.8. Analysis of the dynamic stability of the VAR model (created by author using Eviews).

After checking for the exogeneity of the variables, an analysis of impulsive shocks was conducted and different time horizons for the analysis of shocks were analyzed. First, 24 periods were selected for shock analysis. But this interval was not enough to demonstrate the fading effect of shocks - that is why a period of 48 months was chosen.

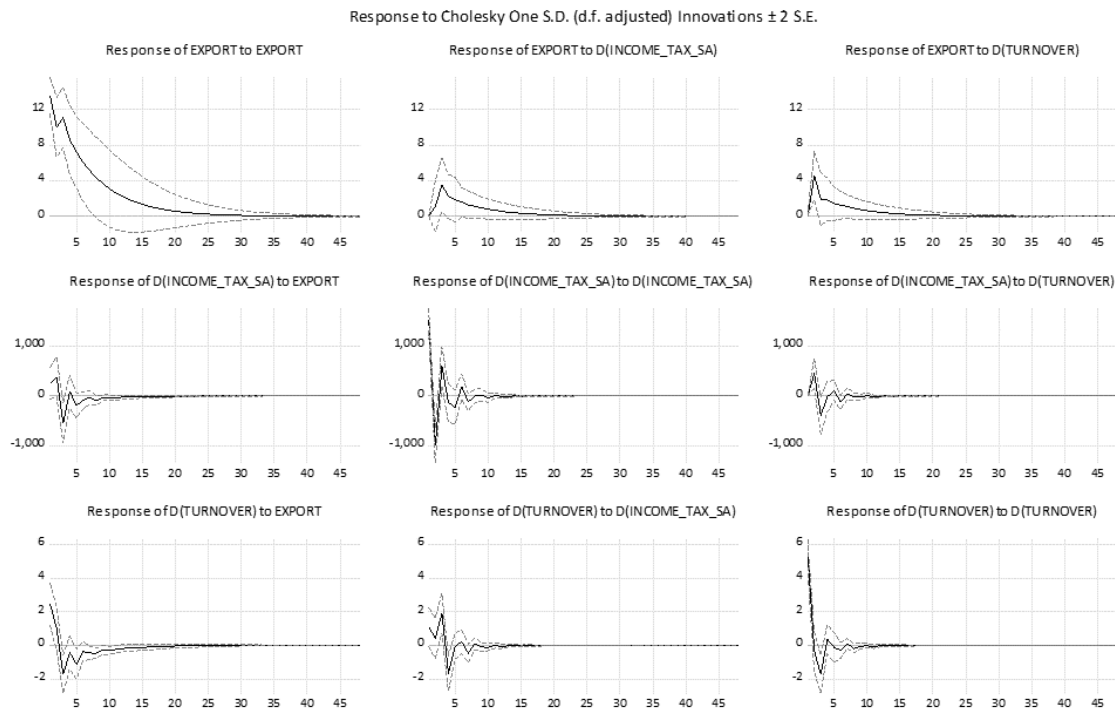


Figure 3.9. Impulsive functions of the VAR model describing the functioning of the tax system and the retail market (created by author using Eviews).

When analyzing impulse functions, it is worth noting that the export shock has the longest effect on retail turnover and income tax receipts for individuals. This is due to the fact that the Ukrainian economy today depends on export opportunities.

The drop in exports due to the blocking of seaports, mining of the Black and Azov seas is one of the reasons for the decrease in Ukrainian exports in 2022. Changes in the personal income tax cause a shock, but which subsides faster than the shock in the export of Ukrainian goods.

Cholesky decomposition allows to analyze the components of influence on a certain variable in the model and to determine the most influential variables and their effect over time. The influence of some variables increases over time (for example,

retail turnover on the amount of personal income tax), but the effect of the variable on itself over time decreases (Figure 3.10).

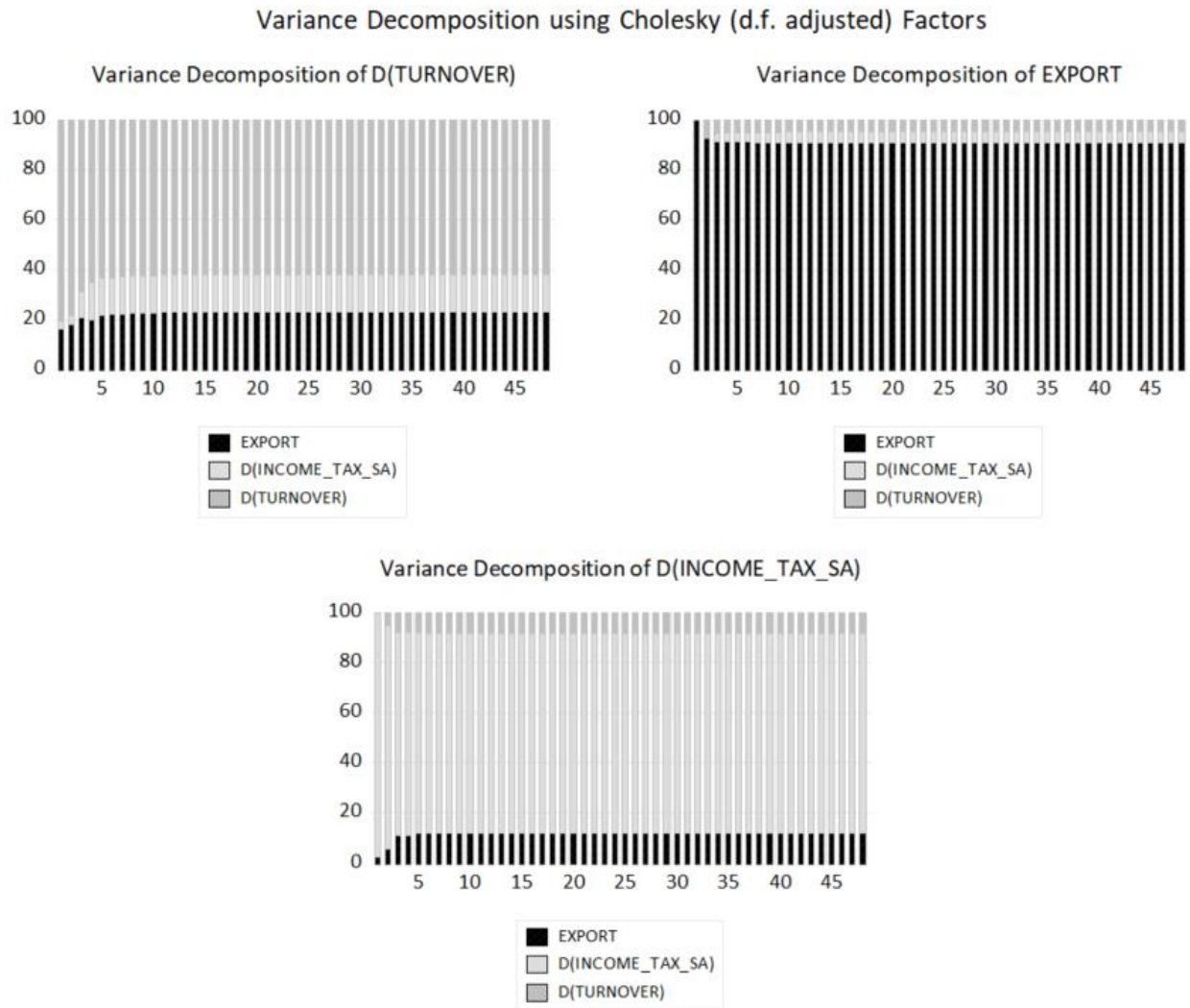


Figure 3.10. Cholesky decomposition for VAR model variables (created by author using Eviews).

Analyzing the impact of variables on personal income tax, the biggest impact is the personal income tax itself, turnover and export opportunities of the Ukrainian economy.

Summarizing the use of an econometric model to describe relationships, it is worth noting that the VAR model allows you to estimate the impact of variables on one of the variables in the model, and to estimate the weight of this impact.

It also allows you to build a forecast of endogenous variables using the Eviews software package. The time horizon from the 9th month of 2022 to the 9th month of 2023 was chosen to build the forecast.

The forecasting results demonstrate the growth of trade indicators and tax revenues. After the drop in exports in 2022, Ukrainian business is transforming and entering new product markets. With regard to exports, the simulation shows a decrease in the rate of decline in exports.

The model shows that the level of exports will start to increase at the end of 2023. This is due to seasonality, an increase in foreign exchange earnings at the end of the year, and the recovery of the Ukrainian economy.

