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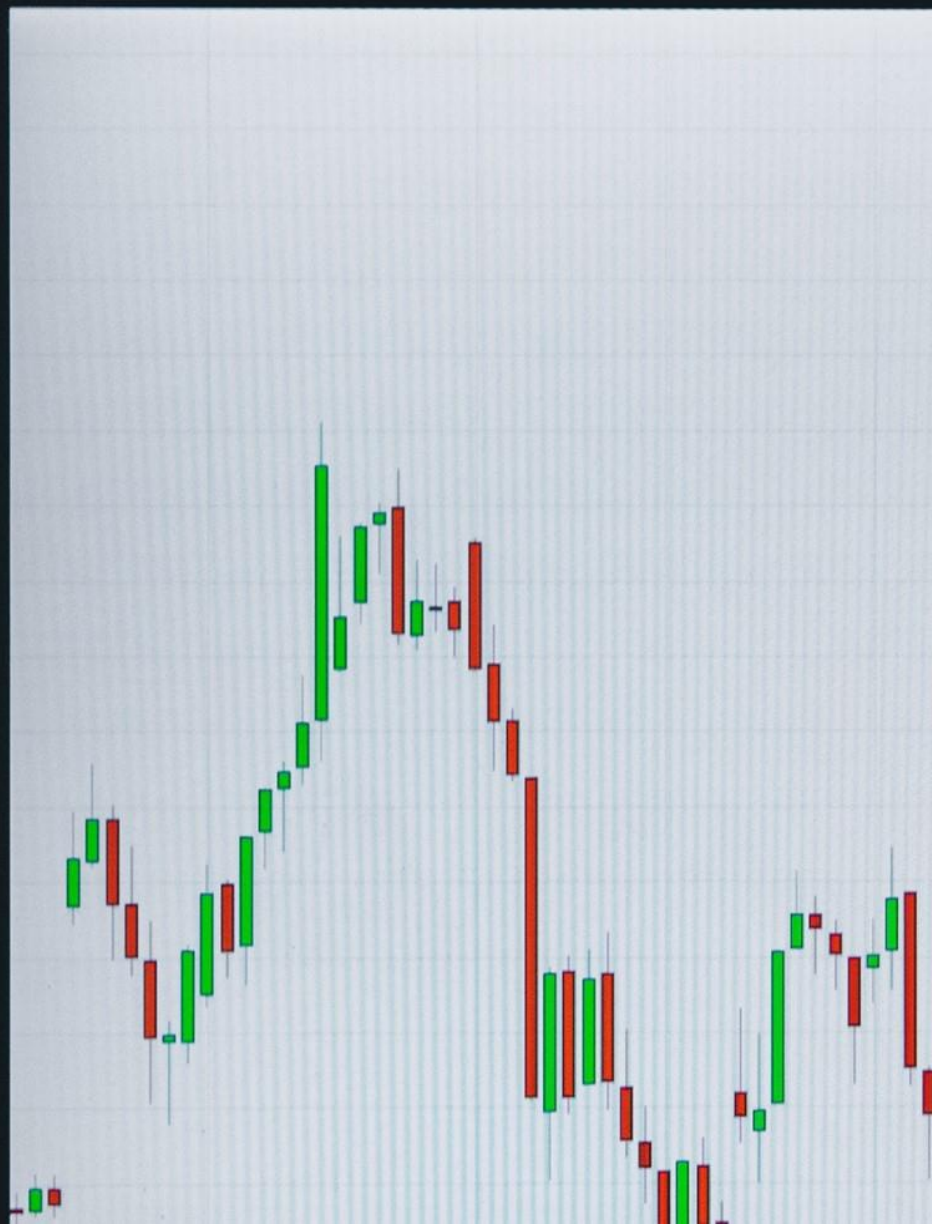


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ATU Agritrade
Ukraine

The Value Added Tax System in Ukrainian Agriculture: Analysis and Policy Options

Kyiv, Berlin
July, 2019



ABOUT THE “AGRITRADE UKRAINE” PROJECT (ATU)

The Agritrade Ukraine project (ATU) started 2016 and is supported up to 2021 by the Federal Ministry of Food and Agriculture of Germany (BMEL). On behalf of BMEL, it is carried out by the mandated body, GFA Consulting Group GmbH, and a consortium consisting of AFC Agriculture and Finance Consultants GmbH and IAK Agrar Consulting. As one project activity, the Agricultural Trade Policy Working Group (ATPWG) has been established at the Ministry of Agrarian Policy and Food of Ukraine (MAPFU) to deepen the policy dialogue and to support policymaking on relevant agricultural trade issues.

The working group has addressed the Value Added Tax (VAT) topic on several meetings and in a joint policy seminar with the Kyiv School of Economics (KSE). Based on these discussions the policy paper has been prepared.

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We would like to thank many people giving advice and supporting this policy strategy paper and, in particular, **Olga Trofimtseva, Acting Minister, MAPFU; Oleksandr Zhemoyda, General Director, MAPFU; André Pilling, Project Leader, ATU; Anastasia Bilych, Former Expert, ATU.**



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Abbreviations

ATPWG	Agricultural Trade Policy Working Group
ATU	Agritrade project
bn	Billion
cif	Cost, insurance and freight
CAP	Common Agricultural Policy
DCFTA	Deep and Comprehensive Free Trade Agreement
EU	European Union
fob	Free on board
$GB^{Production}$	Government's budget due to its production policy
GB^{Total}	Government's total budget
GB^{Trade}	Government's budget due to its trade policy
GB^{VAT}	Government's budget due to its VAT policy
HU	Humboldt University of Berlin
KSE	Kyiv School of Economics
m	Million
MAPE	Ministry of Agrarian Policy and Food of Ukraine
p	Domestic market price
p^d	Demand price (= consumer price)
p^s	Supply price (= producer price)
p^w	World market price
q^d	Demand quantity
q^s	Supply quantity
r	Protection rate
$R^{Domestic}$	Rent in the domestic market due to small farms VAT exemption
R^{Export}	Rent in the export market due to small farms VAT exemption
R^{Refund}	Rent in the export market due to small farms export VAT refund (in case of wrong declaration)
t	Producer tax rate
$T^{Consumer}$	Consumer taxation
$T^{Producer}$	Producer taxation
USD	United States Dollar
v	Value added tax (VAT) rate
VAT	Value added tax
α	Export value added tax (VAT) refund rate
β	Domestic market share of small farms
γ	Export VAT refund share for small farms

The subscript "small" denotes small farms.

Executive summary

INTRODUCTION

The purpose of this paper is to analyse the costs and benefits of specific policy choices regarding the role and use of VAT in the agri-food sector and is based on economic analysis and modelling. Below is a summary of the key findings and conclusions of the deeper analysis and specific modelling of rate changes, rate differentiation, coverage and refunds presented and discussed in the main text. The recommendations are based on the general characteristics of VAT and the specifics of the Ukrainian agri-food sector and taxation system.

GENERALLY APPLICABLE CHARACTERISTICS OF VALUE ADDED TAX (VAT)

VAT is conceived to be a consumer tax and to be production-neutral. Entrepreneurs, typically, collect VAT payments for sales and pay VAT for inputs and they calculate and transfer the balance to fiscal authorities. Hence, the VAT is an administrative burden for them, but their business decisions are not affected.

The implications of VAT are as follows:

- Consumer prices increase; market and producer prices are not affected.
- Consumption decreases and exports and foreign exchange increase (due to reduced domestic consumption).
- Government VAT revenue is equal to consumer taxation / reduction in consumer income.
- There are no further impacts for producers (apart from VAT administration costs).
- There is an overall income/welfare loss for the country (often called economic distortion).

VAT objectives and policy trade-offs

The primary objective of a taxation system is to raise money for government activities. VAT directly taxes an activity i.e. consumption.

- **From the point of view of consumers, VAT reduces their income.** Hence, the VAT rate should be as low as possible. In many countries reduced VAT rates for food are implemented for social and food security reasons. In Germany e.g. the VAT rate for food is 7% as compared to the normal VAT rate of 19%.

However, VAT is also a regressive tax i.e. takes a greater percentage of income from those who earn less since the consumption share in income of low-income people tends to be higher.

- **From the point of view of producers, VAT does not have any impact.** In an open economy with trade, domestic prices and producer prices are determined by world market prices and the VAT does not have any impact on these prices. Hence, VAT does not affect producers' income.

VAT in Trade

The key paradigm is that **free trade maximizes welfare**. If domestic prices deviate from world market prices, welfare losses occur ("distortions"). Hence, VAT results in welfare losses since consumption decreases below the free trade level. **A reduction of the VAT rate will thus increase welfare.**

VAT refund for exports

VAT is conceived to be a consumer tax and production-neutral and requires VAT to be refunded in case of exports. i.e. when the consumption occurs outside of the country.

THE EVOLUTION OF AGRI-FOOD VAT IN UKRAINE AND THE SPECIFICS OF UKRAINIAN POLICY SCENARIOS

The evolution of implementation of the value added tax in Ukraine

- The first phase from 1.01. 1992 introduced the flat tax rate of 28 % , had no budget VAT refund mechanism and provided numerous privileges.
- The second phase from 1.01. 1993 introduced the flat tax rate of 20 % but there was still no tax refund and continued privileges.
- The third phase from 1.10. 1997 introduced the 0% rate and the VAT refund, in particular on export transactions and in 1999 a special VAT regime in agriculture was introduced by which agricultural enterprises were exempted from paying VAT i.e. agricultural enterprises were entitled to retain the VAT received from their sales to recover VAT on inputs and for other production purposes at the discretion of farmers. Since 2017 the special VAT regime was completely eliminated.
- The fourth phase from 1.01. 2011 introduced no significant changes in the VAT collection mechanism.
- The fifth phase from 1.07. 2015 based introduced an electronic VAT administration system (VAT EAS).
- The current system (as of 06.2019) introduced in the fifth phase in 2015 is currently in force provides for generally applicable VAT collection with a rate of 20 % applied to all agri-food goods and an export VAT refund available to all exporters which are VAT payers with the exception of traders of soybeans (from 01.01.18) and in the future for rapeseed (from 01.01.2020).

Ukrainian agri-food sector VAT scenarios

At various stages of its evolution and until today there have been policy change proposals from different stakeholders to **i) generally or selectively remove the VAT refund for exports, ii) value chain VAT rate differentiation, iii) generally or selectively reduce the VAT rate. Additionally iv) there is a large section of the agri-food production sector, which is not covered by the VAT system.**

i) If there is no VAT refund for exports, government's VAT policy turns into a double tax: a consumer tax and an export tax.

No VAT refund for exports will have the following implications, as compared to full export VAT refund:

- Domestic prices, consumer prices and producer prices decrease.
- Consumption goes up and production goes down.
- Exports and foreign exchange decrease (due to increased domestic consumption and decreased domestic production).
- Consumer taxation goes down to zero and producers are taxed instead.
- Government's VAT revenue goes up since the taxation base is larger (production instead of consumption).
- There are welfare gains on the consumption side and welfare losses on the production side. The overall income/welfare change will be small.

We have modelled the specific feature of full, partial or no export VAT refunds in the Ukrainian VAT system in the Excel based VAT market model version 1.0. A variation of the export VAT refund topic is a policy to refund VAT only for parts of exports and/or parts of exporters (like refunding VAT only for exports from producers and not for traders; soybean market)

ii) Promoting value chains by VAT rate differentiation

The “classical” VAT is a consumer tax and production-neutral. VAT payments of producers may thus be made according to varying VAT rates along the chain, but economic calculations and business decisions are not affected. Alternatively there is substantial international experience on policies supporting value chain development including: research and innovation policies; training and capacity building; public infrastructure support (laboratories, certification, transport and storage capacities); local infrastructure support (to develop local value chains); supporting institutions (for value chain management).

iii) A VAT rate reduction will have the following implications, as compared to the original VAT rate:

- Consumer prices decrease and consumption goes up.
- Exports and foreign exchange decrease (due to increased domestic consumption).
- Government’s VAT revenue and consumer taxation go down; and consumers’ income increases.
- Market and producer prices are not affected. There are no further impacts for producers.
- There is an overall income/welfare gain for the country.

iv) VAT exemption / non-inclusion of small farms

Exemption: Many countries exempt small enterprises from the VAT system. These enterprises do not have to make VAT declarations, but they cannot indicate and collect VAT for sales and accordingly usually have to bear VAT payments for inputs. This is an administrative simplification for small enterprises and tax offices but they are still included in the taxation system and pay in a less burdensome way.

Non-inclusion: Small farmers may sell their products through markets that are subject to the VAT system or they choose to sell their products through separate market channels and sometimes both. Sometimes, markets are classified as “official” or “grey”, “shadow” or even “black” markets but may most usefully designated as “VAT markets” and “non-VAT markets”.

In a VAT system which does not include small farms VAT, various rents (transfers) may occur for the private sector and these rents correspond to government’s VAT revenue losses.

Three kinds of economic rent¹ may occur:

- Domestic market rent. The rent occurs when small farmers sell their products on domestic markets (“street markets”). There is a margin between consumer prices on VAT markets (including the VAT) and producer prices and there will be a special market price on “non-VAT markets” between these two prices depending on local and/or individual negotiation and market power. Hence, the rent will be allocated among consumers and small farmers.
- Export market rent. The rent occurs when small farmers sell their products on export markets, if there is no or partial VAT refund for exports (on VAT markets). There is a margin between higher world market prices (what small farmers get for exports since they have not paid the VAT) and domestic prices (what other farmers and/or traders get for exports (since they have paid the VAT). However, small farmers may not be able to capture this rent, since they are probably not directly involved in exports. They will sell their products to other farmers and/or traders for export and will share the rent with them or even lose the rent to them.

¹ “A payment to a factor of production (land, labour, or capital) in excess of that needed to keep it in its present use” <https://www.collinsdictionary.com/dictionary/english/economic-rent>

- Export VAT refund rent. The rent occurs in a VAT system with full or partial refund for exports when small farms exports are wrongly declared resulting in export VAT refunds. As in the case of the export market rent, this rent will probably be shared with other farmers and/or traders or will be even passed on to them.