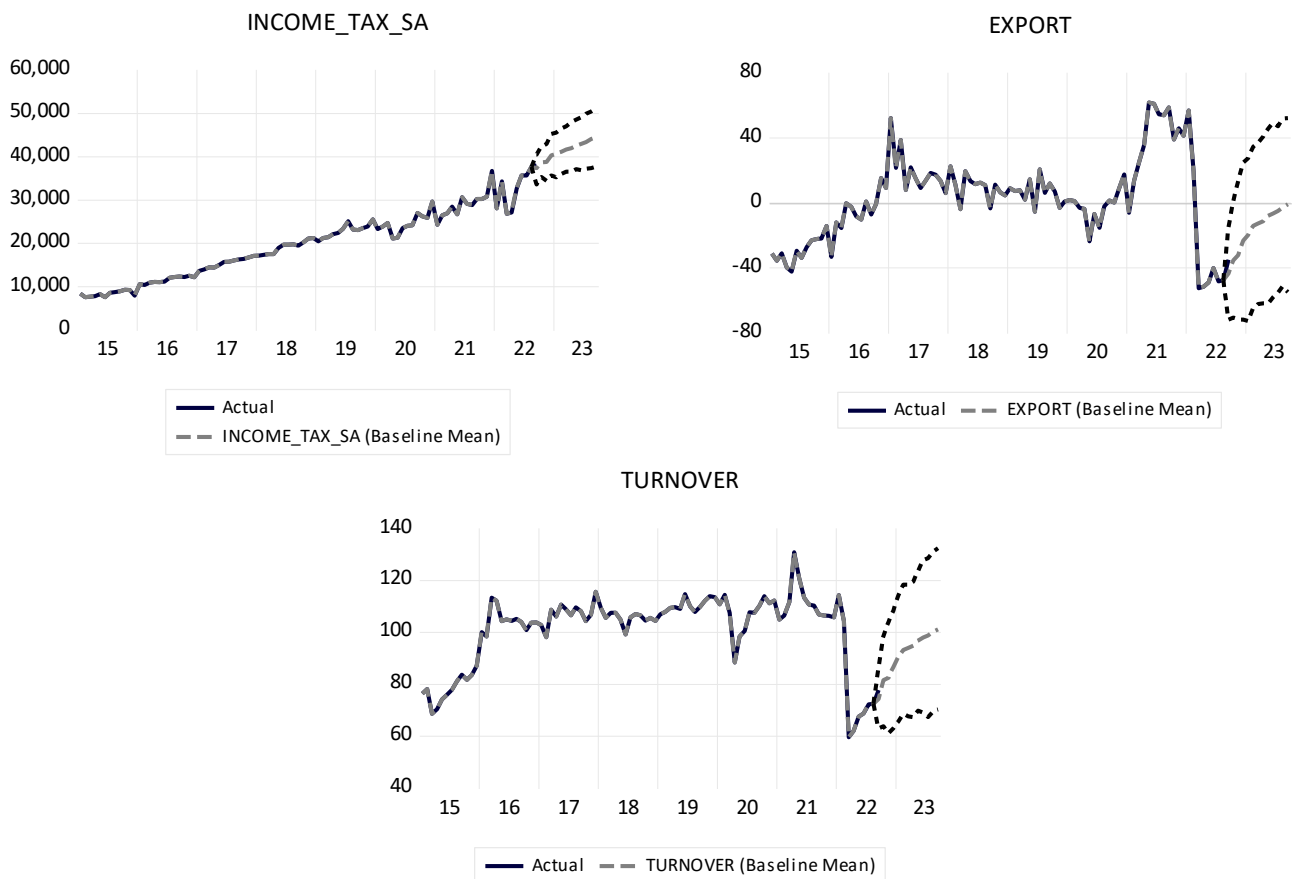


Figure 3.11. Forecasts for the variables of the econometric model (created by author using Eviews).

The increase in tax revenues is due to the increase in wages of citizens and the gradual recovery of the economy. The increase in turnover is due to the recovery of Ukrainian business after the economic shock in 2022. But it is worth noting that the model shows that in 2023, turnover in retail trade will not reach the pre-war 2023 levels.

Forecast Evaluation Date: 04/10/23 Time: 10:55 Sample: 2015M01 2023M09 Included observations: 105 Evaluation sample: 2015M01 2023M09 Number of forecasts: 1						
Evaluation statistics						
Forecast	RMSE	MAE	MAPE	SMAPE	Theil U1	Theil U2
EXPORT	0.871691	0.090390	0.208242	0.230569	0.016179	0.003168

Forecast Evaluation Date: 04/10/23 Time: 10:55 Sample: 2015M01 2023M09 Included observations: 105 Evaluation sample: 2015M01 2023M09 Number of forecasts: 1						
Evaluation statistics						
Forecast	RMSE	MAE	MAPE	SMAPE	Theil U1	Theil U2
INCOME_TAX_SA	64.54616	6.693125	0.017897	0.017749	0.001490	0.020657

Forecast Evaluation Date: 04/10/23 Time: 10:54 Sample: 2015M01 2023M09 Included observations: 105 Evaluation sample: 2015M01 2023M09 Number of forecasts: 1						
Evaluation statistics						
Forecast	RMSE	MAE	MAPE	SMAPE	Theil U1	Theil U2
TURNOVER	0.359997	0.037330	0.050223	0.049077	0.001764	0.071993

Figure 3.12. Evaluation of the forecast quality of the constructed VAR model (created by author using Eviews).

After building the forecast, the quality of the forecast was assessed using the Eviews program. The results demonstrate that the forecast is qualitative because the indicators of the quality of the forecast are low (Figure 3.12).

So, in conclusion, it is worth noting that the Ukrainian economy is gradually recovering, which was demonstrated using econometric modeling.

The increase in trade and tax revenues allows the government to direct more funds to the defense sector, since after the start of a full-scale invasion, most of the tax revenues are directed to the defense sector (KMU, 2023).

The model shows that by the end of 2023, Ukrainian exports will begin to grow, which is explained by the fact that Ukrainian businesses have found new sales markets, and businesses that were forced to relocate are gradually resuming their own production.

3.2 Scenario analysis of the introduction of tax changes and changes in the investment climate

The main obstacles to doing business in retail trade are Russia's war against Ukraine, the blockade of Ukrainian ports, and the mass emigration crisis. The migration crisis and the decrease in real incomes in Ukraine led to a decrease in aggregate demand in Ukraine. The war and declining incomes led to the growth of the shadow economy (UIF, 2022a). One of the important aspects of the shadow economy is informal employment. Informal employment includes people working in the formal and informal sectors who do not pay taxes and are not accounted for by the state (ESAP, 2023).



Figure 3.13. Casual Loop Diagram in the system-dynamic model of retail in Ukraine (created by author using Stella Architect).

Informal employment negatively affects tax revenues and does not provide safe working conditions. Falling revenues have a negative impact on the quality of public institutions that provide services to the population and businesses. One of the main problems for Ukrainian business is ineffective government policy. But it is worth noting that the cyclic loop - taxes - quality services - business - sales - taxes. It is precisely the system dynamic methods that make it possible to evaluate complex systems and evaluate the impact of government policy on business activities.

For this purpose, the author developed a system dynamic model¹ of informal employment for retail trade. Retail trade is part of trade in Ukraine. For some indicators, Ukrstat only publishes data for the entire trade segment (Ukrstat, 2021a), therefore, the author calculated the indicator for retail trade (Figure 3.14).

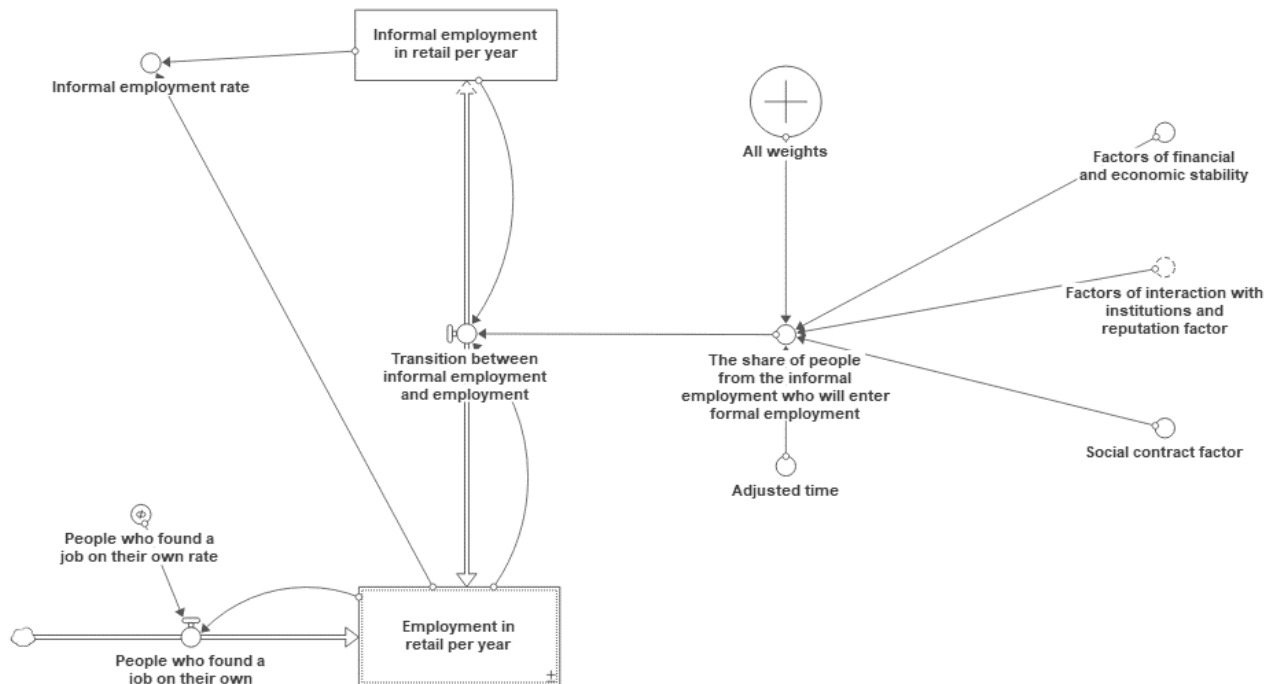


Figure 3.14. Employment in Ukraine in system-dynamics model (created by author using Stella Architect).

To analyze informal employment, the construction of three key streams was used: informal employment in Ukraine, employment in Ukraine and potential employment. Informal employment in retail depends on social and economic factors. Employment includes flows of those who have found work, those who have been laid

¹ Master thesis project in University of Bergen (Norway)

off, and those who have moved from informal employment. During 2015-2021, informal employment decreased in Ukraine. The next component of the model includes the calculation of the activities of companies on the retail market in Ukraine.

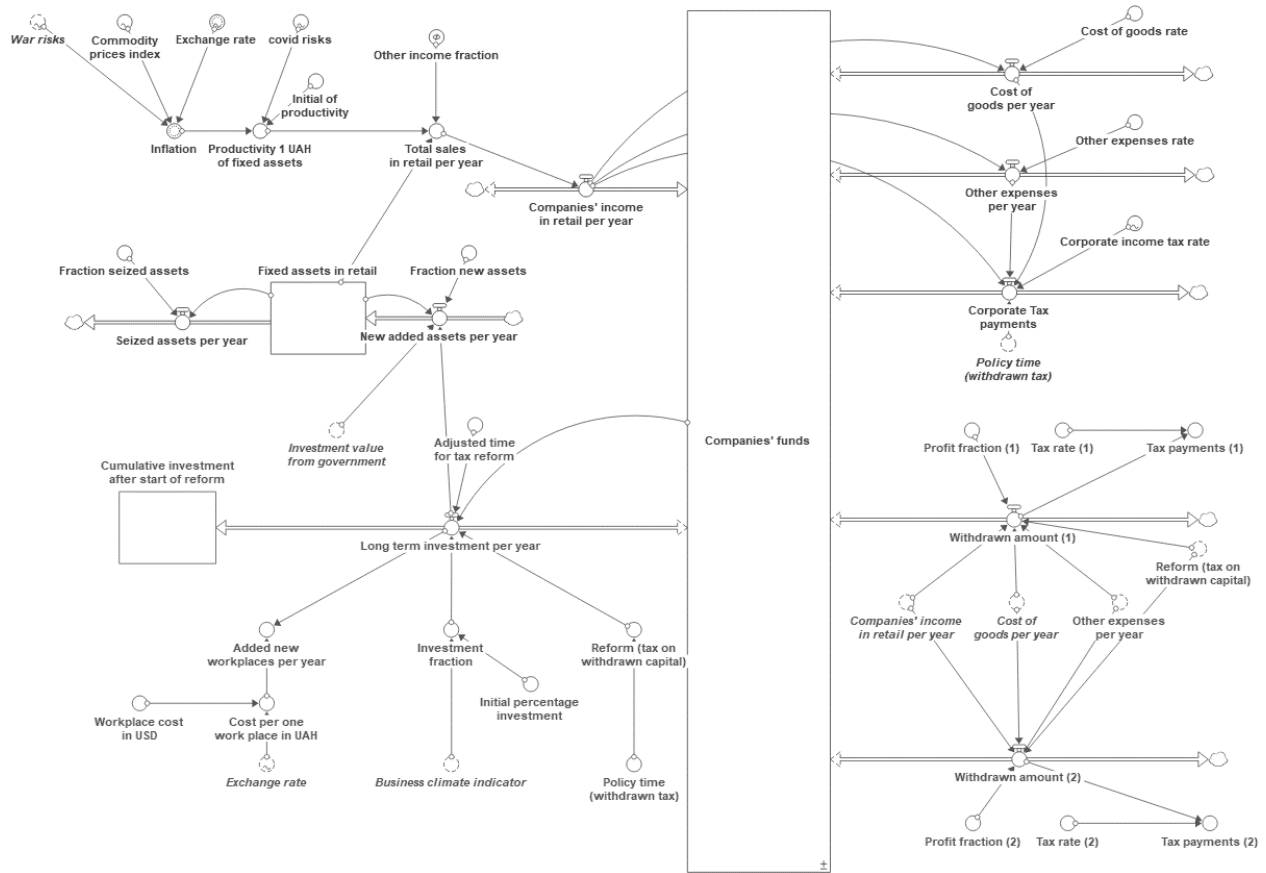


Figure 3.15. Retail in Ukraine in system-dynamics model (created by author using Stella Architect).

The activities of retail companies include analysis of sales, costs, tax payments and investment analysis. To test the government's policy change, the policy of introducing an Exit Capital Tax was embedded. The Exit Capital Tax includes the following logic: the government will tax only those flows that will be determined as withdrawal operations. Any other amount of profit that the company will not withdraw will not be taxed.

Therefore, the saved funds, the business will be able to invest in its own production, to increase the volume of fixed assets, which will increase sales and income. An increase in income will lead to an increase in tax revenues from VAT and corporate tax. Also, the improvement of the business climate will have a positive effect on employment because the improvement of economic conditions has a negative effect

on informal employment in Ukraine. The increase in employment (due to the improvement of economic conditions and the creation of jobs) will lead to an increase in personal income tax revenues.

The logic of the calculation of the Exit Capital Tax is demonstrated in Figure 3.15, where author assume that the introduction of Exit Capital Tax or a change in the tax rate increases companies' own funds, and companies are ready to invest a certain % of their own funds in fixed assets (with a certain lag, because for the transformation funds in fixed assets need time). And fixed assets allow companies to increase their own sales.

In order to calculate the impact of changes in taxes and changes in the tax rate, a module of the budget system of Ukraine was built, which includes VAT earning, personal income tax and corporate tax. Revenues from the single tax and the single social contribution are not included in the model in order not to accumulate the model. Therefore, the growth of tax revenues increases the government's capabilities.

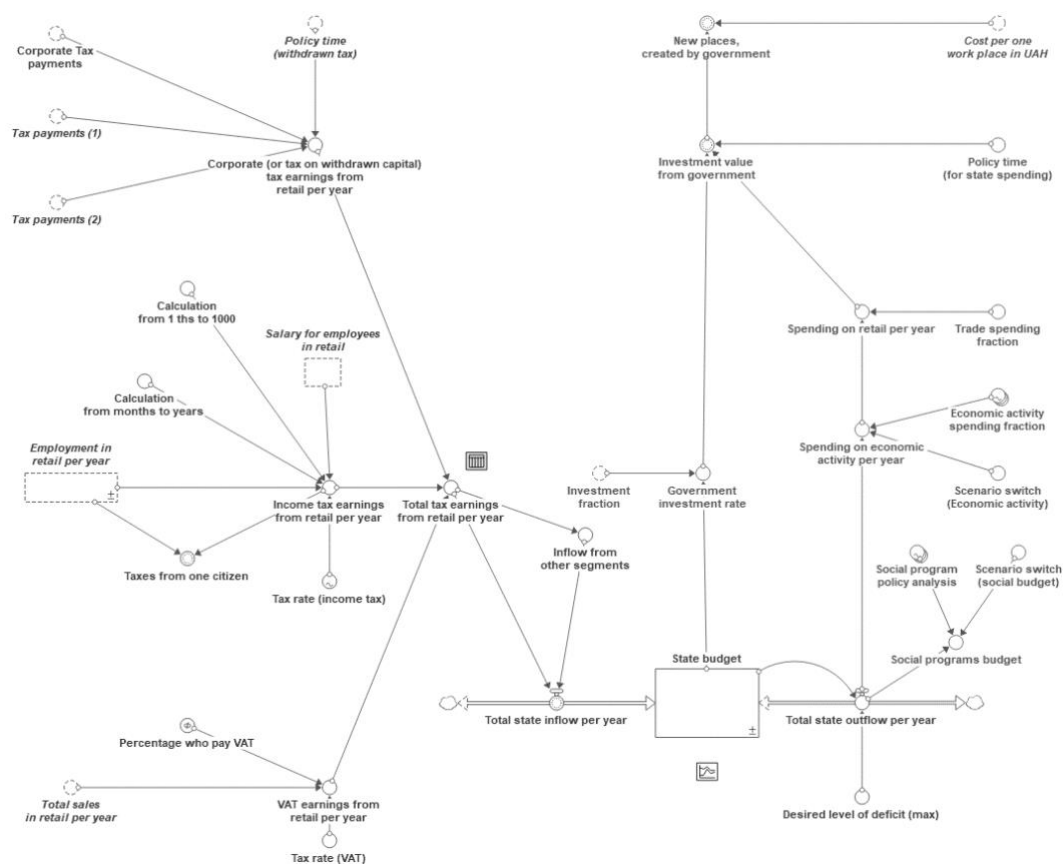


Figure 3.16. State budget system in Ukraine (created by author using Stella Architect).

(Forbes, 2009). The willingness of businesses to pay bribes is determined by the company's real income and inflation rates.

The willingness of tax officials to offer bribes is defined as the ratio of the salary of a tax official to salary of employees in retail segment. Low wages for employees of state institutions is one of the causes of corruption (U4, 2009).

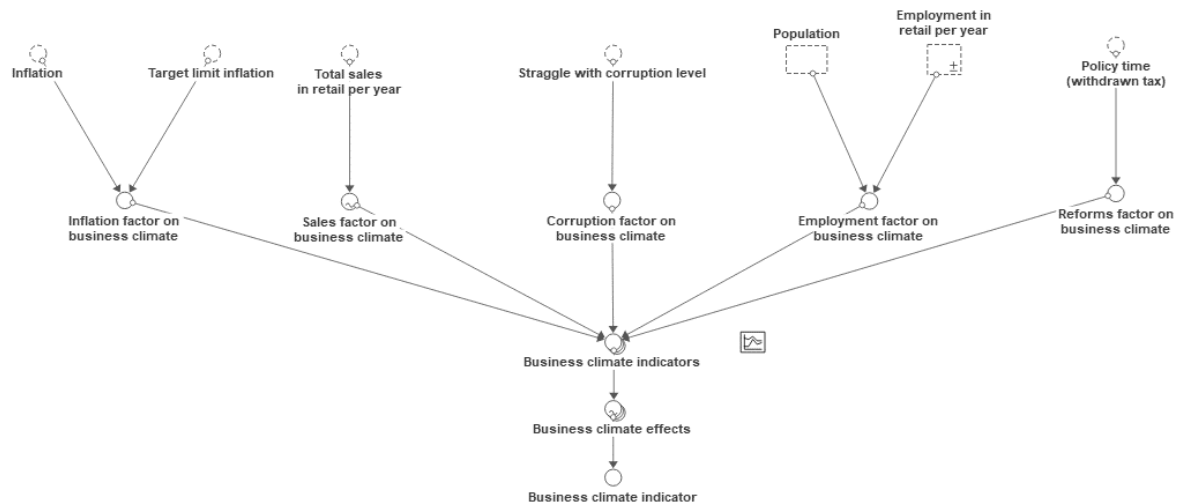


Figure 3.18. Business climate calculation (created by author using Stella Architect).

One of the key blocks of the model is the calculation of the business climate index. The index affects the willingness of businesses to invest their own funds in production. The value of the index depends on economic and social factors.

Among the economic factors, it is worth noting inflation, the volume of sales of companies on the market and the introduction of tax reforms. Social factors include the level of employment and the level of anti-corruption policy.

In the system dynamic model, the author assumes that with a good business climate, 30% will invest, and the business climate indicator can take on values from zero to one. One means the best level of business climate in Ukraine, and zero means the lowest level of business climate.

At the lowest business climate, businesses will not invest in their own production during tax reform. Investment growth is a solution to the problem of obsolescence of fixed assets in Ukraine, because the Ukrainian economy is characterized by a high level of obsolescence of fixed assets (Kukhta, 2020).

In addition to social factors, the model includes economic factors, which are calculated on the basis of the block of the model on retail trade in Ukraine. Economic factors include the tax burden, inflation rates, and the gap between the minimum wage and the average wage (Figure 3.19).