Small farms VAT exemption / non-inclusion will have the following implications, as compared to no exemption (and in a system with full VAT refunds for exports):

- Domestic prices, consumer prices and producer prices are not affected.
- Consumption, production and trade quantities are not affected.
- There will be a domestic market rent and probably an export VAT refund rent (in case of wrong export VAT refund declaration); the rent is equal to the government's VAT revenue loss.
- The rent will be shared among consumers, small farmers and other farmers and/or traders (in case of wrong export VAT refund declaration).
- The rent reduces consumer and producer taxation (which in fact is an indirect subsidisation of small farms since they do not pay VAT); and it is possibly an increased VAT refund payment for other farmers and/or traders (in case of wrong export VAT refund declaration).
- The rent increases consumers' and producers' income, correspondingly, to the disadvantage of government's budget.
- There is no change in welfare.

A VAT reduction in the scenario where many small farmers / agri-food producers are not subject to VAT will have the following implications, as compared to the original VAT rate (and in a system with full VAT refunds for exports):

- Consumer prices decrease and consumption goes up.
- Exports and foreign exchange decrease (due to increased domestic consumption).
- The domestic market rent and the export VAT refund rent (in case of wrong export VAT refund declaration) go down due to the reduced margin on markets. This is equal to a rent decrease for consumers and a subsidisation decrease for small farms (and for other farmers and/or traders in case of wrong export VAT refund declaration).
- Government's VAT revenue and consumer taxation go down.
- There is an overall income/welfare gain for the country.
- A flat-rate VAT system for small farms as in several EU countries may help them getting rid of the VAT payment burden (notably supporting investing and growing small farms) but may further reduce government's VAT revenue.

Modelling (see annex 3 for example of model for the wheat market)

The Excel based VAT market model produced by the project for Ukrainian agricultural markets (version 2.0) explicitly considers the above features of the VAT system: i.e. full, partial or no export VAT refund and small farms VAT exemption / exclusion. **The developed model can be used to calculate concrete values for VAT impact on e.g. export quantity, domestic price, Government revenue and welfare etc.**

VAT enforcement, administration and control

Market interventions and price policies create incentives/disincentives for private actors on markets who try to avoid constraints and taxes and to benefit from policy gaps and subsidies. Hence, market intervention policies must be enforced, properly administrated and controlled. This is true for a VAT system, too. Economists call such activities of private actors due to market interventions "rent-seeking behaviour". **Rent-seeking** is unproductive and ties up resources for distribution struggles; it does not contribute to overall welfare and growth but undermines these objectives. Policymaking can

contribute to this objective by implementing a transparent institutional framework for the economy but also by not inviting private actors to rent-seeking behaviour through market interventions.

SOME KEY CONCLUSIONS IN RESPECT OF AGRICULTURAL VAT POLICY MAKING

- The fiscal objective to raise money for government activities is considered by many economists as the key (and only valid) objective of VAT taxation.
- Many economists would also argue that other (economic) objectives apart from raising money should be pursued by specific policies and not by taxation. This refers to some key objectives of agricultural policymaking: agricultural sector development, food security, healthy food, small farms development, value chain development, rural development, environment and climate protection etc).. Having said that, e.g. more effective food security policies may require an appropriate governance framework which may be incomplete, and, in this case, a reduced VAT rate may in fact be the only available and realistic interim food security policy solution.
- VAT is a regressive tax (i.e. takes a greater percentage of income from those who earn less). A first-best policy approach to deal with food security might in certain circumstances, therefore, be to change the taxation policy away from consumer taxation to a proper income tax and social support system. In Germany, e.g., there is a widespread view today that reduced VAT rates for food should be abolished because they are no longer justified for food security reasons. On the contrary: Higher VAT rates might be considered for some agricultural commodities for health and climate reasons (e.g. sugar, meat).
- VAT marks a tension between consumers' income and government's budget revenue and, equally, implies a trade-off between fiscal revenue and welfare. A VAT reduction enhances income of consumers and of the whole economy at the cost of fiscal revenue.
- If price policy interventions are considered on a market, it should be clear what objective is pursued and whether the price policy applied can achieve this. An example: A "no export VAT refund" policy results in a producer taxation. Economic analysis and modelling can help with this.
- If small farms should be exempted from or are not included in the VAT system the implications to be considered include VAT revenue loss, occurrence of rents and redistribution among consumers, small farmers and other farmers and/or traders, no VAT payment refund for small farmers.
- A flat-rate VAT system for small farms as in several EU countries may help them getting rid of the VAT payment burden but may further reduce government's VAT revenue depending on the scheme.
- There is certainly an incentive for small farms to switch to a flat-rate VAT system or even to the regular VAT system, but this incentive is balanced against the challenges of registration and officialization.

SOME KEY RECOMMENDATIONS IN RESPECT OF AGRICULTURE VAT POLICYMAKING:

- Agricultural sector VAT policy decisions should be based on scientific analysis (e.g. including modelling as demonstrated in this paper) of best available reliable data.
- VAT is conceived as and should be used as a consumer tax and be production-neutral and accordingly VAT policy in agriculture should impact economic activities and markets as little as possible to ensure efficiency, welfare and economic growth.
- VAT is a regressive tax and so should be considered very carefully together with other policy instruments when attempting to address social issues including poverty or food security

- A VAT system without refund for exports results in a consumer tax and an export tax and so should not be contemplated if policy objectives include export development.
- VAT flat rate scheme is a mechanism to reduce the administrative burden of VAT accounting. It should be considered as a policy option if, for example small / family farmers are currently outside of the tax system because of the difficulties or costs of administering VAT calculations and payments.
- VAT changes should not be used to target value chain development as the market distortions and welfare losses created are real, and the intervention rarely achieves the policy objective. Value chain development should be addressed using specific value chain development policy instruments
- A VAT system should balance fiscal requirements and negative economic distortions i.e. to avoid driving the economy into a “shadow” and “rent-seeking” economy.

A comprehensive VAT system with a uniform rate for all market segments and participants is recommended to avoid rent-seeking activities and to optimise welfare and revenue.

1 Introduction

Value Added Tax (VAT) is a key price policy instrument in Ukrainian agriculture, and there has been a continuous debate on this instrument during the period before its introduction and since its introduction and in defining its various iterations. The key debates revolve around the issues of whether agri-food producers should be subject to VAT, at what rate and applied to what products, at what stage of the value chain as well as whether and to what extent the VAT should be refunded for export transactions.

Currently, further changes and adjustments of the VAT system are under discussion. Proposals and ideas relate to a general reduction of the tax rate; to a differentiation of the tax for individual commodities and markets; and to the question whether or, maybe, to what extent the tax should be reimbursed for exports. Such policy changes will, certainly, affect agricultural markets and Ukrainian economy overall, and they will do so in different ways. There will be changes in prices, production, consumption, and imports and exports; tax revenue of the government will be affected as well as taxation and income of farmers and consumers; and there will be impacts on foreign exchange and welfare. However, there is little information on such implications of VAT policy changes, and the current debate suffers from this lack of information.

It is the purpose of this policy strategy paper to support the current debate and the policy-making process on the VAT question by sound economic analysis. We will analyse the key features of the present VAT system in agricultural markets, and we will discuss economic implications of changes in the system. The approach chosen is a literature review and the formulation of a partial equilibrium market model to empirically assess the effects of VAT policy changes. We will use the model to quantify and discuss the effects of various policy options for selected commodity markets.

These are the key questions for the paper:

- What are the implications of the VAT system and its changes to markets and trade?
- What are the implications on government's tax revenue and on producers' and consumers' income?
- How can such impacts be analysed and quantified in a model?
- What are the impacts of relevant VAT policy scenarios and how can policy changes be simulated?
- What VAT policy changes does the analysis suggest?

The structure of the paper is as follows.

Following the introductory chapter, we give an overview of the VAT system in Ukrainian agriculture in chapter 2. We describe the evolution of the system and its current design; we show the state of analysis and the main features of the current political debate;

Chapter 3 provides the theoretical background for the paper. We discuss market effects of a VAT and we consider the "classical" case of a consumer tax with tax refund for exports. We, then, analyse the case of a VAT without export refund. A particular feature for Ukraine is the VAT exemption for small

farms and we discuss the implications of this particularity. And we address some other specific features of Ukrainian agricultural markets and VAT and trade policy-making.

In chapter 4 we formulate a corresponding market model in Excel for interactive use and calculations. We define a basic VAT market model taking into account the key features of the VAT system, and we develop an extended version integrating small farms VAT exemption into the model. Data requirements and assumptions are explained, and we discuss further adjustments of the VAT analysis and modelling framework addressing some more specific features of the VAT system in Ukraine.

The model, then, is applied in chapter 5 for quantifying and discussing the effects of VAT policy scenarios and simulations. We focus on the wheat and soybean market and on the implications of a VAT rate reduction and refund. We look at the implications of small farms VAT exemption and address some more specific features on these markets. We, then, analyse the implications of VAT policy changes on other selected markets and address some specific VAT policy questions.

Based on the analysis we will discuss and assess VAT policy options for the future VAT system and give recommendations in chapter 6. Since recommendations, basically, are value judgements we will not give a unique recommendation for a policy reform, but we will highlight the consequences of various options in view of the objectives pursued and we will draw on international experience with respect to this policy question.

The paper, hopefully, enhances transparency and orientation in the current debate and the policy-making process.

2 The Value Added Tax (VAT) system in Ukraine

2.1 Introducing basic terminology and how VAT works

This chapter introduces how the VAT works using grain exports supply chain. In a (simplified) grain supply chain, farmers sell grain to elevators who dry and clean it. The elevator then sells the grain further on to a grain trader who either sells it to a mill domestically or exports it beyond the national border. In case that the grain trader also possesses an elevator, the second transaction in the chain will not take place, and no VAT transaction is paid to and later refunded by the State Fiscal Service (SFS).

The VAT clearance chain works as follows: The farmer sells grain to the elevator, and assuming normal or standard VAT rate (20%), (s)he will charge VAT on his invoice/price. Under normal circumstances, a farmer gets back a **refund** of the amount of VAT in farm inputs from the SFS and transfers the amount of VAT on his/her sales to the SFS. **Technically**, a farmer transfers/gets back just a positive/negative balance of VAT on sales and purchases. If, however, a farmer is **exempted** from paying VAT, (s)he may simply retain the amount of VAT on sales regardless of the amount of VAT (s)he paid in farm inputs. When the elevator sells the grain to a trader, he charges VAT on the invoice/sales, and will reclaim the amount of VAT he has paid to the farmer as **refund** from the SFS.

When the trader sells the grain to a domestic mill, and the mill sells flour to a bakery, the same procedure is repeated: VAT on procured inputs (grain and flour) will be reclaimed by the enterprises from (refunded by) the SFS, while those who sold the goods have to transfer the amount of VAT written

on the invoice to the SFS. This ensures that the economic incentive prices on the basis of which businesses are dealing with each other are always on a net base, i.e. net of VAT.

The mechanism works differently when the bakery sells bread to the final consumer. Consumer prices also contain VAT (one can find this in cash receipts), and the bakery has to transfer this money to the SFS. However, and this is the big difference to the transaction between business entities – the final consumers cannot re-claim/refund the VAT he has paid at the shop counter, unless he can prove that he will further process the bread instead of directly consuming it. Two major conclusions follow from the above discussion. First is that the SFS has to pay back (refund) all the VAT for intermediate products. Those players in the supply chain that transfer VAT to the SFS are acting as tax agents only, while the tax itself is effectively paid by consumers.

If the grain trader decides to export the grain instead of marketing it domestically, most governments have decided to apply a **zero VAT** rate to the value of these exports. This **zero rate** VAT on exports implies that a trader gets back a total amount of VAT he has paid to the farmer or elevator if he can prove that he has really exported the grain. This common international practice is applied in order to avoid double taxation, as almost all countries charge VAT on imports.

2.2 Evolution and characteristics of the Ukrainian VAT system

1. The key phases of implementation of the value added tax in Ukraine

The evolution of the VAT system as it applies to agriculture has seen various phases of Implementation as outlined below:

First phase from 1.01. 1992 was introduced based on Law of Ukraine on the Value Added Tax of December 20, 1991 No. 2007-XII. It introduced the flat tax rate of 28% (no 0% rate applied; export transactions were exempt from taxation);

Key elements:

There was no budget VAT refund mechanism;

Numerous privileges were granted, which in the vast majority of cases had a political rationale (in particular, supply of cattle and poultry meat, as well as of semi-finished products from them, was exempt from taxation);

There was a complete absence of or significantly underdeveloped important elements of the VAT collection mechanism, in particular, registration of taxpayers, issuance of invoices, tax accounting, etc.

Second phase from 1.01. 1993 based on the Decree of the CMU On the Value Added Tax, as of December 26, 1992 No. 14-92.

Introduced the flat tax rate of 20 % (no 0% rate applied; export transactions were still exempt from taxation);

Key elements:

There was no direct tax refund, which resulted in economic entities' significant shortage of working capital;

The continued practice of granting numerous privileges, which reduced fiscal effectiveness of the tax (in particular, supply of agricultural products for payment of wages, provision of services for population by agricultural enterprises - such as ploughing, harvesting, etc. - were exempt from taxation);

The third phase from 1.10. 1997 based on the Law of Ukraine On the Value Added Tax No. 168/97-VR as of April 3, 1997

Introduced approximation of the collection mechanism to European practices;

Key elements:

Appearance of the 0% rate, in particular on export transactions;

Introduction of the VAT refund - a negative debit of VAT balance was subject to reimbursement from the budget within a month, amounts that were not timely refunded to a taxpayer were classified as budget arrears;

The extension of the VAT collection mechanism to cover activities of trade enterprises and intermediary activities (up to that time, their surcharges were subject to taxation);

The mandatory documentary registration of any transactions, in particular tax bills, to have the opportunity to obtain tax credit amounts;

The introduction of tax accounting - for taxpayers when selling goods (services), it is mandatory to issue a tax bill;

In 1999 a special VAT regime in agriculture was introduced by which agricultural enterprises were exempted from paying VAT.

According to this special regime, agricultural enterprises were entitled to retain the VAT received from their sales to recover VAT on inputs and for other production purposes at the discretion of farmers. In 2015, the benefits from the Agriculture VAT accrued to UAH 39 bn. From 2016 under the pressure from the IMF, the system was changed. In particular, since 2016 agricultural producers have 'to share' a (positive) VAT balance with the State budget according to a specific formula. For grain and technical crops: 80% is transferred to the State Budget and 10% is retained on producers' accounts; for the dairy producers: 20% is transferred to the State Budget and 80% is retained on farmers accounts; for other livestock products the formula is 50% - 50%. Since 2017 the special VAT regime was completely eliminated.

The fourth phase from 1.01. 2011 based on the Tax Code of Ukraine No. 2755-VI, as of December 2, 2010 (Section V)

There were no significant changes in the VAT collection mechanism, since the purpose of adopting the Tax Code was to codify the existing tax legislation in a single regulatory act; thus, most of provisions of Law No. 168/97-VR were transferred to Section V of the Tax Code. In particular, tax preferences (special VAT regime and so-called Fixed agricultural tax) for agricultural enterprises were preserved.

The fifth phase from 1.07. 2015 based on the Law of Ukraine On Amendments to the Tax Code of Ukraine and Certain Legislative Acts of Ukraine on the Tax Reform of December 28, 2014 No. 71-VIII;

Introduced an electronic VAT administration system (VAT EAS)² - a set of organizational measures that are implemented using special software and hardware and are aimed at ensuring the VAT administration in electronic mode;

The Law of Ukraine On Amending the Tax Code of Ukraine to Improve the Investment Climate in Ukraine No. 1797 of December 21, 2016

² See <https://cabinet.sfs.gov.ua/registers/vat-refund>; <https://www.minfin.gov.ua/reestr>

Key elements:

Due to VAT EAS, information on VAT amounts in terms of tax liabilities and tax credits, as well as their specific components, is available to the SFS at any time (not after submission of the statements),

VAT EAS made it possible to quickly regulate the process of generating liabilities and tax credit of taxpayers in such a way that all in all the VAT refund amount did not exceed the amount of tax revenues to the budget.

An integral part of the VAT EAS is electronic VAT bills as a form of effective control over VAT abuse - their introduction made it possible to pre-book VAT amounts, which reduced chances for abuse;

Tax bills are issued electronically and registered in SRTB, a tax bill registered in the SRTB forms sufficient grounds to charge tax amounts attributed to the tax credit and does not require any further confirmation (for traders);

An electronic system was introduced to monitor compliance with the criteria to assess degrees of risk sufficient to halt registration of a tax bill (MS CAR) and block the possibility of tax bill registration

The current system (as of 03.2019)

The system as introduced in the fifth phase in 2015 is currently in force with the following key elements:

- Starting from January 1, 2018, agricultural enterprises completely switched to the general VAT collection regime;
- Applicable rate of 20 % applied to all agri-food goods;
- Export VAT refund available to all exporters which are VAT payers with the exception of traders (cf. producers) of soybeans (from 01.09.18) and in the future for rapeseed (from 01.01.2020)³.

2.3 State of analysis and political debate

ANALYSIS

Whilst the debate over VAT in agriculture has been ongoing for many years, the level of scientific analysis has been limited. Below is a non-exhaustive list of papers addressing the key VAT issues:

1) The Struggle over VAT Refunds for Grain Exports of April 2004 in which the Institute for Economic Research and Policy Consulting in Ukraine and the German advisory group on Economic Reform modelled a similar situation to the current situation with VAT export refunds concluded:

“..numerous legislative projectsaimed at restricting the general rule that grain exporters get a full VAT refund when they export grain. However, the internationally accepted practice to refund VAT of exports is crucially important for both exporters and farmers, as its abandonment would mean a double taxation of grain by both the exporting country (Ukraine) and the country of destination. The analysis of the attempts to use VAT regulations as a means to influence market outcomes has shown that this often results in a taxation of agricultural producers.”

2) VAT in Ukraine: Would other Indirect Taxes Perform Better? of the German Advisory Group and Institute for Economic Research and Policy Consulting which assessed the alternatives to VAT and concluded:

³ See <https://zakon.rada.gov.ua/laws/show/2440-viii>; Law of Ukraine # 2440-VIII as of 22.05.2018

“... even assuming that VAT’s fiscal performance is poor, replacing it with another indirect tax would not necessarily be a good idea, as shown by our quantitative assessment. A general (retail) sales tax would generate less revenues for the government and is more susceptible for tax evasion, as the amount of taxes evaded is much higher than in the case of VAT, in which the seller of a good can deduct the input VAT. As for the turnover tax, the second major alternative to VAT, it would have major negative structural effects on the economy, due to its cumulative, cascading effect. Besides, it would hurt exports and economic growth, thus eroding its tax base. Finally, it should be emphasised that maintaining VAT is necessary for the conclusion of a DCFTA with the EU, which is a major priority of Ukraine’s trade policy. Thus, VAT should not be replaced.”

3) Nivievskiy (2017) studied the impact of agricultural tax exemptions on the productivity in Ukraine. In particular, he looked at how agricultural value-added exemptions as well as profit and land tax exemptions (or so called single agricultural tax) affect productivity growth in Ukraine’s agriculture. Overall, tax exemptions turned out to be very cost-inefficient instrument of stimulating productivity growth in Ukraine’s agriculture. Tax exemptions strongly undermine efficiency and productivity convergence in agriculture.

4) Kulyk et al (2014) looked at a comparative assessment of welfare effects of various grain export policies in Ukraine. One of the policies considered in the paper was a partial or full non-refund of VAT to grain exporters that took place in 2011-2013. The export tariff equivalent for the non-refund VAT policy at that time was estimated at the level of 0.31, i.e. 31%.

POLICY DEBATE

Some **Public administration bodies** in the sphere of public finances, have begun to progressively promote the idea of changing the VAT regime for the export of agricultural products by applying a **zero** rate (i.e. when no VAT refund on agricultural products to exporters is available).

Among the arguments used by representatives of the state administration, justifying the expediency of the legislative implementation of the relevant scenario include:

- Optimization of budgetary indicators, balancing public finances, reducing the loss of public financial resources and eliminating the problem of administering VAT in agriculture - since it is objectively difficult for fiscal authorities to control the origin of grain for export, with more than 40% of the agrarian economy being in the shadow economy, and a significant part of agricultural production is “brought out of the shadows” just before export;
- the need to minimize the loss of budget revenues as a result current model of VAT taxation focussed on export deliveries of "raw" agricultural products.
- the need to stimulate the extension of the value added further along the chain (e.g. to processing) formation

Method of implementation - considering the numerous facts of abuse when collecting VAT from agricultural producers, the option of changing the VAT taxation regime on exports of agricultural products is considered, namely, cancelling the zero rate on exports (VAT refund) unprocessed agricultural products (first of all, grain and oilseeds).

Expectations - a decrease in the volume of budget losses of VAT and an increase in the volume of budget revenues of VAT to the budget (now the agricultural sector has a negative balance on VAT)

The economic management bodies including the Ministry of Economy and Trade, the Ministry of Agrarian Policy, the Agrarian Committee of the Verkhovna Rada have proposed the introduction of the practice of exempting from VAT operations for the export of certain types of unprocessed agricultural

products in particular, those that can be processed in Ukraine, and processed products can be sold for export and the reduction of the VAT rate on individual food products (throughout the supply chain)

Motivation for change is to ensure economic growth in the industry by means of a tax mechanism, stimulating the lengthening of value chains, increasing exports of processed food products, increasing the number of jobs, ensuring the availability of food for the population in conditions of low purchasing power. The expectations is the lengthening the value chain, increasing jobs and ensuring the availability of food.

The representatives of **processing enterprises**, the owners of which are interested in full exploitation of the existing production capacities, maintain practically the same position (especially this concerns the processing capacity of oilseed crops, the volumes of which considerably exceed the possibilities for the production of such crops in Ukraine, and the import of the corresponding raw materials is not practiced), and use for this purpose their lobby in the Verhovna Rada.

A compromise that the above party contemplates is the possibility of applying the 0-rate regime only in the case when the export supply is carried out by the producer of the corresponding agricultural products. On the other hand, agricultural producers and their public organizations insist on preservation (for oil seeds) of the full refund regime. To this end, in early 2019 several draft laws were registered.

Representatives of **agricultural producers** seek to reduce the VAT rate when taxing agricultural products and products of its processing and are expecting the utilisation of existing and potential production capacities through the implementation of a tax policy, which stimulates the export supply of processed products, rather than agricultural products and a decrease in the share of VAT in the price of products and, consequently, an increase in the profitability of agricultural activities and an increase in the sales of products;

This would be achieved through a change in the tax regime for VAT on exports of agricultural products by the introduction of a regime of exemption from taxation on exports of certain types of agricultural products in an unprocessed form (in particular, grains and oilseeds) and the use of a zero-rate regime only for agricultural products in a processed form. In order to put this idea into practice, in early 2018 several draft laws were registered in the Verkhovna Rada of Ukraine (with a different set of products at a reduced rate). However, the responses to the initiative were not supported by the Cabinet and did not cause any interest in the people's deputies.

The proposed methods of implementation include a reduction in the VAT rate on certain types of agricultural products, namely, those where budget losses will be minimal as well as in order to prevent losses of agricultural enterprises, the introduction of the same reduced rate of VAT for inputs.

The **traders** are interested in applying a unified approach to the formation of a tax regime for export of agricultural products. They do not approve of the use of a differentiated approach (the 0th rate in the case of export deliveries by direct producers, the exemption regime - in the case of export supplies by intermediaries) since in this case they are significantly disadvantaged ("independent" exports become much more profitable).

Consumers' expectations are a reduction in food prices due to the reduced VAT factor, ensuring the availability of food in conditions of low purchasing power of the population by reducing the level of food expense. This they hope to achieve through Method of implementation - a reduction in the VAT rate on certain types of food (throughout the supply chain).

3 Economic analysis

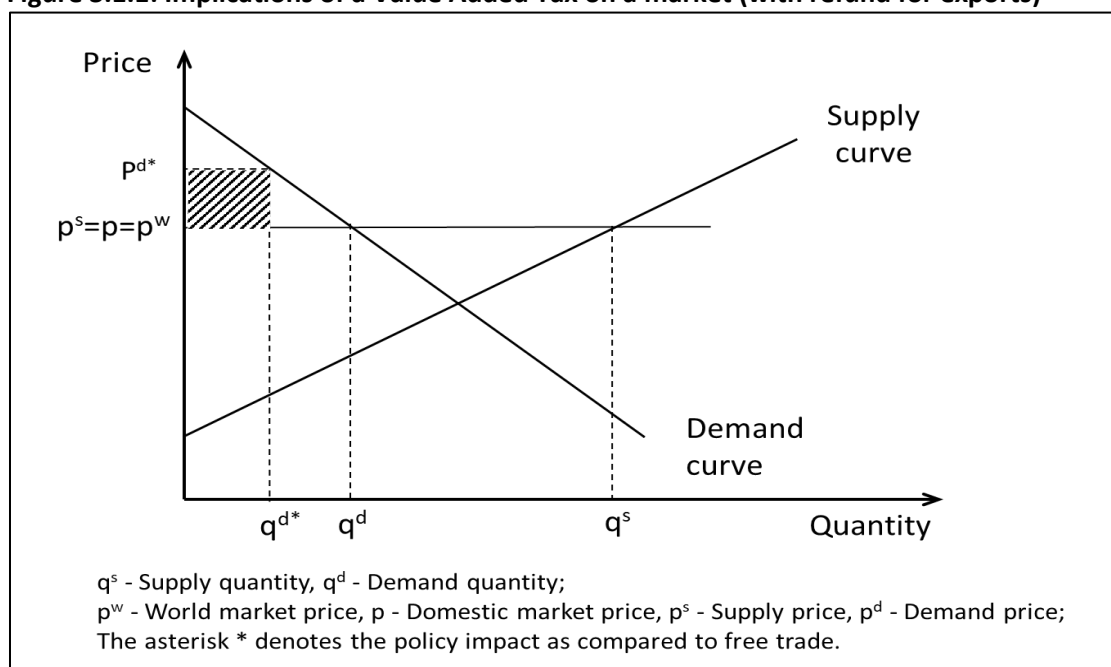
VAT is typically understood as a consumer tax, but analysis and effects of this price policy instrument on a market depend on the specific institutional design applied. Hence, we have to look at the specific features of the Ukrainian VAT system in agriculture.

3.1 Consumer tax and export tax

The VAT with refund for exports is a “classical” consumer tax

For starting, let us assume that we consider an open economy with free trade and no government intervention on markets. Then, the domestic price on markets would be determined by the world market price; in fact, the domestic market price and, thus, the price for producers and consumers would be equal to the world market price if we neglect transfer cost⁴ (what we do for simplification and following standard economic market analysis). The free trade situation is illustrated in figure 3.1.1 showing an export market (reflecting the Ukrainian case for most agricultural commodities). The figure shows the quantities supplied, consumed and exported under free trade; and producer revenue, consumer expenditure, and foreign exchange earnings can be easily calculated. Applied welfare economics tells us that economic welfare is maximised under free trade, and it shows the implications for producers’ and consumers’ (real) income under this constellation. Since there is no government intervention the government budget is not affected. The presentation follows standard microeconomic analysis (see JECHLITSCHKA, KIRSCHKE and SCHWARZ, 2007, chapter 1-3 or, e.g. PINDYCK and RUBINFELD, 2018, chapter 9).

Figure 3.1.1: Implications of a Value Added Tax on a market (with refund for exports)



Source: Own compilation according to JECHLITSCHKA, KIRSCHKE and SCHWARZ, 2007, chapter 1-3.

⁴ Transfer costs consists primarily of transport and other costs (e.g. handling, processing, inspection, laboratory tests, paperwork etc) that a trader/producer must incur to bring his/her product to the border

If the government introduces a VAT, the consumers typically have to pay this tax and the consumer price (or demand price) is higher than the market price as given by the world market price. The producer price (or supply price) is not affected; it is the domestic market price given by the world market price. Typically, the VAT is collected from producers for practical reasons. For domestic sales, however, producers get the higher consumer price, and for exports, they get the VAT refunded from the government. This is the “classical” case of a consumer tax: The government taxes domestic consumption and not either production or exports.

Figure 3.1.1 shows the implications of a VAT as compared to free trade: Consumption goes down (depending on the elasticity of demand) and exports increase whereas production is not affected. The hatched area marks the government’s tax revenue. The VAT reduces consumers’ (real) income whereas producers’ income is not affected.