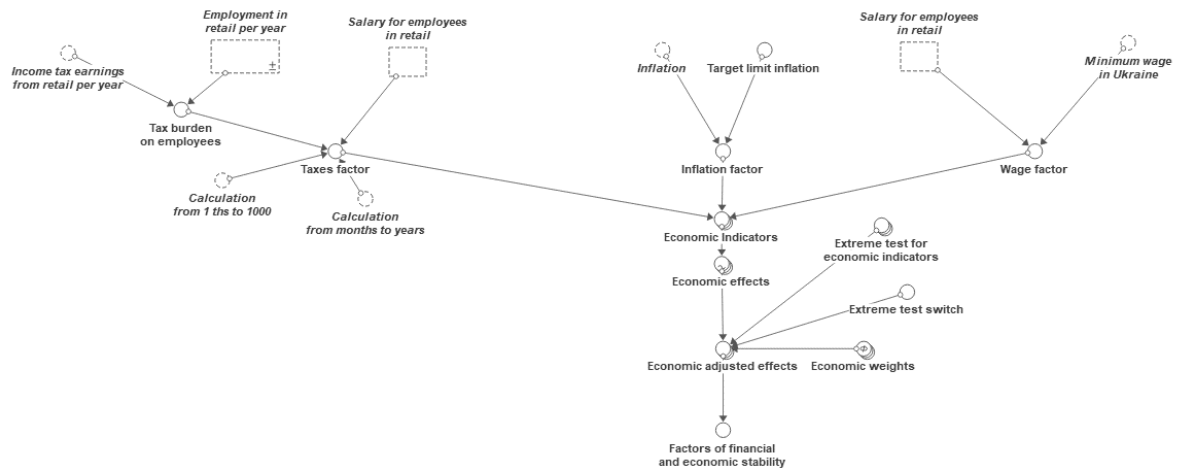


Figure 3.19. Economic factors that affect on informal employment (created by author using Stella Architect).

The increase in the tax burden has a negative effect on the economic factors that contribute to the transition to employment (IMF, 2017). After all, the opportunity cost of working legally increases for the employee and it is attractive for the employee to work as an informally employed employee and not pay taxes.

The increase in inflation increases the gap between inflation and the target level determined by the National Bank of Ukraine. The smaller this gap, the better the level of macroeconomic stability in Ukraine. The third factor about the minimum wage involves the gap between the minimum wage and the average salary. An increase in the minimum wage can have a negative impact on informal employment. This is due to the fact that a large number of people begin to receive wages below the minimum wage level. That is why the minimum wage should be raised gradually.

Rising salaries widen the gap, allowing the government to gradually raise the minimum wage. A sufficient minimum wage allows to improve the social living conditions of the country's poor population. Today, overcoming poverty should become one of the main goals of the government, because due to the full-scale russian

invasion of Ukraine, the level of poverty in Ukraine has increased by 7.1 million Ukrainians (WB, 2023).

Also, the model includes a block of potential employment, which includes employed and unemployed people who could potentially switch to retail trade. In this category the author includes school leavers exempt from retail trade and the unemployed population in all trade (retail and wholesale). The Potential Employment block allows to create labor flows to/from retail employment.

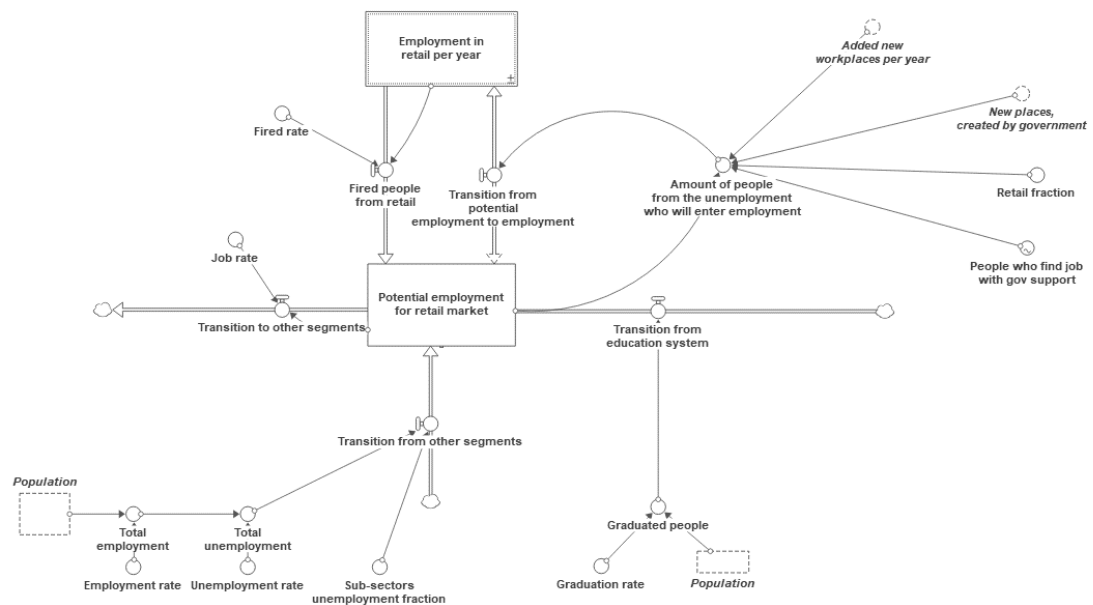


Figure 3.20. Potential employment for retail in Ukraine (created by author using Stella Architect).

So, in conclusion, it is worth noting that the developed model allows you to estimate the impact of the introduction of the Exit Capital Tax and the adjustment of rates for VAT, personal income tax and corporate tax. The impact assessment includes an analysis of the effects on tax revenues, government expenditures, the level of quality of public services and the level of informal employment in retail trade. In the future, the model can be scaled to other sectors of the Ukrainian economy.

The model can be effective for policy makers to consider all the pros and cons for an implemented policy. Also, the model can be used for scenario analysis of the introduction of tax policy, social and anti-corruption policy. Reducing informal employment is one part of the policy of reducing the shadow economy.

3.3 Determination of the optimal scenario and recommendations

High level of the shadow economy in retail trade (20% as of the first half of 2021) (Slovaidilo.ua, 2021b) and the low level of investment in the economy (\$2.4 billion in 2021) (NBU, 2022) causes a negative impact on tax revenues to the Ukrainian budget.

According to NBU analysis, the level of investment in the economy is influenced by the following factors: tax and financial benefits, protection of private property, access to quality financial services and the existence of currency control for investors (NBU, 2022).

If analyze domestic investors, it is important to carry out tax reform. From the survey of Ukrainian business, out of the 10 biggest problems, 3 problems concern the tax system, and the other 3 problems concern access to financial resources in enterprises.

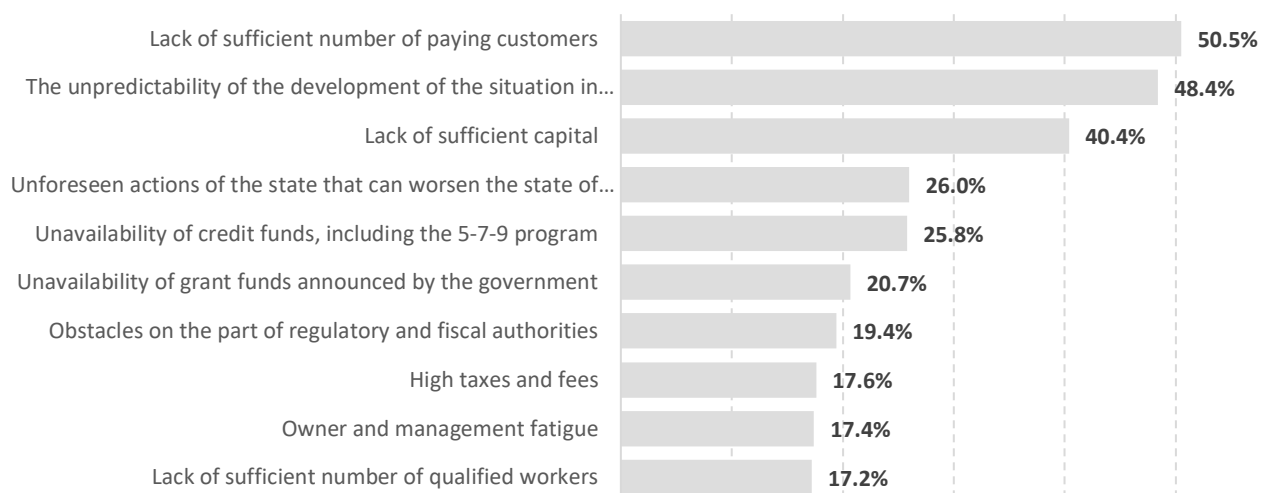


Figure 3.21. The main problems of Ukrainian business in 2022 (Advanter.Group, 2023).

Therefore, the Ukrainian government should take into account the problems of business when developing a road map for the post-war reconstruction of the Ukrainian economy.

The main principles of the reconstruction of the Ukrainian economy should become (Kytaichuk, 2022):

1. Reduction of labor, investment, and consumption taxation. This will stimulate Ukrainian business and the population to increase investment in their own production.

It will also increase the competitiveness of the Ukrainian economy compared to other European countries. The introduction of a Exit Capital Tax will allow companies to direct funds to increase production with greater added value and increase the productivity of companies (OECD, 2015).

The increase in production and income of the population compensates for the losses of the Ukrainian budget during the first years of the tax reform (system dynamic model results).

According to the recommendations of the Advanter Group and the Ukrainian Institute of the Future, the tax reform can take the form of a 10-10-10-3 system, where the corporate tax, personal income tax, VAT are 10% and the military levy is 3%.

2. Increasing taxation of environmentally harmful enterprises, the tobacco industry, and the spirits industry. This will increase tax revenues and compensate for losses from the first point of the recommendation. Also, taxation of harmful sectors of the economy will improve the quality of life and the state of public health in the country (Kooshkebaghi et al., 2022).

3. Reduction of the influence of the human factor on decision-making regarding Ukrainian business (reduction of tax discretion) - especially in the tax and staff systems (Savarets, 2023).

Reducing discretion will reduce corruption risks in the tax and staff services. Today, one of the biggest business problems is the discretion of tax officials (Dubrovskiy, 2023).

Digitization and optimization of tax legislation should be part of the government's state anti-corruption policy.

4. Digitization of the Ukrainian economy, which will reduce shadow economy in the Ukrainian economy. For 2022, the Ukrainian economy ranks 57 out of 132 according to the Global Innovation Index 2022 (GII, 2022). Today, 88% of administrative services in the state tax service are digitized (DPS, 2023b).

5. Increasing trust in the government and developing a taxpayer culture. One of the possible KPIs for evaluating the progress of trust in the government can be the E-Government Development Index (Ukraine ranks 46th out of 193 countries in 2022) (UN, 2022).