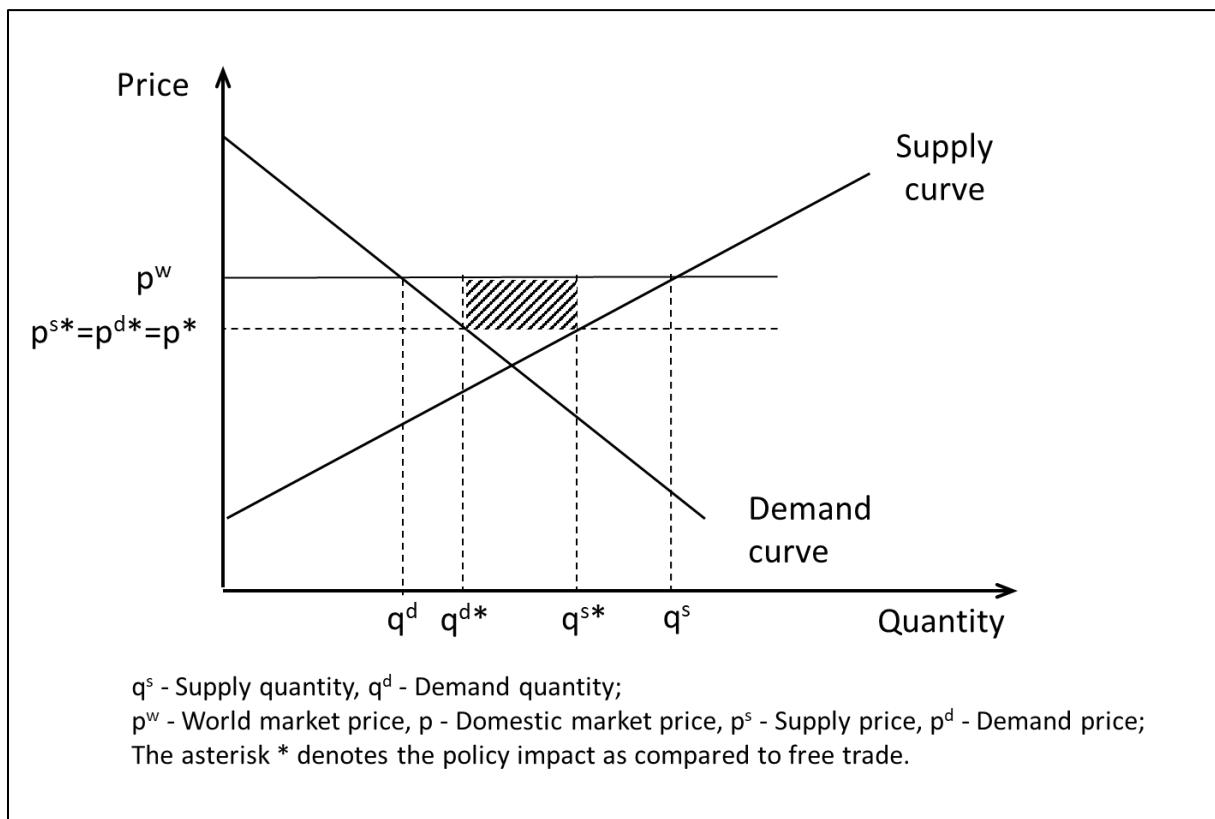
In this “classical” institutional VAT setting a tax rate reduction will reduce the consumer price and not affect the market price. Domestic consumption will increase whereas exports will decrease correspondingly. Since elasticities of demand are, generally, low for agricultural commodities government’s tax revenue will go down.

Implications of an export tax

If the government does not refund the collected VAT for exports, the tax system, fundamentally, changes. In this case the government, in fact, introduces a second tax beyond the “classical” consumer tax, and this is an export tax. Hence, we have to discuss the implications of an export tax first before looking at the combined effect of both taxes.

Figure 3.1.2 shows that an export tax reduces the domestic market price below the world market price. This is straightforward since what producers get abroad for their exports will determine the domestic market price. With an export tax, they get the world market price minus tax, and this determines the new domestic price level and, thus, the producer price as well as the consumer price. Hence, an export tax is a producer tax and a consumer subsidy, as compared to free trade; it reduces producers’ (real) income and increases consumers’ (real) income. The export tax, also, reduces exports both by cutting down production and enhancing consumption. The hatched area in figure 3.1.2 denotes government’s revenue of the export tax.

Figure 3.1.2: Implications of an export tax on a market



Source: Own compilation according to JECHLITSCHKA, KIRSCHKE and SCHWARZ, 2007, chapter 1-3.

3.2 VAT without export refund

The VAT without refund for exports turns into a producer tax

Let us, now, look at the **combined effect of a VAT and an export tax** that is: a VAT without refund for exports. The implications are shown in figure 3.2.

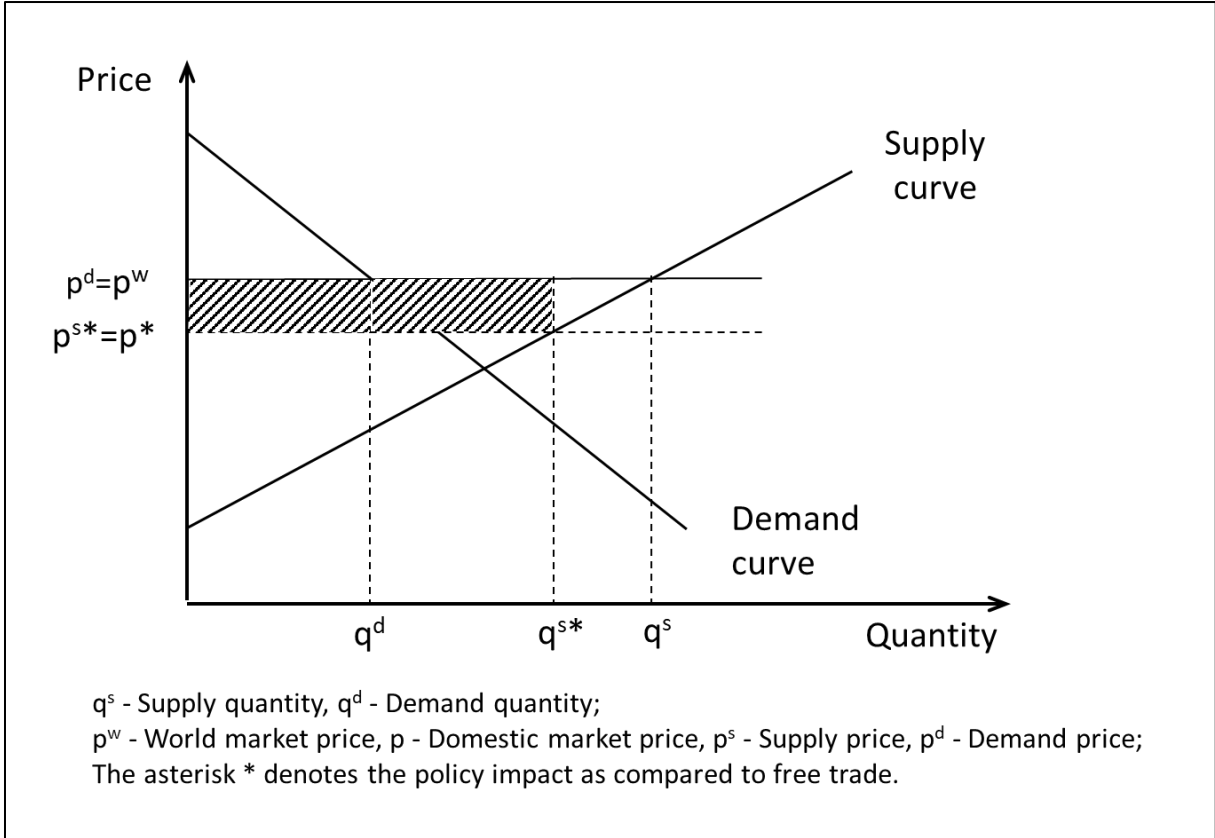
The export tax component of the combined tax system will reduce the domestic market price below the world market price, and this will be the new producer price that producers get for sales both on the domestic market and for exports. The consumers, on the other side, gain from the lower market price, but their consumer price is higher than the market price according to the VAT. Hence, the new consumer price will be exactly the same as under free trade: What consumers gain from the “No VAT refund for exports policy” from a lower market price they lose from the VAT payment itself – or vice versa.

As a consequence, the VAT without refund for exports turns out to be a producer tax whereas consumers are not affected under combined effect of ‘classical VAT’ and non-refund of export VAT. For them, we get the same situation as under free trade without VAT. Government’s tax revenue, now, is given by the hatched area. From a fiscal point of view the tax revenue, certainly, is higher than for a “classical” VAT since, in an export situation with higher production than consumption, the taxation of

production yields a higher revenue than the taxation of consumption. Exports will go down, on the other hand, due to a decrease in production.

It is interesting to look at the implications of a VAT rate reduction in this system. The tax reduction will increase the domestic market price and, thus, the producer price bringing up the domestic price level closer to the world market price. There is no change, on the other side, for the consumer price. The market price goes up, but the tax is lower leaving the consumer price at the world market price level as before. Hence, **a VAT rate reduction in a system with no VAT refund for exports**, effectively, is a producer tax reduction whereas (real) income of consumers is not affected.

Figure 3.2.1: Implications of a Value Added Tax on a market (without refund for exports)



Source: Own compilation according to JECHLITSCHKA, KIRSCHKE and SCHWARZ, 2007, chapter 1-3.

Things become more complex if the government’s VAT policy is a mixture of both tax systems considered. This is not an artificial theoretical assumption but seems to be a conceivable policy option in view of ideas to partially reimburse the tax for exports. What would be the consequence? Imagine for a moment that the government starts from a “No VAT refund for exports policy” and, gradually, increases the refund rate from zero to hundred percent. The market price and, thus, the producer price would, gradually, move up in this case, but the consumer price would also go up above the world market price. In the end, with such a system change, we would switch from figure 3.2.1 to figure 3.1.1.

The presentation sketches out the basic theoretical background for the VAT policy discussion and it addresses a specific feature that has been applied and still is applied in VAT policymaking on Ukrainian

agricultural markets. Before we move on and look at other specific features let us consider for a moment some constraints and assumptions of the analysis.

Constraints and assumptions of the analysis

Any theory or model is a simplification of reality and can only try to work out and focus on relevant aspects for a problem considered. In our case we look at the VAT policy and this is a price policy intervention on markets. The market effects shown above, thus, focus on this price policy intervention in a simple partial equilibrium framework. We assume, e. g. competitive markets neglecting potential market power; we consider just one commodity neglecting market interdependencies and the value chain; and we consider the “small country case” with a given world market price neglecting potential world market effects of Ukraine’s domestic VAT policy.

All these assumptions are worth to be considered and reflected. Our philosophy and proposal are to focus on the essentials of the VAT policy first and this is a price policy intervention on markets suggesting a theoretical and modelling framework as presented.

An important assumption in our partial equilibrium market model (as in most others) is the neglect of transfer cost to simplify the analysis. Hence, there is no regional differentiation and there are only uniform domestic prices i.e. one uniform domestic market price, one uniform producer (=supply) price and one uniform consumer (=demand) price. This assumption requires to define some uniform domestic “numeraire” prices, and these are most often derived from a country’s trade prices i.e. the world market prices. This the understanding when we say that, under free trade, the domestic market, producer and consumer price are equal the world market price. In reality, regional or local prices will deviate from the relevant world market price depending on transfer cost whereas these regional or local prices, certainly, depend from world market prices. The world market price is often calculated as a “trade unit price” which is the trade value (export value plus import value) divided by trade volume (export quantity plus import quantity). For a country which is heavily export-oriented like Ukraine on many agricultural markets it is straightforward to just calculate the “export unit price” as world market price which is the export value divided by the export quantity.

Apart from these remarks some specific features of the Ukrainian VAT and trade system in agriculture are worth to be considered. The discussions on the VAT topic so far have addressed the following points:

- No or only partial VAT reimbursement for exports
- VAT exemption for small farms
- Export constraints on some markets (“informal agreements” on export bounds, VAT refund only for some exports and exporters)
- Concentration and market power on some markets
- Administration and control of the VAT system.
- Uncertainty about price responses of producers and consumers and, thus, supply and demand elasticities (see the figure 3.2.2)

Demand elasticities for food products (e.g. bread), though, are simply not available for Ukraine. For this purpose, we used the estimates available for Russia, assuming that there is no reason to assume substantial differences in consumption preferences between the two countries.

Figure 3.2.2: Discussion on wheat and bread products price demand and supply elasticities

Author/source	product	type: (supply, demand, export, import)	elasticity	country
Kuznetsova (2007)	wheat	domestic demand	-0.24	Ukraine
		domestic supply	0.20	
		import demand	-0.23	
Seale et. al. (2003)	bread and cereals	income	0.46	Ukraine
		own price	-0.37	Ukraine
RASMU model database; Kuhn (2004)	wheat	Supply	0.29	Ukraine
Staudigel M. and R. Schroeck	Bread and bakery	demand	-0.52 (2008/2010) -0.49 (1995/2010)	Russia
	Cereals	demand	-0.95 (2008/2010) -1.27 (1995/2010)	Russia
USDA (Demand elasticities from the literature)	cereals	demand	-0.54	USA
Reed, Levedahl, Hallahan (2005); Huang and Lin (2000); Park et al. (1996);	Cereals and bakery	demand	-0.58; -0.61; -0.45; -0.14; -0.51	USA
Barnes and Shields (1998); Samarendu et al (1997)	Wheat; cereals	demand	-0.75; -0.849; - 0.231; -0.27	USA
Tomek and Kaiser (2014)	Wheat	Supply	0.25; 0.34;	USA
	Corn	supply	0.29	

Note: Unfortunately, the stock of supply and demand elasticities for agri-food products for Ukraine is extremely scarce. The table above shows just a handful of sources available after an intensive search, that could shed light on the range of values for supply and demand elasticities that could be used in our model calculations. As a cross-check, we also show estimated wheat supply and demand elasticity for the US. One can see that the estimate available for Ukraine are plausible from theoretical point of view, whereby usually demand and supply schedule are assumed to be quite inelastic. Moreover, Ukraine's estimates are quite comparable to the US ones.

Given the ranges of elasticities found in the literature, the suggested range of elasticities is the following:

- Wheat supply: $0.2 \div 0.3$; wheat demand: $-0.2 \div -0.3$
- Bread supply: $0.2 \div 0.3$; Bread demand: $0.1 \div 0.2$

We have already addressed the issue of no or only partial VAT reimbursement for exports in this chapter 3.2 and we will discuss the VAT exemption for small farms in the preceding chapter 3.3. Both aspects will, explicitly, be dealt with in the Excel modelling framework in chapter 4. We will define a basic VAT market model (Version 1.0) considering full, partial and no VAT reimbursement for exports and develop an extended Version 2.0 integrating VAT exemption for small farms.