Trust in the government, provision of quality services to the population is an important part of the social contract between the government and the population (Aleksynska & Wojcieszynski, 2022). The government provides the population with quality services, protection, security, and social assistance in case of unemployment, but in return the government receives taxes from companies and taxes from citizens.

6. Increasing control over the payment of taxes by the Ukrainian government and digitization of control. Creation of a clear system of checks and control rules to prevent the abuse of control and the creation of a negative impact on the investment climate in Ukraine. But at the same time, the government should reduce control over businesses that pay taxes. The increase in control can negatively affect the shadow economy, due to the increase in informal employment.

When analyzing the recommendations, the following risks for the recommendations were also taken into account:

1. An increase in the Ukrainian budget deficit, which is risky during the war. An increase in the deficit may lead to a decrease in the effectiveness and efficiency of the Ukrainian government (Kytaichuk, 2022).

Ways to minimize the risk: making a decision on the reform in cooperation with international partners and gradually introducing the reform in Ukraine.

2. The ineffectiveness of the reform due to an ineffective judicial and law enforcement system (Zarazhevska & Krytska, 2022).

Ways to minimize risk: digitalization and reduction of discretion in the judicial system of Ukraine, reduction of the list of grounds for carrying out company inspections and increased fines for violations of legislation.

3. Negative impact on earning to local budgets of amalgamated territorial community (Zarazhevska & Krytska, 2022).

Ways to minimize the risk: creation of a state system of support for local communities by providing grants and loans.

4. The risk of insufficient solvency of Ukrainian business (Zarazhevska & Krytska, 2022).

Ways to minimize the risk: provision of preferential loans and strengthening of international support.

5. A low level of investment after the introduction of tax cuts (reduction of tax rates or replacement of taxes).

Determining the potential for investment in Ukrainian companies is not within the scope of this master's thesis. But it is worth noting that the developed dynamic model allows analyzing various scenarios that can satisfy potential stakeholders:

5.1 The Ministry of Finance of Ukraine is interested in the implementation of the budget plan of Ukraine.

5.2 Business - interested in reducing taxation and increasing own funds that can be invested.

5.3 The population is interested in increasing the quality of governance, providing social services, and reducing corruption.

5.4 The government is interested in overcoming poverty and ensuring economic growth.

5.5 International organizations - solvency of the Ukrainian government.

Ways to minimize risks: creation of working groups to take into account the interests of all stakeholders. After all, one of the reasons for the lack of tax reforms is the lack of consensus between state institutions and business (Minfin.com.ua, 2022). It is also necessary to conduct a detailed survey, which will allow to determine the amount that the business is ready to invest in its own production after the introduction of the Exit Capital Tax.

The results of econometric modeling showed that the Ukrainian economy is gradually recovering after the shock in 2022. Ukrainian manufacturers have found new markets, some Ukrainian refugees have returned to Ukraine, the Ukrainian energy

system has adapted to work under constant shelling and continuously provides electricity to the population and businesses.

All these factors contribute to the recovery of the Ukrainian economy. The simulation results also demonstrate the growth of retail turnover.

It is important to note that this forecast does not include military risks and the risk of territory occupation. It was this factor that had a decisive influence on the dynamics of indicators in 2022.

But at the same time, the model does not take into account the potential for the rapid recovery of the Ukrainian economy in cooperation with international partners after the end of hostilities on the entire territory of Ukraine.

Based on the results of modeling and risk analysis for potential policies, the following recommendations should be noted:

1. Quick recovery of business should be the first priority for the Ukrainian government. Business recovery will reduce unemployment and increase tax revenues.

2. Reducing the pressure on business that limits economic activity. This will lead to an increase in foreign investment.

3. Digitization of public services, automation of the VAT refund process (fixing system bugs that block VAT refunds for Ukrainian businesses). Digitization should be implemented together with the fiscalization of Ukrainian business. In this process, communication between business and government is extremely important, which will allow to achieve optimal results.

4. Strengthening control over employees of tax inspectorates. Increased control will have a negative impact on corruption, but at the same time, it is necessary to ensure the high-quality work of state institutions. In Ukraine, today the judicial system is ineffective, only 2.4% of the initiated criminal corruption cases led to the conviction of persons in 2020 (Slovoudilo.ua, 2021a).

So, summarizing the recommendations and risks for the Ukrainian retail trade, a table of KPIs was developed for the Ukrainian government to improve the tax system of Ukraine, which will accelerate the development of retail trade in Ukraine.

Table 3.5 includes country rankings for the level of corruption, tax burden and e-government.

Table 3.5. KPI for Ukrainian government (created by author).

Index / Indicator	Description	Ukraine, 2015	Ukraine, 2022	Poland, 2022	Germany, 2022	Israel, 2022
CORRUPTION PERCEPTIONS INDEX (Transparency International, 2023)	Corruption level	27	33	55	79	63
E-Government Development Index (UN, 2022)	Digitalization level	87	46	34	22	16
Tax complexity index (Taxcomplexity.org, 2020)	Tax burden level	66*	63**	57**	38**	31**

*2016 year

**2020 year

The recovery of the Ukrainian economy will allow economic factors affecting the shadow economy in Ukraine. To reduce the shadow economy, the government should reform the civil service and reform the tax system.

Additional key performance indicators may include:

1. The number of verdicts in all criminal cases related to corruption abuses.
2. The share of online services in the general list of services for the population and business.
3. Time for payment and administration of taxes.
4. Volume of complaints to the state tax service.
5. The number of employees of state institutions undergoing advanced training courses.
6. Number of Ukrainian business inspections.

CONCLUSIONS

During the research of factors affecting the development of retail trade in Ukraine, emphasis was placed on the shadow economy and the reasons for its formation.

Among the reasons for the formation of the shadow economy, it is worth noting the low quality of public services, high tax burden, economic crisis, and low reputational losses for those who are participants in the shadow economy in Ukraine.

A full-scale russian invasion of Ukraine in 2022 only worsened the situation with Ukraine's shadow economy. Rising unemployment, falling real incomes and relocation of businesses have led to the growth of informal employment and the shadow economy.

It is worth noting that during 2014-2022, the reform of the Ukrainian government, the implementation of anti-corruption reforms and the digitalization of the public sector led to the reduction of the shadow economy of Ukraine.

Shadow economy is present in all economies of the world, a certain level of shadow economy is always present in the economic system (activities of households, for example). But the government, in a policy to reduce the shadow economy, should not negatively affect companies that pay taxes and operate legally. That is why increasing quantitative indicators, namely the number of inspections, blocking business activities are ineffective government policies that can have a positive impact on budget revenues, while having a predominant negative impact on the business climate and economic activity.

That is why it is necessary to invest in the quality of institutions that will ensure effective state control and good conditions for doing business and paying taxes. Increasing control over employees of the tax service, reducing tax discretion, and reforming the judicial system will increase the efficiency of the Ukrainian government.

The implementation of tax reform during the war requires the work of the main stakeholders: the Ukrainian government (Ministry of Finance, NBU, Cabinet of Ministers of Ukraine, Office of the President), think tanks (Ukrainian Institute for the Future, Center for Economic Strategy, Center for Economic Recovery, Centre for

Economic Studies), Ukrainian business and international partners of Ukraine (IMF, World Bank, USA, EU).

The results of the literature review demonstrate that the Ukrainian economy needs stimulation for rapid recovery. One of the stimulus policies could be the introduction of the Exit Capital tax or the 10-10-10 tax reform. But for the introduction of these policies, it is necessary to justify the losses and revenues of the budget, the effect on the country's economy and the shadow economy.

The system dynamic model developed by the author makes it possible to compare implemented policies and assess the effect on business (sales, investments, fixed assets), government (tax revenues, expenditures on economic activity, expenditures on social policy and provision of state institutions).

The modeling includes the following policies: an increase in spending on economic activity, which will stimulate employment growth (due to the creation of new jobs), an increase in spending on social policy (will increase satisfaction with the government and improve the quality of the social contract between the government and business), strengthening anti-corruption policy (will allow improve the quality of state institutions).

The developed system dynamic model makes it possible to assess the impact of the tax reform and the quality of the government on informal employment in retail trade in Ukraine. For this system dynamic model, retail trade was chosen as an example, which allows scaling the model for other sectors of the Ukrainian economy.

The developed econometric model makes it possible to assess the relationship between turnover in retail trade, inflation, and the volume of tax revenues. The simulation results demonstrate the recovery of trade turnover and export growth starting from the second half of 2023.

The developed econometric model was analyzed and the optimal set of exogenous and endogenous variables for the econometric model was determined: personal income tax, retail turnover, exports were determined as endogenous variables. Inflation and corporate tax were defined as exogenous variables for the econometric

model. Forecasts and simulation results have also been tested for relevance, forecast quality is high as analyzed in Eviews.

The system dynamic model shows a decrease in informal employment and an increase in employment in retail trade in Ukraine after 2016. Also, the quality of institutions in Ukraine will increase, this is connected with the rapid integration with the EU, the development of anti-corruption institutions and the increase of international aid for Ukraine.

Increasing the quality of state institutions and improving economic conditions will be the main factors in reducing the shadow economy in Ukraine. In this context, it is worth noting the risks of implementing this forecast: first of all, it is the continuation of a full-scale war, the strengthening of the migration crisis in Ukraine, the growth of corruption in state institutions and the reduction of international aid. If this scenario is implemented, the shadow economy will grow and pose a threat to the budget system of Ukraine.

Summarizing the modeling results, it is worth noting that econometric modeling was used to predict the retail trade variables. System dynamics was used to assess the system, relationships, and conduct scenario analysis.

The key results of the study are:

1. Determination of key factors affecting the shadow economy.

Continuation of military actions, quality of state institutions, level of tax burden, economic situation.

2. The key problems for the retail trade market in Ukraine are identified.

The fall in domestic demand due to the occupation of the territories and the mass crisis of refugees from Ukraine.

Excessive government control. Excessive control includes the level of bureaucracy, corruption, the number of inspections, the level of digitalization, and blocking the activities of companies.

3. The key factors affecting the quality of state institutions are identified.

The level of material support, the level of internal control, the level of digitization, the level of wages and programs for improving staff skills.

4. The key elements of the system for the shadow economy in retail trade (informal employment) were determined using the system-dynamic model.

The model includes a block of retail trade, a budget block, a block of state institutions, a block of business climate, and a block of informal employment in retail trade in Ukraine.

5. A tool was created to analyze the effectiveness of tax reform and tax replacement (using the example of the Exit Capital Tax).

The tool, using Stella Architect software, allows for a detailed scenario analysis of tax reforms (Model results – see Appendix 2).

Therefore, in order to accelerate the development of retail trade, the government should reduce control by blocking invoices, conducting inspections, etc. One of the incentives for business development can be the 10-10-10 tax reform or the introduction of the Exit Capital Tax. But the introduction of these reforms requires finding a compromise between all potential stakeholders.

In addition to economic incentives, the government can strengthen anti-corruption policies, increase control over employees and digitize the public sector, which after the end of the war will minimize the shadow economy in Ukraine.

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APPENDIX 1

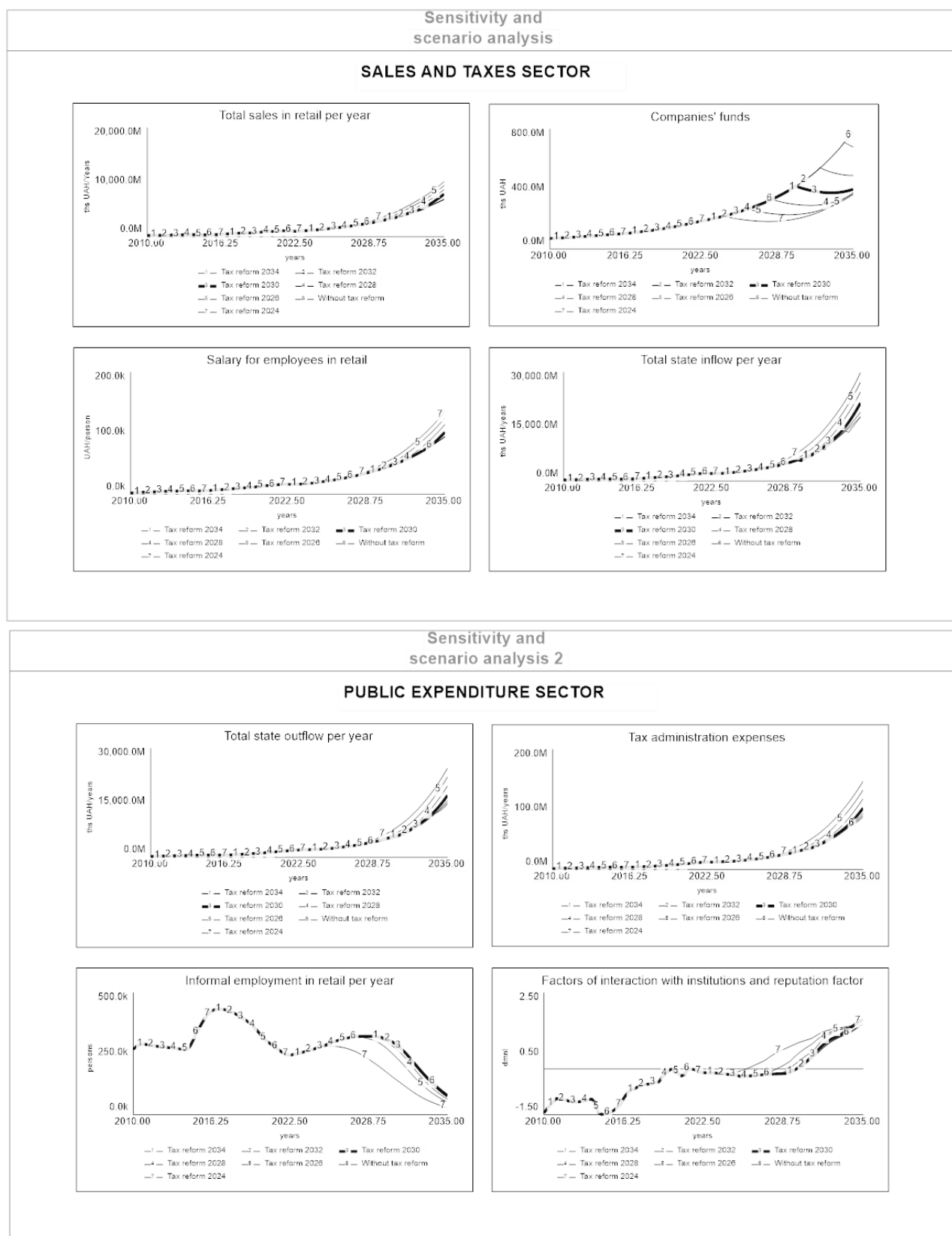
Dataset used to build an econometric model of retail in Ukraine.

G Group: FINAL_GROUP - Workfile: FINAL_ILKIV MODEL:Untitled\

View	Proc	Object	Print	Name	Freeze	Default	Sort	Edit+/-	Smpl+/-	Compare+/-	Transpose+/-	Title	Sample
		CORPORA...		EXPORT		INCOME T...		INFLATION		TURNOVER			
		CORPORA...		EXPORT		INCOME T...		INFLATION		TURNOVER			
2015M01		9983.39753...		-31.2		8408.62939...		28.5		76.4			
2015M02		5022.00955...		-35.6		7555.37146...		34.5		78.2			
2015M03		-4246.1535...		-31.1		7694.72722...		45.8		68.7			
2015M04		10209.3563...		-39.9		7824.62389...		60.9		70.4			
2015M05		-9876.4408...		-42.3		8261.81373...		58.4		74.2			
2015M06		9077.84037...		-29.4		7593.24538...		57.5		76			
2015M07		9459.68429...		-33.9		8577.06949...		55.3		77.9			
2015M08		-8753.2212...		-27.3		8737.08157...		52.8		81.2			
2015M09		9987.4421565		-23		8927.09958...		51.9		83.7			
2015M10		9665.12079...		-22.2		9281.62983...		46.4		81.7			
2015M11		-10652.956...		-22		9214.93553...		46.6		83.6			
2015M12		9182.10331...		-14.2		7904.70822...		43.3		87.1			
2016M01		8313.80498...		-33.2		10559.5409...		40.3		100.1			
2016M02		3755.41780...		-12		10425.1262...		32.7		98.5			
2016M03		-1782.7605...		-15.5		10919.4704...		20.9		113.4			
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2016M05		-4126.4218...		-2.5		11051.3409...		7.5		104.4			
2016M06		7810.02548...		-8.2		11187.0008...		6.9		105			
2016M07		8923.9431458		-10.3		12066.7351...		7.9		104.5			
2016M08		-1017.8487...		0.9		12231.8642...		8.4		105.2			
2016M09		8690.14259...		-7.2		12351.1744...		7.9		104.1			
2016M10		8191.60926...		-0.7		12202.6948...		12.4		100.9			
2016M11		-1597.2667...		15.3		12528.9144...		12.1		103.8			
2016M12		14246.5676...		9.2		12165.3544...		12.4		103.9			
2017M01		8268.19939...		52.3		13644.4525...		12.6		102.9			
2017M02		11166.0525...		21.6		14002.7877...		14.2		98.2			
2017M03		-10791.423...		38.7		14478.7488...		15.1		108.8			
2017M04		8600.30323...		8		14422.6325...		12.2		106.1			
2017M05		3233.68537...		21.9		14976.5505...		13.5		110.7			
2017M06		9999.69077...		14.8		15711.7580...		15.6		109			
2017M07		9240.37367...		9.2		15782.1741...		15.9		106.6			
2017M08		4027.69128...		13.9		16054.2827...		16.2		109.7			
2017M09		8688.08277...		18.5		16289.3146...		16.4		108.2			
2017M10		8760.67592...		17.3		16400.7657...		14.6		104.4			
2017M11		2707.00916...		13.6		16793.7345...		13.6		106.8			
2017M12		9501.09652...		6.1		17127.7884...		13.7		115.7			
2018M01		9482.34445...		22.6		17153.313748		14.1		109.5			
2018M02		8430.91147...		11.4		17358.2748...		14		105.6			
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2018M05		10108.0987...		13.4		18929.7753...		11.7		104.9			
2018M06		8448.21436...		11.5		19717.6740...		9.9		99.2			
2018M07		9475.81162...		12.5		19736.5244...		8.9		105.8			
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2018M09		9891.67707...		-3.4		19478.56077		8.9		106.6			
2018M10		8768.68952...		11.3		20269.4593...		9.5		104.6			
2018M11		7875.69099...		6.5		21137.0100...		10		105.6			
2018M12		8614.67572...		4.6		21264.2866...		9.8		104.5			
2019M01		10370.9061...		9.1		20473.973023		9.2		107			
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2019M03													

APPENDIX 2

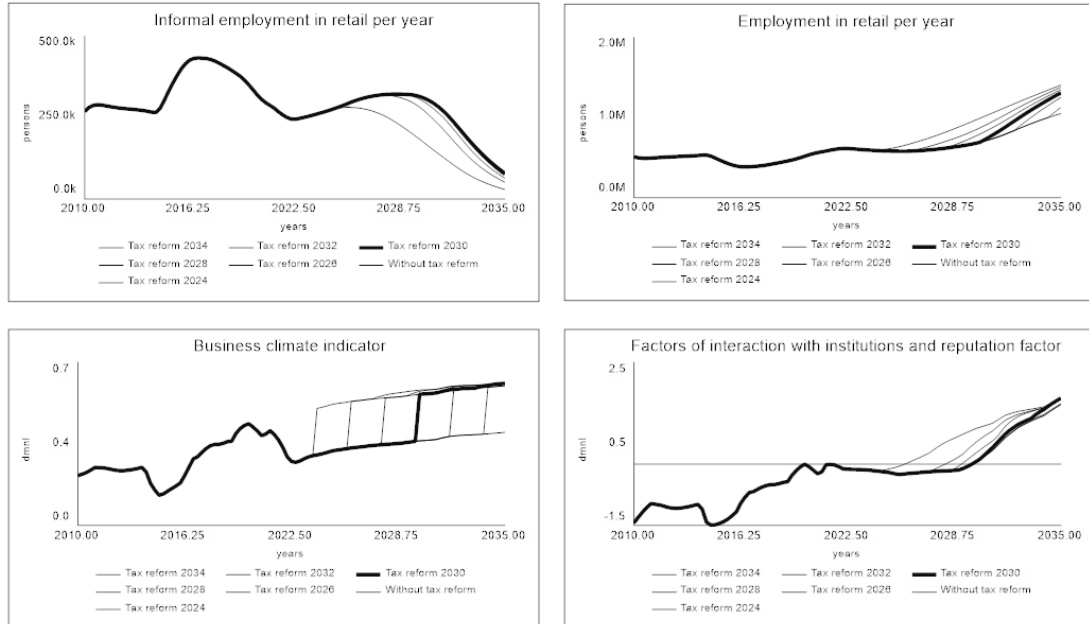
Model results example (Exit Capital Tax)