The other specific features will be addressed in chapter 3.4 and we will come back on them in the following chapters for specific markets and policy questions considered.

3.3 VAT exemption for small farms

The theoretical framework discussed so far implies that all producers and consumers in a market are subject to the VAT system. This may not apply in some country cases. In Ukraine, in particular, small farms, e.g. on the wheat market, might not be included in the VAT system. VAT is not collected from them, their selling on domestic markets may not be covered by the VAT system and, in case of exports, they do not qualify for VAT refunding (since a VAT has not been collected from them).

It would be straightforward to constrain our analysis to those economic activities (production, consumption and trade) that are subject to the VAT system. However, there may be interdependencies in the markets and it may be interesting to know what the implications of VAT exemptions for small farms are and what would happen if more farms are integrated into the VAT system. Hence, we have to discuss the VAT exclusion for small farms explicitly.

On the Ukrainian wheat market e. g. small farms make a substantial contribution to the country's total supply outside the VAT system. They sell on the domestic market and contribute to exports. Let us look at the consequences for our theoretical framework and start with the price formation on a market. We have explained that domestic prices, basically, depend on the world market price and the specifics of the price intervention system, in general, and the VAT system, in particular. We, now, argue that the domestic market price will be the relevant supply price both for large and for small farms. Small farmers may get some margin when selling on the domestic market (since consumers may be willing to pay a higher price to them which is, nevertheless, lower than the consumer price on "official" markets including the VAT), but we would not expect small farmers to react to such a "price incentive". The domestic market price would also be the relevant price for small farmers in case of exports. This is obvious for a "classical" consumer tax where the domestic price is equal to the world market price. We would not expect price formation to be affected when explicitly including small farms VAT exemption into the analysis. The price formation as discussed holds and there will be no change in total supply and demand quantities.

Consequences can, certainly, be expected with respect to the government's budget and the taxation of consumers and farmers. Let us start with the "classical" consumer tax first. With small farms VAT exemption, the government will lose tax revenue.

This budget loss for the government, at the same time, is a reduction of consumer taxation. But there is another aspect to be considered as compared to the basic analysis: This loss in the government's budget is a gain for consumers and/or (small) producers. Economically speaking, this is a rent to be allocated to the market partners. There will be a special market price for selling of small farmers to consumers in the domestic market somewhere between the domestic market price and the consumer price, and this price may be closer to the consumer price or to the market price depending on local market power. Hence, part of the rent will go to the small farmers enhancing revenue and (real) income, and another part reduces expenditure and increases (real) income of consumers.

If there is no VAT refund for exports another rent has to be considered. We have discussed a "No VAT refund for exports policy" in chapter 3.2 and the VAT system turns into a producer tax in this case. With VAT exemption for small farms there is a loss of tax revenue in the domestic market, as discussed, but there is also a loss in tax revenue with respect to exports. The point is: The government cannot profit from its non-refunding policy from tax revenues that it did not collect before from small farms.

The government's tax loss with respect to exports is a rent for small farms. They benefit from a higher world market price as compared to the domestic market price. But the situation may be more complex. Small farms may not be able to capture this rent for exports since they are probably not directly involved in exports. They may be willing to sell their production for exports to large farms and/or traders who can handle international trade. In this case there will be a market price for small farmers exports somewhere between the world market price and the domestic market price and the rent will be allocated between small farmers and large farmers and/or traders depending on local market power. The rent will enhance their revenue and (real) income accordingly.

A third aspect may be worth to be considered. The discussions have indicated that some of small farmers exports may be wrongly declared resulting in export VAT refunds. Obviously, this is an enforcement and control problem, but, from an economic point of view, this is an additional rent to be allocated. It reduces government's VAT budget and increases producers' revenue and (real) income. It needs to be discussed to what extent this rent is allocated to small farms and/or large farms and/traders. This third potential rent due to small farmers VAT exemption may occur in a VAT system with full or partial VAT refund for exports. In a system with no VAT refund for exports this rent will not occur (since there is no refund).

What do we learn from all this? Any price policy intervention on a market, in general, and a VAT system like in Ukraine, in particular, induces private activities trying to avoid taxation and seeking profit opportunities. The more complex interventions are the more difficult it will be to enforce the system properly and to assess reactions and implications. It may, therefore, be a good idea to be sure of what market policy intervention is really intended and to design the intervention as simple, transparent and enforceable as possible. We will come back to such ideas in chapter 6.

3.4 Other specific features of Ukrainian agricultural markets and VAT and trade policy-making

Uncertainty about price responses of producers and consumers and, thus, supply and demand elasticities

Producers and/or consumers may react to price changes in a market more or less strongly. Such reactions have to be properly assessed in an empirical investigation to make realistic calculations on market effects of VAT policy changes. The best way is to empirically estimate supply and demand functions in a market. If this is not possible a realistic guess should be made drawing on relevant studies or figures for similar commodities, regions and/or countries in the literature. In our approach we use isoelastic supply and demand functions with constant elasticities of supply and demand; hence, the elasticity values describe producers' and consumers' reactions to price changes that we are looking for.

The relevance of such price reactions for the analysis depends on the VAT policy system considered. For a "classical" consumer tax VAT changes only affect domestic consumption (and the derived variables). In this case the elasticity of demand determines the size of the calculated effects whereas the elasticity of supply is not relevant (since there is no producer price change). In a system with no VAT export refund it is the other way around: In this case it is the elasticity of supply that impacts on the calculation results whereas the elasticity of demand is not relevant. In a system with partial VAT export refund, then, both elasticity values would be relevant. Finally, if VAT exemption for small farms is to be considered, it may be useful to differentiate between supply elasticities for small and big farms.

Higher elasticity values (more precisely: absolute values since the demand elasticity will be negative), generally, result in higher reactions of supply, demand and trade and of corresponding changes in the derived other market variables. If there is uncertainty about the proper elasticity values in a specific market a typical approach is to carry out sensitivity analysis. The implications of VAT policy changes would, then, be calculated for a set of elasticity values comprising e. g. a "best guess" and an "upper" and "lower" value. This is what it says: a sensitivity analysis allowing for a better assessment of the calculation results in view of the elasticity assumptions made.

Export constraints on some markets ("informal agreements" on export bounds, VAT refund only for some exports and exporters)

Sometimes VAT policy implementation and changes may be accompanied by additional trade policy interventions. A "classical" trade intervention has been a protectionist policy implemented e. g. by a tariff or an import subsidy (as exercised e. g. by the former EU's Common Agricultural Policy (CAP). Ukraine, on the other hand, has experimented with an export tax. A protection policy, typically, brings up the domestic market price above the world market price whereas a "trade taxation" policy like an export tax results in a lower domestic market price as compared to the world market price (see chapter 3 and figure 3.1.2). The combined effect of a trade policy intervention and of a VAT policy is difficult to visualise but can easily be modelled (see the proceeding chapter 4). In fact, we explicitly, incorporate

a trade policy intervention into our model. Looking at VAT policy implications in view of export constraints, then, is analysing the combined effects of these two policy interventions.

The Ukraine has also applied export constraints on some markets. Such a quantity constraint is a specific form of “trade taxation” and it brings down the domestic market price below the world market price like an export tax. Hence, the implications of an export constraint could also be illustrated by figure 3.1.2. The only difference is the tax revenue collected with an export tax (as shown in the figure); with an export constraint, the government would only get hold of such a revenue if it sells or auctions export permits. If the Government simply distributes export constraints to producers and/or traders this is a rent for those who get the permit as they get a higher world market price for their export as compared to the lower domestic market price. The combined effect of an export constraint and of a VAT policy, then, can be analysed as discussed in the previous paragraph.

Since October 2011⁵, grain traders and the Ukrainian Ministry of Agricultural Policy and Food signed the Memorandum of Understanding (MoU) have been practicing so-called voluntary export restrictions, whereby grain traders sign up to caps on their exportable volumes of grains. It has never been analyzed, however, whether those caps were ever binding. Such an export informal agreement would be analysed in the same way as an export constraint just discussed. It would be interesting to see how the export permits would be allocated, whether there is some government revenue and/or who gets the rent. It will be difficult, of course, to get such information about “informal agreements”.

Another interesting feature relating to the VAT and trade framework is a differentiation in VAT refund for exports. Consider that some producers/traders get export VAT refund and others do not. To analyse potential effects of this refund differentiation we would have to proceed, similarly, to analysing the impact of small farms VAT exemption. We have to look at two producer/trader groups (those who are refunded and those who are not) and discuss the implications for price formation, the distributional effects on government’s revenue and producer and consumer taxation, and we would have to analyse the potential allocation of rents. The discussion would even be more complex with a further refund differentiation between more producer/trader groups and different refund rates, maybe not only for these groups, but also for quantities. The attempt to analyse and model such complexities would become hopeless.

A simple alternative would be to calculate some average export VAT refund rate for all producers/traders, and this average rate would, then, determine the domestic market price level. The domestic market price to be calculated would, obviously, be somewhere between the world market price and the lowest domestic market price with no export VAT refunds. The underlying assumptions are that producers base their (production) decisions on such an average domestic market price and group-specific differentiations (and, maybe, rents) can or should be neglected. If these assumptions do not hold, we are thrown back to the reflections in the previous paragraph.

The discussion, clearly, shows that any effort to analyse and model a specific policy intervention on a market must be a compromise between capturing key aspects of that policy intervention and

⁵ <https://zakon.rada.gov.ua/rada/show/n0003730-11>

information and research needed. It is a good idea to start with key aspects, and, then, to assess what additional specific features should be taken up and reflected in the analysis.

4 Modelling framework

Based on the theoretical framework the project team developed a VAT market model based on Excel. Using a spreadsheet model allows for interactive use and simple adaptations for specific markets and policy questions. The model is based on the partial equilibrium modelling approach from JECHLITSCHKA, KIRSCHKE and SCHWARZ (2007, chapter 1-4); we have adjusted the standard framework taking into account the particularities of the Ukrainian VAT policy system. In this chapter we present the features of the model and discuss data requirements. The model, then, is used in chapter 5 for calculating and discussing the effects of VAT system changes for selected markets and policy options.

4.1 Basic VAT market model

Excel based VAT market model for the Ukrainian wheat market (see annex 1)

The model focusses on price policy interventions in a market and their implications on key market and policy variables. The model is driven by supply and demand prices determining supply and demand quantities. We use isoelastic supply and demand functions with constant elasticities of supply and demand, respectively. Based on prices and quantities all other variables are calculated according to microeconomic theory and applied welfare economics, in particular.

We include in the model information on production, consumption and trade (supply quantity, demand quantity, export quantity, producer revenue, consumer expenditure, and foreign exchange) as well as fiscal variables (government budget, farmer taxation and consumer taxation). The government's budget is affected whenever, due to a price policy intervention, domestic prices (supply price, demand price, domestic market price) deviate from the world market price. According to this deviation farmer taxation and consumer taxation are calculated.

In addition to these variables, some basic welfare indicators are calculated. Total benefit describes the total benefit of consuming as the area under the demand curve whereas cost describes the (variable) production cost as the area under the supply curve. Producer surplus, on the other hand, indicates the (real) income of producers whereas consumer surplus indicates the (real) income of consumers related to the market constellation. Welfare, then, can be calculated in two ways: either as total benefit minus cost plus foreign exchange or as the sum of producer surplus, consumer surplus and government budget. It needs to be noted, though, that the absolute values of total benefit, cost, producer surplus and consumer surplus and, thus, welfare are arbitrary due to technical reasons (due to the functional shape of the supply and demand functions used). The important point is that they describe exactly distributional and welfare changes of policy changes considered (see JECHLITSCHKA, KIRSCHKE and SCHWARZ (2007, chapter 1-4).

Price policy formulation

The price policy formulation within the model is the key for policy analysis. Basically, a government can intervene in trade, production and consumption. A trade policy is modelled by the protection rate. A tariff (in an import situation) or an export subsidy (in an export situation) brings up the domestic market price above the world market price whereas an export tax (a negative protection rate) reduces the domestic market price below the world market price (as discussed above). The functional relationship is

$$(1) \quad p = (1 + r) p^w$$

where p - Domestic market price, p^w - World market price and r - Protection rate.

A producer tax, or more precisely: a production-tied producer tax (or production tax), brings down the supply price below the domestic market price whereas a producer subsidy (= negative producer subsidy) increases the supply price. The functional relationship is modelled as follows

$$(2) \quad p^s = (1 - t) p$$

where p^s - Supply price and t - Producer tax rate.

Let us, now, come to the VAT policy part of the model. A VAT pushes the demand price above the domestic market price; we get

$$(3) \quad p^d = (1 + v) p$$

where p^d - Demand price and v - VAT rate.

To take into account a VAT policy with no or only partial refund for exports we have introduced an export VAT refund rate: The rate is hundred percent in case of full export VAT refund ("classical" consumer tax) and zero percent in case of no refund. Now, we get the following functional relationship for the domestic market price

$$(4) \quad p = (1 + r) p^w - v p (1 - \alpha)$$

with α - Export VAT refund rate.

As explained a protectionist policy will bring the domestic price above the world market price and a "No VAT refund for exports policy" will reduce it below the world market price. Solving (4) for we get

$$(4') \quad p = \frac{1 + r}{1 + v(1 - \alpha)} p^w.$$

This is the new equation for the domestic market price integrating no or partial VAT reimbursement for exports in the model. With a "Full export VAT refund policy" equation (4') reduces to equation (1) and with no price policy at all we get free trade: $p^s = p^d = p = p^w$.

Calculating the government's budget and producer and consumer taxation

The government's budget or net tax income is the sum of all budget revenues minus budget expenditures due to its price policy interventions on a market considered. We get

$$(5) \quad GB^{Total} = GB^{Trade} + GB^{Production} + GB^{VAT}$$

where GB^{Total} – Government total budget, GB^{Trade} – Government budget due to its trade policy, $GB^{Production}$ – Government budget due to its production policy and GB^{VAT} – Government budget due to its VAT policy.