Model results example (Exit Capital Tax 2)

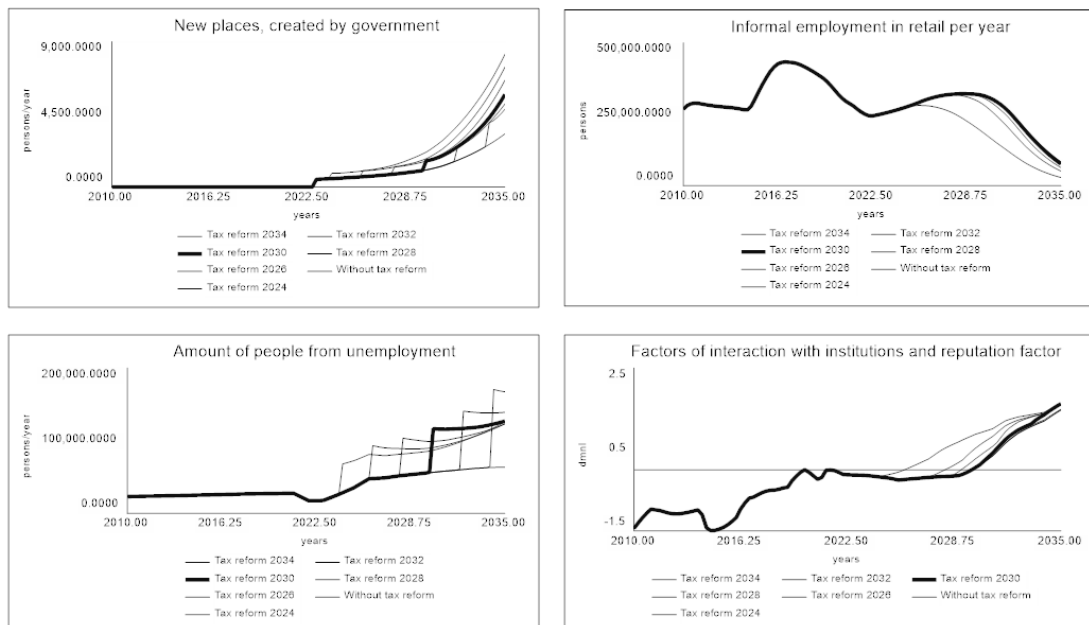
Policy analysis 2

ANTI-CORRUPTION REFORM



Policy analysis 4

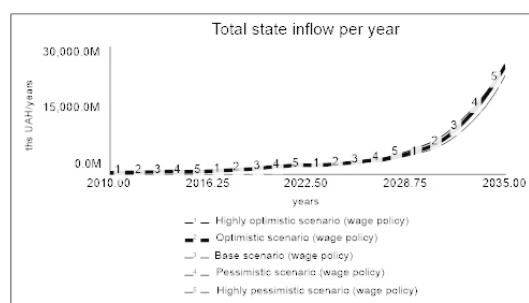
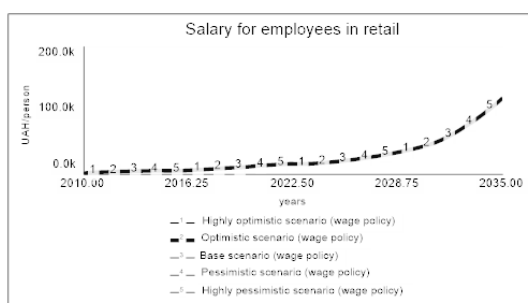
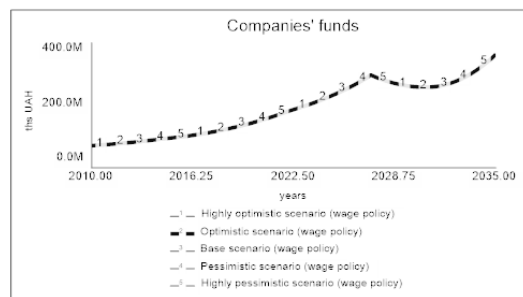
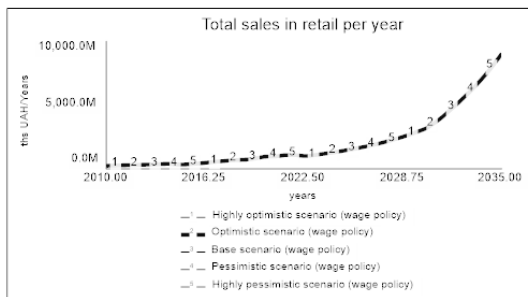
SPENDING POLICY



Model results example (Wage policy)

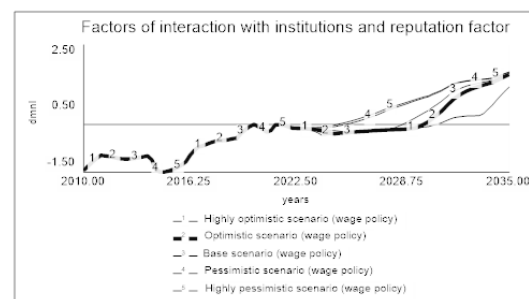
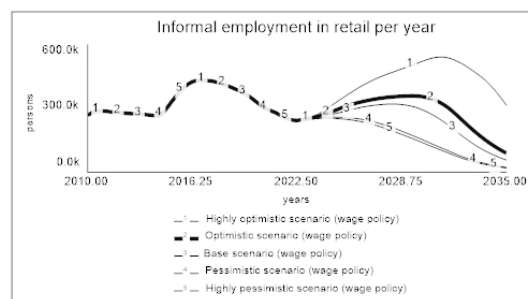
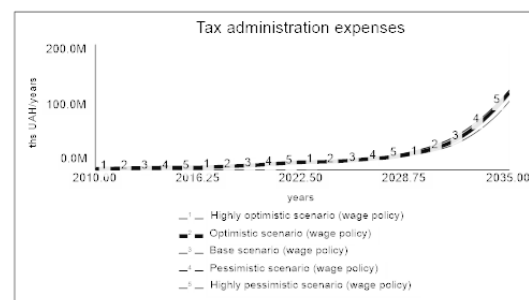
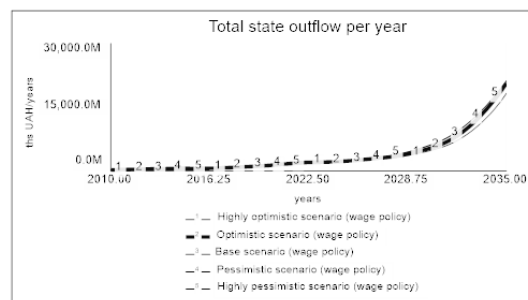
Sensitivity and scenario analysis

SALES AND TAXES SECTOR



Sensitivity and scenario analysis 2

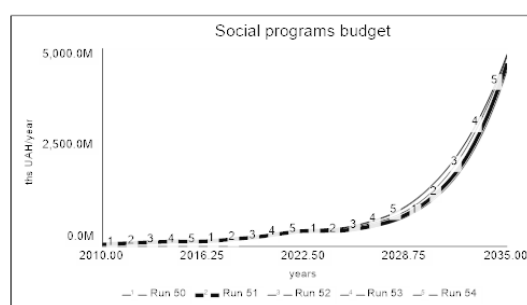
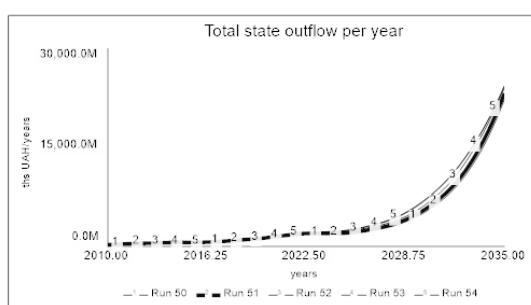
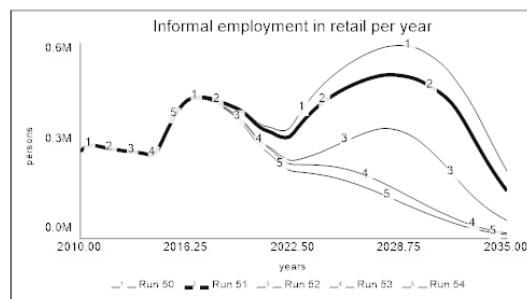
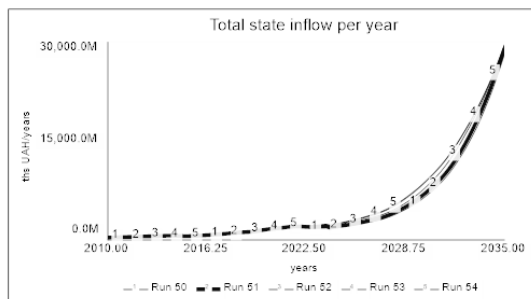
PUBLIC EXPENDITURE SECTOR



Model results example (Anti-corruption policy - digitalization)