The corresponding formulae are

$$(6) \quad GB^{Trade} = r p^w (q^d - q^s),$$

$$(7) \quad GB^{Production} = t p q^s \text{ and}$$

$$(8) \quad GB^{VAT} = v p q^s - \alpha v p (q^s - q^d)$$

With no trade and production intervention ($r = 0, t = 0$), the government's budget shows the implications of the VAT policy. According to equation (8), government's budget is the tax revenue collected from producers minus the VAT refund for exports. If there is full VAT export refund ($\alpha = 1$) equation (8) reduces to $GB^{VAT} = v p q^d$; this is the "classical" consumer tax. On the other hand, we get $GB^{VAT} = v p q^s$ for no VAT export refunds ($\alpha = 0$); and this is a producer tax.

The government's budget is the sum of consumer and producer taxation. Consumers are taxed by price policy interventions if the ultimate consumer price is higher than the world market price. We get

$$(9) \quad T^{Consumer} = (p^d - p^w) q^d$$

where $T^{Consumer}$ – Consumer taxation.

Neglecting trade policy interventions and assuming a full VAT refund for exports ($r = 0, \alpha = 1$) we get consumer taxation for the "classical" consumer tax as visualised in figure 3.1.1 and calculated in figure 4.1.(annex 1).

Equally, we can calculate producer taxation. Producers are taxed by price policy interventions if the ultimate producer price is lower than the world market price. We get

$$(10) \quad T^{Producer} = (p^w - p^s) q^s$$

where $T^{Producer}$ – Producer taxation.

Neglecting trade policy interventions and producer taxes ($r = 0, t = 0$) the effects of the VAT system on producer taxation can be determined. With full VAT export refund the producer price is equal to the world market price and producer taxation is zero whereas, with no VAT refund for exports, the producer taxation as visualised in figure 3.2.1 can be calculated.

The model can be used for calculating the effects of various price policy interventions. There are four price policy parameters: the protection rate, the producer tax rate, the VAT rate and the export VAT refund rate. If no trade policy intervention and no producer tax or subsidy are applied, we can set the protection rate and the producer tax rate to zero and the calculations will show and focus on the implications of the VAT system and VAT policy options considered.

4.2 Data requirements

To get realistic figures for specific markets the model must be calibrated. We adjust the supply function and the demand function by calculating the constants of these functions based on real market data which is done, automatically, in the Excel model. The Excel cells coloured in green in figure 4.1 (annex 1) denote the information needed: quantities of supply and demand, supply and demand prices, world market price, elasticities of supply and demand and price policy parameters.

Supply quantity. The information should, usually, be available from production statistics. Production figures for the last three to five years indicate the supply level for the commodity market considered. For simplification, we assume that the supply quantity is given by the production quantity; hence, we neglect subsistence consumption of producers. We should draw from these figures an expected average supply quantity for the current year which would be the baseline or reference scenario for the policy simulations.

Demand quantity. In a similar way we can determine an expected average demand quantity for the current year, based on demand data for the last three to five years. Often, statistics do not directly show demand quantities, but the figures can be derived from production and trade statistics. The demand quantity is calculated as supply (or production) quantity plus import quantity minus export quantity.

Supply price. The supply price is derived from the world market price as explained above (see equations (2) and (4')). Hence, we need the following data input: world market price and the domestic price policy setting given by the protection rate, the producer tax rate, the VAT rate and the export VAT refund rate. In most of the markets considered we can neglect trade policies and (product-tied) producer taxes and just consider the VAT policy applied. The protection rate and the producer tax rate, then, would be zero; and, with information on the world market price, the VAT rate and the export VAT refund rate, we would get the supply price as shown in the example above and as automatically calculated in the Excel model.

Demand price. In a similar way we can calculate the demand price following equations (3) and (4').

World market price. World market prices can be available in trade statistics as “free on board” (fob) prices for exports or “cost, insurance and freight” (cif) prices for imports. If this information is not available the world market price can be calculated as a “trade unit price” defined as the trade value (export value plus import value) divided by the trade volume (export quantity plus import quantity). For most export-oriented Ukrainian agricultural markets we suggest simplifying and to calculate the “export unit price” given the export value divided by the export quantity. This would be the “fob” world market price for an export market. In a similar way the “cif” world market price could be calculated for an import market.

VAT rate. This information should be available from (fiscal) statistics.

Export VAT refund rate. This information should, also, be available from (fiscal) statistics.

Elasticity of supply. In the best case, supply elasticities have been estimated in a recent study. Sometimes, analogous values can be considered drawing on older studies or figures from similar

commodities, regions and/or countries. A “rough and dirty” way is to just assume some “inelastic” parameter value since many studies have shown that agricultural elasticities of supply are rather small.

Elasticity of demand. In a similar way the elasticity of demand must be determined.

Data base used for the calculations

The data base for the model calculations is shown in figure 4.2. The figures originate from calculations of the Institute of Agrarian Economics of NAAS based on the data from the State Statistics Service of Ukraine (see specific notes).

Figure 4.2: Data base for the VAT market model for Ukrainian agriculture ⁶

Data base for the VAT market model for Ukrainian agriculture									
Market	Supply quantity ^a	(Net) export quantity ^{a, b}	Demand quantity	World market price ^c	World market price ^c	Protection rate	Producer subsidy rate	VAT rate	Export VAT refund rate
	(MM t)	(MM t)	(MM t)	(USD/t)	(UAH/t)	(%)	(%)	(%)	(%)
Wheat	26.80	18.00	8.80	210,00 ^d	5775	0%	0%	20%	100%
Barley	8.10	4.30	3.80	225.00	6188	0%	0%	20%	100%
Maize	31.30	24.60	6.70	168.00	4620	0%	0%	20%	100%
Soybean	4.30	2.10	2.20	360.00	9900	0%	0%	20%	40%
Rape seed	3.50	3.20	0.30	425.00	11688	0%	0%	20%	50%
Pea	0.97	0.80	0.17	230.00	6325	0%	0%	20%	100%
Nuts	0.12	0.09	0.04	1445.00	39738	0%	0%	20%	100%
Poultry meat	1.35	0.26	1.09	1450.00	39875	0%	0%	20%	100%
Oil (sunflower, soybean, rapeseed)	6.20	6.00	0.20	700.00	19250	0%	0%	20%	100%

⁶ a) Estimated 2019 values according to the forecast of production volumes for 2019, made by the Institute of Agrarian Economics of NAAS

b) Export minus import. Import neglected for all products except poultry meat.

Estimated 2019 values of the export and import volumes according to the forecast of the Institute of Agrarian Economics of NAAS on the basis of assessment of existing trends (based on official data of the State Statistics Service of Ukraine: <http://www.ukrstat.gov.ua/> / Economic Statistics / Foreign Economic Activity / Foreign Trade in Specific Products by Countries of the World)

c) As of the end of 2018. According to the current price situation in agrarian markets as of the end of 2019 (according to official data of the State Statistics Committee of Ukraine regarding the level of export prices)

d) Free on board (fob) price.

Source: Own compilation and calculations based on the production forecast for 2019, made by the Institute of Agrarian Economics of NAAS (on the basis of projected crop area and projected crop yields / expected livestock and poultry productivity). Estimated 2019 prices are formed on the basis of evaluation of the current price situation in the relevant markets on the basis of statistical data of the State Statistics Agency (section "Foreign Economic Activity" / Foreign trade in certain types of goods by countries of the world)

4.3 Baseline scenarios for the wheat and soybean market

The Excel model developed can be used to analyse price interventions on agricultural markets in Ukraine and VAT policies, in particular. In its basic version 1.0 a specific Ukrainian VAT policy particularity is explicitly considered: the export VAT refund policy. The modelling starts from baseline scenarios for markets considered. Such baseline scenarios describe the present situation with respect to market data and the policy framework. We will carry out scenario calculations for various VAT policy options and discuss the implications of these policy options as compared to these baseline scenarios.

In this chapter we describe the baseline scenarios for the wheat and the soybean market. The supply quantity is 26.8 m tons and, given the export quantity of 18.0 m tons, a demand quantity of 8.8 m tons can be calculated. The world market price is given by the fob price of 210.00 USD/ton and the VAT policy is characterised by a 20% VAT rate and a 100% export VAT refund rate. We remember that this is the “classical” consumer tax case. We assume inelastic supply and demand with an elasticity of supply of 0.3 and an elasticity of demand of -0.4. Based on this data input the domestic market price is equal to the world market price of 210.00 USD/ton and this, also, is the supply (=producer) price. The demand (=consumer) price of 252.00 USD/ton is 20% higher than the domestic market price.

Based on these “starting” values the other market variables are calculated., e. g. producer revenue of 5.6 bn USD, consumer expenditure of 2.2 bn USD and foreign exchange earnings of 3.8 bn USD. The government budget due to the VAT is calculated to be 370 m USD, with 1126 m USD VAT revenue collected from the producers and 756 m USD export VAT refund paid, and this is equal to government’s total budget since there is no other price policy intervention. The VAT tax burden is born by the consumers alone since we consider the case of a “classical” consumer tax.

The baseline scenario for the Ukrainian soybean market is visualised in figure 4.3 (see annex 2, Excel model, version 1.0). The supply quantity is 4.3 m tons and, given the export quantity of 2.1 m tons, a demand quantity of 2.2 m tons can be calculated. The world market price is given by the fob price of 360.00 USD and the VAT policy is characterised by a 20% VAT rate and a 40% export VAT refund rate. Hence, this market is characterised by a partial export VAT refund policy. As for wheat, we assume inelastic supply and demand with an elasticity of supply of 0.3 and an elasticity of demand of -0.4. Due to an only partial VAT refund for exports, we, now, get a domestic market price below the world market price with 321,43 USD/ton. This is the relevant producer price whereas the world market price is 20% above the domestic market price and is 385.71 USD/ton. Hence, as a consequence of this VAT policy situation, we get a taxation both of consumers and of producers, as compared to the world market price level.

Consequently, a producer revenue of 1382 USD, a consumer expenditure of 849 USD and foreign exchange earnings of 756 m USD can be calculated. The government budget due to the VAT is calculated to be 222 m USD and this is the result of 276 USD VAT revenue collected from producers and 54 m USD export VAT refund paid. The government’s total budget due to the VAT equals its total budget since there is no other price policy intervention. The VAT tax burden, now, is born both by consumers and producers. The consumer taxation is 57 m USD and the producer taxation 166 m USD. Hence, the “Partial export VAT refund policy” reduces the tax burden for consumers and shifts the

burden to producers. It can, easily, be calculated, by changing the export VAT refund parameter, that a “classical” consumer tax on the soybean market ($\alpha = 1$) would result in a total budget of 151 m USD (= consumer taxation) whereas a “No export VAT refund policy” ($\alpha = 0$) would yield a budget of 253 m USD (= producer taxation).

Based on these baseline scenarios the implications of VAT policy changes in fact, of any price policy changes) can be calculated. We will present such scenario calculations and simulations in chapter 5.

4.4 Integrating small farms VAT exemption into the model

Following our theoretical discussion on the implications of VAT exemption for small farms we extend the wheat market model and integrate the VAT exemption into the modelling approach. We have captured some basic features in the model which are: production share of small farms and their share in the domestic market/consumption; implications on the price formation process; and the occurrence of rents. As a result, the basic market design is adjusted and the formulation and calculation of market variables has to be adjusted accordingly. The new Excel model with the baseline scenario for the Ukrainian wheat market (Wheat market model, version 2.0) is visualised in figure 4.4 (see annex 3). The changes of the modelling framework and the model properties are explained in this chapter.

As compared to the basic version the model requires additional information which is visualised by the orange cells and a new “Smalls farms parameters” section. The model requires a split into the two producer groups and redefining and calculating market variables for both producer groups separately. The model becomes “bigger”. Obviously, the aggregation must lead to the same market variables like supply, demand and export quantity as in the basic model. The key implications of the model relate to distributional aspects such as changes of the government budget and changes of taxation and (real) income for producers (i.e. for both producer groups) and consumers. From a modelling perspective, the distributional features of the model developed are emphasised.

It has been argued that the price formation process in the market, basically, is the same as before. Thus, the world market price, the protection rate and the export VAT refund rate (for the large farms) determine the domestic market price as shown in equation (4') and this is the domestic market price for both producer groups and consumers. As without VAT exemption for small farms the domestic market price is 210.00 USD/ton. Also, the supply price for both producer groups is the same piece as before (210.00 USD/ton), equalling to the world market price and, with a VAT rate of 20%, the demand price is 252.00 USD/ton.

Based on these price data and bearing in mind the production share of 30% we have calibrated two separate supply functions; the demand function is the same as before. Taking further into account a domestic market share of small farms of 60%, the quantities sold in the domestic market (not visualised in figure 4.4 (see annex 3)) and the export quantities can be calculated for both producer groups. Small farms exports amount to 2.8 m tons and large farmers exports to 15.2 m tons, adding up to a total export quantity of 18.0 m tons.

It has been argued that the occurrence of rents is a key feature of small farms VAT exemption. The rent in the domestic market is due to domestic sales of small farms and the VAT revenue forgone in this market; the rent in the export market originates from a lower domestic market price (due to no or partial export VAT refund for large farms), as compared to the world market price, and small farmers exports; and the rent for potential export VAT refund for small farm exports (in case of a wrong declaration) depends on the export VAT refund, small farmer exports and a (wrong declaration) export VAT refund share for these small farms exports. The three rent components, equally, constitute government VAT budget losses as compared to a full integration of small farms into the VAT system. We get

$$(11) R^{Domestic} = v p \beta q^d$$

where $R^{Domestic}$ - Rent in the domestic market due to small farms VAT exemption, β – Domestic market share of small farms,

$$(12) R^{Export} = (1 - \alpha) v p (q_{small}^s - \beta q^d)$$

where R^{Export} - Rent in the export market due to small farms VAT exemption, the subscript “small” denotes small farms, and

$$(12) R^{Refund} = \gamma \alpha v p (q_{small}^s - \beta q^d)$$

where R^{Refund} - Rent in the export market due to small farms export VAT refund (in case of wrong declaration), and γ – Export VAT refund share.

For the existing VAT system and with small farms VAT exemption, we calculate a rent in the domestic market of 221.8 m USD. The rent in the export market is zero (since there is no depression of the domestic market price due to full VAT refund for exports). With respect to the rent in the export market due to small farms export VAT refund (in case of wrong declaration), we have, arbitrarily, assumed an export VAT refund share (“wrong declaration” share) of 10%, resulting in a “refund rent” of 11.6 m USD. The total rent due to small farms VAT exemption amounts to 233.4 m USD and this is the government’s budget loss due to VAT exemption policy.