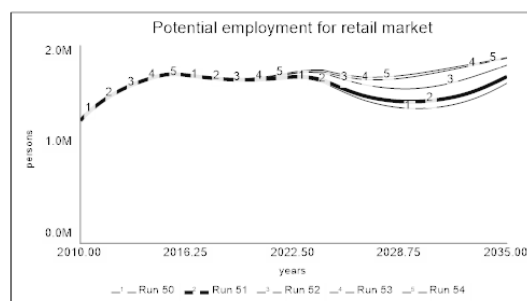
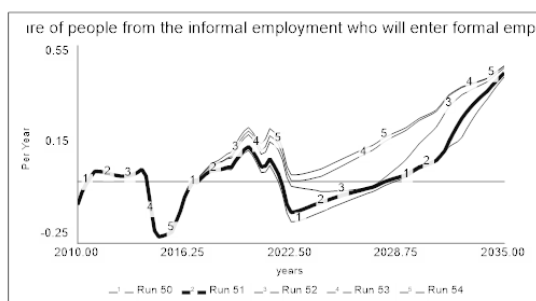
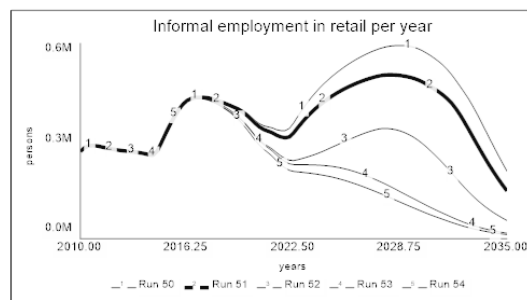
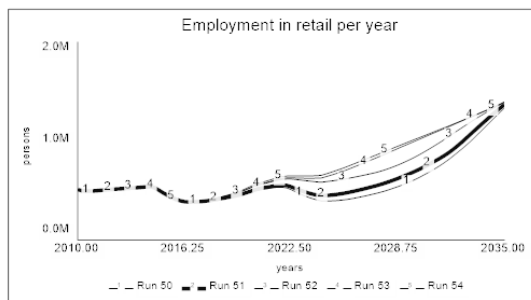
Sensitivity and scenario analysis 1

TAX REVENUE SECTOR



Sensitivity and scenario analysis 3

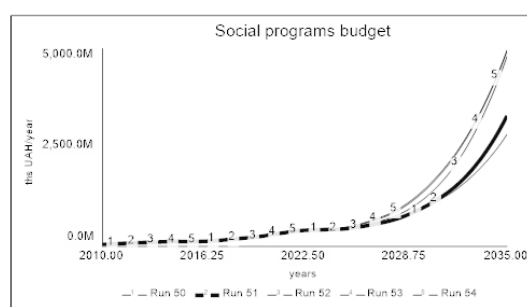
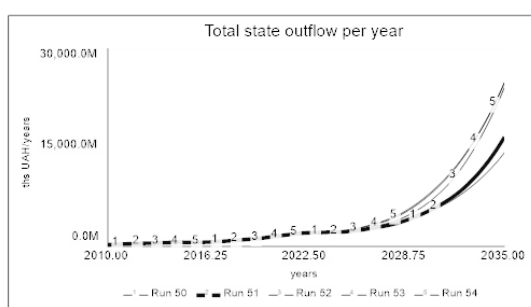
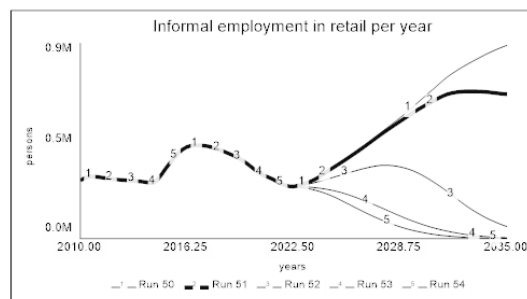
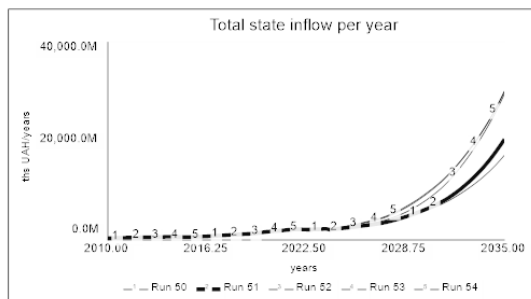
EMPLOYMENT SECTOR



Model results example (Anti-corruption policy – staff control)

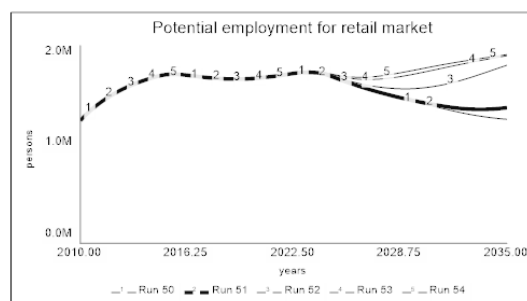
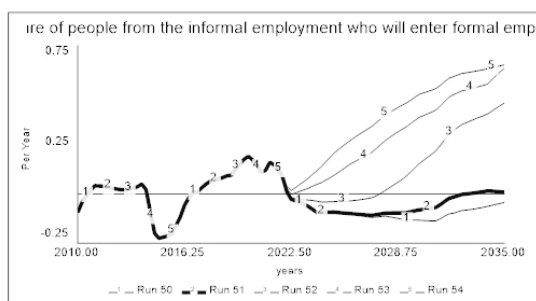
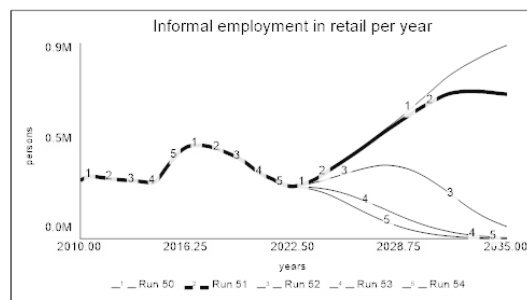
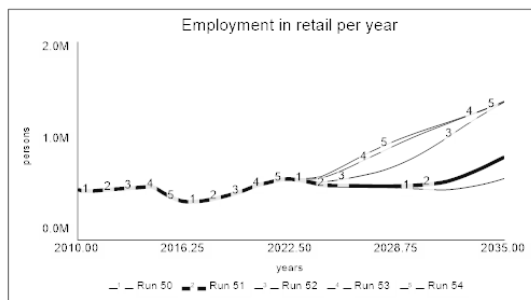
Sensitivity and scenario analysis 1

TAX REVENUE SECTOR



Sensitivity and scenario analysis 3

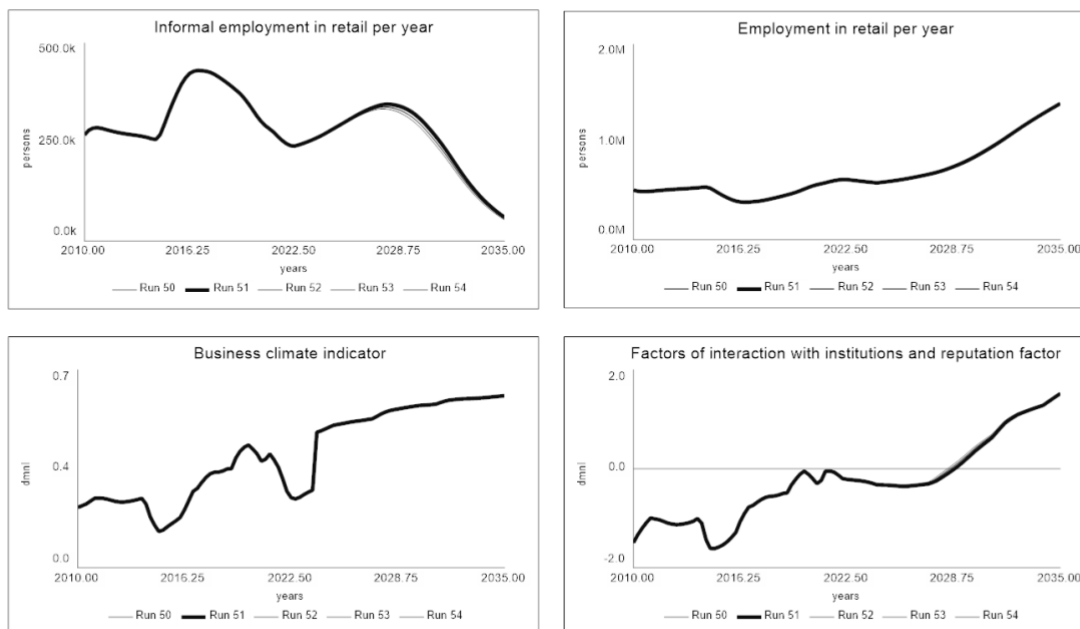
EMPLOYMENT SECTOR



Model results example (Anti-corruption policy – business control)

Policy analysis 2

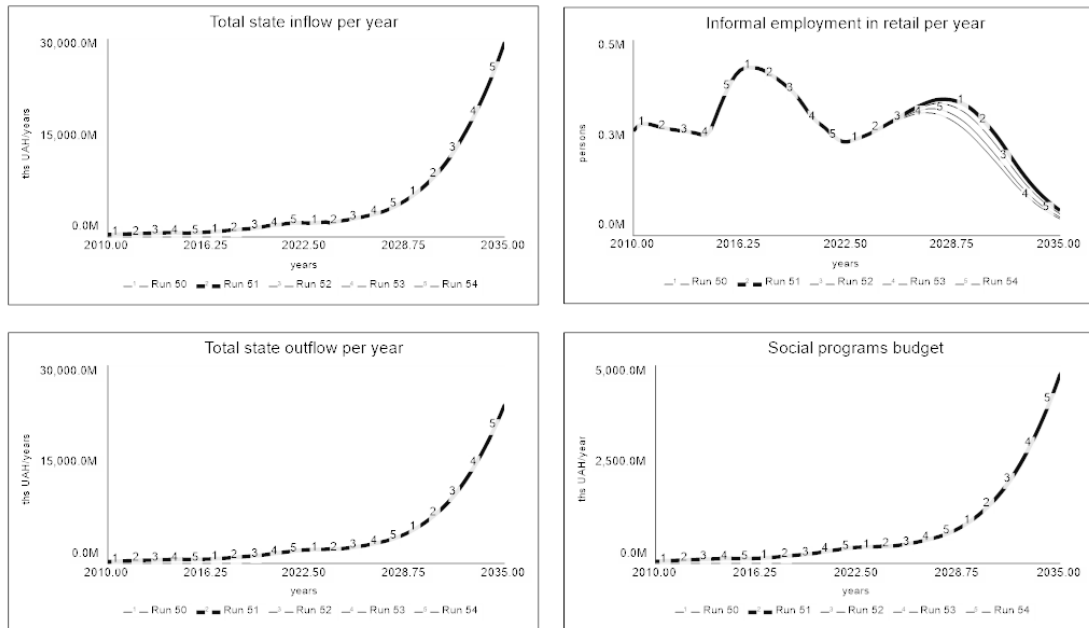
ANTI-CORRUPTION REFORM



Model results example (Anti-corruption policy – staff quality)

Sensitivity and scenario analysis 1

TAX REVENUE SECTOR



Sensitivity and scenario analysis 3

EMPLOYMENT SECTOR