This rent is distributed to the private sector. Small farms and consumers share the domestic market rent and small and large farms share the rent in the export market for small farms and the “refund rent”. Due to a lack of information about the size of the shares, we have assumed equal shares of 50% for all cases. We get a rent profit of 116.7 m USD for small farms, 5.8 m USD for large farms and 110.9 m USD for consumers.

Government’s total VAT budget under the present VAT policy, due to the rent described, is 136.3 m USD and this is 233.4 m USD less than without VAT exemption for small farms. The rent profit, on the other hand, reduces consumer and producer taxation. We get a consumer taxation of 258.7 m USD and a negative taxation (= (indirect) subsidisation) of small farms (116.7 m USD) and of large farms (5.8 m USD):

The rent profit, equally, increases producer revenue and reduces consumer expenditure in the private sector and, thus, is a (real) income increase for producers and consumers according to the rent received (as indicated by the change in producer and consumer surplus).

It can also be observed that the welfare level does not change due to small farms VAT exemption. This is not surprising since the producer price and the consumer price do not change as we have argued. Economically speaking, this is a pure internal distribution game or a “zero sum game”. The implications for welfare, certainly, have to be taken into account if intervention policy changes the producer and/or the consumer price e. g. in case of an export VAT refund reduction.

It is another story that the emergence of rents due to government’s intervention in a market provides incentives for capturing these rents instead of looking at efficiency and competitiveness. Such a “rent-seeking” behaviour as it is called, certainly, binds economic resources and, thus, reduces welfare. The occurrence of rents, certainly, is a problematic feature for policy evaluation. Unfortunately, we cannot address this problem in the modelling framework, but we can reveal it and describe its dimensions as we have tried discussing the small farmers VAT exemption problem in this chapter. We will come back on this problem addressing the assessment of VAT policy options and recommendations in chapter 6.

The implications of a VAT system change can, easily, be calculated. We have analysed a VAT rate reduction to 7%. The results for this VAT scenario ($v = 7\%$, $\alpha = 100\%$) are shown figure 4.5 (annex 4).

We have also looked at the implications of an export VAT refund rate reduction to 50 % (with the present VAT rate of 20%); the VAT scenario is given by ($v = 20\%$, $\alpha = 50\%$). The results of these scenarios are shown in figure 4.6 (annex 5). Selected results of these scenario calculations are summarized in figure 4.7 (annex 6).

The calculations show the price and quantity effects for these VAT policy scenarios as expected from our discussion. The rent goes down with a VAT rate reduction to 7% and somewhat increases for an export VAT refund rate reduction, mostly due to rent changes in the domestic market. Government’s budget goes down with a VAT rate reduction and, considerably, increases with an export VAT refund rate reduction. This is due to a shift from consumer taxation to producer taxation and the large farms, in particular, and the higher taxation potential on the supply side as compared to the demand side. The (real) income effects for producers and consumers are straightforward. Welfare changes are plausible. There is a welfare increase for a VAT rate reduction since this VAT policy change reduces distortions on the demand side. With a VAT refund rate reduction, there is not a big welfare change: There are less distortions on the demand side, but there are new distortions on the supply side, due to a lower domestic market and supply price below the world market price.

In a similar way the model can be used to carry out scenario calculations and simulations for various VAT and other policy options of interest. We will discuss such policy options in chapter 5

5 Ukrainian VAT policy scenarios and their consequences

Policy options

There are several VAT policy options which are currently being proposed and discussed as part of the debate on taxation and agri-food sectoral support. The key agri-food sector VAT policy scenarios, their proponents and key arguments are set out below followed by the key outcomes of their modelled or projected implementation (see following figure 5.1 VAT scenario calculations for the Ukrainian wheat market in annex 7):

SCENARIOS

I Public administration bodies in the sphere of public finances

Proposed policy change

Propose changing the VAT regime for the export of primary agricultural products by cancelling 0 rate and implementing exemption regime on export of primary agricultural products (i.e. no VAT refund on agri-products for export operations).

Rationale of stakeholder

To maximise VAT revenue and to stimulate domestic processing of primary agricultural products and thus extension of the value added further along the value chain i.e. to include processed products, by disincentivising the export of primary products.

Project team comment on rationale

Whilst budget revenue will increase, a reduction in producer price does not necessarily result in a change in the producer price ratio between selling to domestic processors and exporting. That depends on the market reaction for these products. Only if the producer price ratio changes in favour of processed commodities there may be an incentive for value chain development.

Economists are rather sceptical with respect to price interventions on markets to push the value chain. The distortions and welfare losses created are real, but the intervention may not lead to dynamic chain improvements as expected.

➤ Scenario I a. No export refund on primary agricultural production

All scenario implications as discussed here are depicted in figure 5.1 (annex 7).

Consequences

- Domestic prices will be depressed.

e.g. Wheat

Price with refund: 210,00 USD/ton

Price without refund: 175,00 USD/ton

- Budget revenue will increase.

Rev with refund: 136,25 m USD

Rev without refund: 621,65 m USD

- Domestic consumption will increase - final consumption

Consumption with refund: 8,80 m tons

Consumption without refund: 9,47 m tons

- Export volume will decrease (because production is decreasing, and domestic consumption is increasing).

Export volume with refund: 18,00 m tons

Export volume without refund: 15,91 m tons

- Welfare (economic income) roughly stays the same. Whereas this scenario results in welfare gains on the consumption side it induces new welfare losses on the production side. The efficiency losses in production are due to lower producer prices as compared to export VAT refund in the baseline scenario or under free trade.

Conclusions

- This scenario switches the VAT system from a consumer taxation to a producer taxation.
- Consumers benefit from a reduced consumer price.
- Removing the export VAT refund reduces the input price and is equivalent to a subsidy for those industries which consume those raw materials e.g. livestock and oil processors. However, their output price may change according to the VAT system applied and market price changes. In an open economy where producer prices for processed products are determined by world market prices, producer prices for the processing industry will not change, but they will decline in closed domestic markets.
- This is not an efficient way to promote processing (e.g. infant industry argument) and it has been proven around the world that it is not an appropriate long-term instrument for promoting domestic processing.

➤ **Scenario I b**

As a compromise between Agrarian Committee, NGO's and agricultural producers the above scenario is slightly amended (as with soybeans and rape seeds) leading to the below variation:

No export refund on primary agricultural products except where exported directly by the producer (i.e. no export refund for traders)

Rationale of stakeholder –

Traders have in the past claimed the majority of VAT refund and therefore by removing this possibility the VAT revenue will increase. There has also been an assertion that traders have been overclaiming the VAT refund.

Project team comment on the rationale

Preventing traders from full participation in agri-food export will lead to a distortion. There are other ways to deal with the overclaiming including by making the systems more transparent and less susceptible to manipulation e.g. through electronic means.

Consequences

- Domestic price will be depressed but not as much as with zero-refund.

e.g. Wheat

Price with refund for traders: 210,00 USD/ton

Price without refund for traders: 187,50 USD/ton

- Budget revenue will increase but not as much as with zero refund

Revenue with refund for traders: 136,25 m USD

Revenue without refund for traders: 459,87 m USD

- Domestic consumption will increase but not as much as with zero refund

Consumption with refund for traders: 8,80 m tons

Consumption without refund for traders: 9,21 m tons

- Export volume will decrease but not as much as with zero refund

Export volume with refund for traders: 18,00 m tons

Export volume without refund for traders : 16,70 m tons

- As with the no export VAT refund scenario welfare (economic income) roughly stays the same. The scenario results in welfare gains on the consumption side and it induces new welfare losses on the production side due to lower producer prices.
- As with the no export VAT refund scenario this scenario switches the VAT system from a consumer taxation to a producer taxation.
- Equally, consumers benefit from a reduced consumer price.
- Small and medium farmers which can't export themselves and decide to or have no choice but to export through traders, will bear the cost (receive a lower price) as they cannot get world market price. However, this will depend on the market channels available for small and medium producers.
- The scenario will be equivalent to a subsidy (reduced compared to the 1a) for those industries which consume those raw materials e.g. livestock and oil processors.
- Traders margins probably won't be affected (due to market power) as they reduce the price to the farmers to compensate the VAT
- Competition between traders and agri-holdings (both can export) will be undermined (rents for agri-holding's will be created) and agri-holdings have advantage because they get refund

➤ II Agricultural producers and their representatives

Proposed policy change

Propose reducing the VAT rate on agri-food products

Stakeholder Rationale

- To reduce food prices due to the VAT factor, ensuring the availability of food in conditions of low purchasing power of the population.
- To lengthen the value chain, increasing jobs, ensuring the availability of food
- To improve Ukrainian agri-food sector competitiveness

Project team Comment on Rationale

Food prices will go down and consumption goes up. Everything beyond price prediction is based on assumptions and can't be predicted. Definitively, consumer prices will go down but there can be no expectation of any effects on jobs and the value chain.

The producer price would not change.

Low consumer price is beneficial for consumers and relatively more beneficial for poorer consumers, but this instrument is not targeted and there are better instruments or direct social income transfers no food security programme talking about VAT

Consequences

- Demand price sinks

20 % VAT rate: 252,50 USD/ton

7% VAT rate: 224,70 USD/ton

Supply price not affected

20 % VAT rate: 210,00 USD/ton

7% VAT rate: 210,00 USD/ton

- Supply quantity not affected

20 % VAT rate: 26,80 m tons

7% VAT rate: 26,80 m tons

- Consumption increases

20 % VAT rate: 8,80 m tons

7% VAT rate: 9,21 m tons

- Exports decrease

20 % VAT rate: 18,00 m tons

7% VAT rate: 17,59 m tons

- Tax revenue decreases

20 % VAR rate: 136,25 m USD

7% VAT rate: 50,48 m USD

Conclusion

Welfare will increase by 11,56 m USD due to reduced distortions on the consumption side.

➤ **Scenario II a. Reduced VAT rates for selected agri-food products (throughout the supply chain)**

Consequences

- Price for consumer decreases on selected products.
- Exports of selected products will decrease.
- More of selected products will be consumed domestically.
- Fiscal revenues will be reduced.

Conclusions

- Selective VAT changes is an intervention in (relative) prices for consumption. E.g. if VAT is decreased on poultry then consumption of beef will decline due to cross price elasticity – i.e. other sectors will be affected negatively.
- Price is reduced for everyone – rich and poor. E.g. VAT reduction for meat is a subsidy for rich rather than poor due to higher meat consumption.

➤ **Scenario II b**

Reducing the VAT for part of the value chain for certain value chains (e.g. wheat, milk)

Stakeholder rationale: To reduce the costs of inputs and accordingly the price for final consumer

e.g. What will be the impact on the various stakeholders e.g. enterprises, state budget, retail and consumer if a reduced rate is applied inputs to but final products are charged at the standard rate?

Consequences

- This will reduce the VAT revenue
- It will not change the net economic calculations along the value chain and will therefore not impact on the other value chain stakeholders including producers, processors or consumers as long as the VAT rate on the final product remains the same.

We cannot model such a scenario with our current modelling approach. The implications of a production subsidy (output subsidy) and an input subsidy are different and are modelled in a different way. The producer subsidy is already integrated in our model (negative producer tax) whereas an input subsidy has to be modelled as a supply curve shift.

Conclusions

A regular VAT system is producer-neutral and in such a system there will be no effect due to a VAT differentiation policy along the value chain.

➤ **Scenario III Traders**

Propose and support a unified approach to the application of the VAT regime to all agri-food market operators for domestic sale and export of all agricultural products.

Stakeholder rationale

Differentiated approach is discriminatory and disadvantageous to them.

Project team comment on rationale

Differentiated approach has a negative approach not only for them, but for the whole economy

Scenario: Single VAT regime applied to all agri-food market operators

This is the current situation as indicated in the baseline scenario. Changing the status quo through the above proposed scenarios favours one or other of the stakeholders, whereas this scenario is the optimum for general economic development with minimum market distortion.

6 Conclusions and Recommendations

Scientific background

Any policy assessment starts with policy objectives pursued. A “good” policy contributes to policy objectives whereas a “bad” policy moves away from them. Policymaking should aim at attaining the objectives pursued and policymakers should explain and justify that their policy does so. In other words: Policymaking should be goal-oriented and problem-solving.

Certainly, real policy-making and politics is much more than problem-solving (in view e.g. of power and lobbyism, preservation of interests, majority-seeking and legitimation, symbol politics and populism; it is an old debate in economics “why policy-making is as it is and not as it should be”). But here we focus on problem-solving.

It is a subjective and, thus, a value judgement which objectives should be pursued in policymaking. In a democratic system, policy objectives will develop in a democratic process and should, broadly, reflect the objectives of the society. Scientists may have their own opinion about objectives as citizens and play their role in the democratic process, but they do not have a special authority for saying what policy objectives are “right” or “wrong”.

Scientists can, however, do a lot to support goal-oriented policy-making and problem-solving:

- A key task is to show the implications of policies on the objectives pursued.
- Scientists can compare different policies and show their relative excellence or “comparative advantage” to attain the objectives.
- They can reveal “trade-offs” between different policy objectives and “costs” of policies.
- And they can provide approaches to deal with multiple objectives in policymaking.

A modelling approach as used in our analysis can help to explicitly address the features of a policy-making problem and reveal interdependencies and policy implications. A quantitative modelling approach, in particular, sharpens the view on quantitative effects of policy interventions and changes.

Economics and taxation systems

There is a widespread view (i.e. value judgement) among economists and far beyond that policymaking should affect economic activities and markets as little as possible to ensure efficiency, welfare and economic growth.

Basically, this claim refers to economic activities on markets: consumption, production and trade. Hence, there should be no trade intervention and the free trade paradigm, and the WTO mission are well-known; and there should be no taxation and/or subsidisation of domestic consumption and/or production.

Note: This basic claim does not mean that economic policymaking becomes superfluous in a market economy. On the contrary: There is a genuine responsibility for economic policymaking in market systems to ensure proper framework conditions for markets and to support market development. The idea is just not to misunderstand economic policymaking as direct market intervention (“you should not slaughter the cow that you wish to milk”).

Of course, there is much to do for policymaking beyond economics in any country, and often the framework conditions for the economy have to be addressed explicitly (e.g. internalising negative environmental or climate effects). We will not elaborate on this broader view of (agricultural) policymaking here; it may be sufficient to note, for our purpose, that a strong economy will be a good basis for policymaking in any case and economic and tax policymaking should not undermine this basis.

Another widespread view is that any policy intervention should be as simple and transparent as possible. Market interventions, in particular, may induce incentives and/or disincentives creating economic distortions and rent-seeking behaviour. The design of a taxation system should avoid such negative economic implications.

Against this background a taxation system should affect economic activities as little as possible but should rather focus on the results of economic activities. This is why the taxation of income (and a complementary social support system) is generally considered as a first-best choice for a tax system.

The recommendation is clear: When talking about taxation in a country the starting point should be the implementation and functioning of a proper income tax and social security system (a key point for the Ukrainian taxation and VAT discussion that we do not pursue here).

On the other hand, there are exemptions and limits for an income tax and social security system:

- High income taxation may reduce economic activities and investments.
- High income taxation may result in tax emigration of entrepreneurs.
- Due to these limitations, income taxation cannot arbitrarily be extended, but should be designed in a thoughtful way (whatever that means in a specific country context).
- As a consequence, income taxation may not be sufficient to finance public expenditures and has to be complemented by other taxes.

Note: The income tax, originally, is a personal tax taking into account profit/income of entrepreneurs who own and run private companies. The income tax system in Germany e.g. is based on a uniform taxation of all incomes from various sources (including income from agriculture). Major principles are special personal deductions; tax free allowance; progressive tax rate. There is no income tax exemption for small entrepreneurs. Small agricultural entrepreneurs, however, may opt for a simplified income tax calculation using taxation flat rates for cultivated land and livestock units.

In economic systems with corporate companies the personal income tax system is generally supplemented with a corporate income tax system (with various special features).

In many countries the income tax raised is not sufficient to cover public expenditures. Often, the income tax is complemented by a VAT system.

VAT characteristics

The VAT is conceived to be a consumer tax and to be production-neutral.

Entrepreneurs, typically, collect VAT payments for sales and pay VAT for inputs; and they calculate and transfer the balance to fiscal authorities. Hence, the VAT is an administrative burden for them, but their net calculations and business decisions are not affected.

The VAT system implies that taxation addresses the value added in an economy, and this is where the "VAT" name comes from. In case of no inputs the final output would be equal to the value added and government's VAT revenue would be equal to final consumers' VAT payments.

The implications of a VAT, as compared to free trade, are as follows:

- Consumer prices increase; market and producer prices are not affected.
- Consumption goes down and exports and foreign exchange increase (due to reduced domestic consumption).
- Government's VAT revenue is equal to consumer taxation, and consumers' income reduces, correspondingly.
- There are no further impacts for producers (apart from VAT administration costs).
- There is an overall income/welfare loss for the country (often called economic distortions).

Note: Consumer taxation occurs when consumer prices increase due to market policy intervention as compared to free trade whereas producer taxation occurs when producer prices decrease, correspondingly.

The VAT is a clear violation of the general principle discussed above that a taxation system should affect economic activities as little as possible and not directly address economic activities. In this case, consumption is negatively affected creating distortions on the consumption side. It is a widespread view (i.e. value judgement) that such a policy intervention is necessary for fiscal reasons and less detrimental than policy interventions with respect to trade and/or production.

There is no doubt, on the other hand, that the VAT is a regressive tax i.e. taxing poor people - relatively - more than rich people since the consumption share in income of poor people tends to be higher.

According to the general taxation principles discussed above a VAT system should be as simple and transparent and include as many economic actors as possible to avoid economic distortions and rent-seeking behaviour. This suggests a uniform VAT rate at all levels and for all enterprises.

A VAT rate reduction will have the following implications, as compared to the original VAT rate:

- Consumer prices decrease and consumption goes up.
- Exports and foreign exchange decrease (due to increased domestic consumption).
- Government's VAT revenue and consumer taxation go down; and consumers' income increases, correspondingly.
- Market and producer prices are not affected. There are no further impacts for producers.
- There is an overall income/welfare gain for the country.

VAT objectives and trade-offs

The primary objective of a taxing system is to raise money for government activities. An income tax addresses the result of economic activities whereas a VAT directly taxes an activity i.e. consumption.

The fiscal effects of market intervention policies are straightforward. Government may affect consumption, production and/or trade and there will be a budget gain whenever consumer prices

increase above world market prices due to government policies and/or producer prices decrease below world market prices, correspondingly. Hence, the simplest and most effective way to raise government's budget is to tax both consumers and producers.

Note: Multiple market intervention policies may be more sophisticated and complex, but the distributional implications are the same. Hence, an export tax would bring down the domestic price resulting in consumer subsidisation and producer taxation. If a consumer tax and an export tax are combined, the result will be a producer tax with no effect on consumers, as compared to free trade.

From the point of view of consumers, a VAT reduces their income. Hence, the VAT rate should be as low as possible.

In many countries reduced VAT rates for food are implemented for social and food security reasons. In Germany e.g. the VAT rate for food is 7% as compared to the normal VAT rate of 19%. In view of consumer effects of a VAT as discussed above this is a valid policy approach.

However, the following arguments should be considered:

- The VAT is a regressive tax anyway. A first-best policy approach to deal with food security would, therefore, be to change the taxation policy away from consumer taxation to a proper income tax and social support system.
- Within a given taxation system, more direct policy approaches to enhance food security instead of addressing VAT rates are typically recommended. Such policies refer to food supply and availability, to income support and transfers, to direct food consumption support like "food stamps" in the US, or to food consumption stabilisation. There is a widespread international experience on effective food security policies beyond market intervention.
- More effective food security policies may require an appropriate governance framework which is often missing in a developing country context. In this case, a reduced VAT rate may in fact be the only available and realistic food security policy approach.
- The situation is different in more developed countries. In Germany, e.g., there is a widespread view today that reduced VAT rates for food should be abolished because they are no longer justified for food security reasons. On the contrary: Higher VAT rates might be considered for some agricultural commodities for health and climate reasons (e.g. sugar, meat).

From the point of view of producers, a VAT does not have any impact. In an open economy with trade, domestic prices and producer prices are determined by world market prices and the VAT does not have any impact on these prices. Hence, a VAT does not affect producers' income.

There is a widespread misunderstanding of VAT implications on producers (originating from a historical closed economy view on markets): Whereas reduced VAT rates for food may enhance domestic consumption (and, thus, increase imports and/or reduce exports), these effects will not impact on producer prices, production and producers' income.

In economics the welfare objective (and i.e. the overall (real) income of the people in a country) plays a dominant role (which is understandable since economics has to do with making the best use of a country's resources for the well-being of people), but is a value judgement, nevertheless. The key paradigm is that free trade maximizes welfare. If domestic prices deviate from world market prices, welfare losses occur ("distortions").

Hence, a VAT results in welfare losses since consumption decreases below the free trade level. A reduction of the VAT rate will thus increase welfare.

A trade-off occurs when a policy enhances one objective at the cost of others. We could equally speak of a conflict which is typical for real life policymaking (though often neglected or not openly addressed by policymakers). Remind Friedman's "there is no such a thing like a free lunch".

A VAT marks a conflict between consumers' income and government's budget revenue and, equally, implies a trade-off between fiscal revenue and welfare. A VAT reduction enhances income of consumers and of the whole economy at the cost of fiscal revenue.

Other policy objectives may be relevant for VAT policymaking though addressed to a less extent in public debates. An example: A VAT results in increased exports (or decreased imports) and increased foreign exchange earnings (or decreased foreign exchange expenditures) due to decreased domestic consumption, as compared to free trade.

Sometimes, some more indirect effects of a VAT are addressed, however, the reasoning often remains vague. A VAT reduction e.g. will increase consumers' income and this may possibly stimulate demand and growth in a region and/or stimulate rural development (may happen, but difficult to assess). Some people expect positive effects of a VAT reduction on the labour market and for value chains. However, such implications are rather unlikely. Interdependencies between production and factor markets certainly exist, but these links relate to technology and producer and/or factor prices. It is not obvious how a VAT change could affect these variables. Also, a VAT system is producer-neutral and value chain effects cannot be expected (we come to this aspect later).

We would like to state: When discussing the implications of a VAT or a VAT change it is straightforward and important to start with obvious and direct effects before speculating about more indirect and vague effects. The VAT is a market intervention policy and this is why an analysis of this policy instrument should start with a market analysis as suggested in our modelling approach.

No VAT refund for exports

The VAT is conceived to be a consumer tax and production-neutral. This requires VAT refund in case of exports (if the VAT is collected from producers which is, typically, the case). If there is no VAT refund for exports, government's VAT policy, actually, turns into a double tax: a consumer tax and an export tax.

No VAT refund for exports will have the following implications, as compared to full export VAT refund:

- Domestic prices, consumer prices and producer prices decrease.
- Consumption goes up and production goes down.
- Exports and foreign exchange decrease (due to increased domestic consumption and decreased domestic production).
- Consumer taxation goes down to zero and producers are taxed instead.
- Government's VAT revenue goes up since the taxation base is larger (production instead of consumption).
- There are welfare gains on the consumption side and welfare losses on the production side. The overall income/welfare change will be small.

Note: A VAT system with no export VAT refund corresponds to a producer tax. The "No export VAT refund policy" switches the VAT system from a consumer tax to a producer tax and, thus, from consumer taxation to producer taxation.

In a VAT system with no VAT refunds for exports, a VAT rate reduction will have the following implications, as compared to the original VAT rate:

- Consumer prices are not affected and there will be no effect on the consumption side.

- Producer prices increase (because the “producer tax” decreases) and production goes up.
- Exports and foreign exchange increase (due to increased domestic production).
- Government’s VAT revenue goes down and producer taxation does so, correspondingly.
- Income/welfare for the country increases due to less distortions on the producer side.

Things become more complex if the government applies partial VAT refunds for exports. In fact, this would be a mixture of both VAT tax systems considered. This is not an artificial theoretical assumption but rather seems to be a conceivable policy option in view of ideas to partially reimburse the tax for exports.

To look at the consequences, imagine for a moment that the government starts from a “No VAT refund for exports policy” and gradually increases the refund rate from zero to hundred percent. The market price and, thus, the producer price would, gradually, move up in this case, but the consumer price would also go up above the world market price. In the end, with such a system change, we would switch from a “producer taxation VAT system” to a “classical” “consumer taxation VAT system” as discussed above.

We have modelled the specific feature of full, partial or no export VAT refunds in the Ukrainian VAT system in the Excel based VAT market model version 1.0.

A variation of the export VAT refund topic is a policy to refund VAT only for parts of exports and/or parts of exporters (like refunding VAT only for exports from producers and not for traders; soybean market)

It is difficult to assess the implications of such a VAT system. Basically, the behaviour of the various actors in the market and export channels and their reactions to the specific policy incentives/disincentives must be analysed. This is more than ambitious for scientific analysis, but also for policymaking, to say at least; moreover, policymaking should not be based on rather vague ideas and speculations on market implications.

One implication is that VAT policymaking should not create arbitrary incentives and/or disincentives and induce rent-seeking in a market, but create a simple, transparent and controllable market policy framework for all actors involved. We will come back to this point later.

Another implication is to try to assess the implications of such a VAT system in a simplified way to get at least an idea of potential implications. The guiding idea of the analysis is that all market policy interventions will result in price effects. For a “Partial VAT refund for exports policy” as discussed here we assume a resulting domestic price level somewhere between the world market price (with full export VAT refund) and the lower domestic price level with no export VAT refund. The implications of a partial VAT export refund as compared to no refund would then be somewhat less accentuated, but basically be the same as discussed for no VAT refund for exports.

We have modelled this specific feature of differentiated export VAT refunds in the Excel based VAT market model for the Ukrainian soybean market (version 1.0).

VAT exemption for small farms

Many countries exempt small enterprises from the VAT system. These enterprises do not have to make VAT declarations, and they cannot indicate and collect VAT for sales. This is an administrative simplification for small enterprises and tax offices. However, these enterprises usually have to bear VAT payments for inputs.

In many countries small farms and sometimes even all farms are exempted from the VAT system due to political reasons.

It is difficult to assess the implications of small farms exemption of the VAT system. Basically, the behaviour of small farmers and the various actors in the market and their reactions to the VAT exemption policy must be analysed. The starting point for the analysis is to look at what happens on markets and to prices. There are various possibilities. Small farmers may sell their products through markets that are subject to the VAT system or they choose to sell their products through separate market channels. Sometimes, markets are classified as “official” or “grey”, “shadow” or even “black” markets accordingly, but this is a rather value-based wording; we prefer just to speak of “VAT markets” and “non-VAT markets”. Of course, a mixture of both market channels for small farms will be observed in reality. Thorough empirical research is necessary to investigate what really happens in these markets with small farms VAT exemption.

With limited information available, simplifying assumptions can help to get at least an idea on the implications of small farms VAT exemption. We assume that there are in fact two separate markets and small farms sell their products through their own market channel (which is a quite typical situation in a developing country and rural development context with little market organisation and/or control). We also assume that prices are determined on “VAT markets” according to government’s VAT policy as described above (which is reasonable if these markets constitute a major part of the economy). The prices on these markets then mark the scope for economic activities on “non-VAT markets”.

A key feature of small farms VAT exemption is the occurrence of rents (or transfers). Economists understand rents as income without consideration; rents do not affect economic activities like consumption, production and trade (but they certainly induce rent-seeking behaviour, to be discussed later); they simply redistribute income due to the specific institutional setting in a market.

In a VAT system with small farms VAT exemption, various rents may occur for the private sector and these rents correspond to government’s VAT revenue losses.

Three kinds of rents may occur:

- Domestic market rent. The rent occurs when small farmers sell their products on domestic markets (“street markets”). There is a margin between consumer prices on VAT markets (including the VAT) and producer prices and there will be a special market price on “non-VAT markets” between these two prices depending on local and/or individual negotiation and market power. Hence, the rent will be allocated among consumers and small farmers.
- Export market rent. The rent occurs when small farmers sell their products on export markets, if there is no or partial VAT refund for exports (on VAT markets). There is a margin between higher world market prices (what small farmers get for exports since they have not paid the VAT) and domestic prices (what other farmers and/or traders get for exports (since they have paid the VAT). However, small farmers may not be able to capture this rent, since they are probably not directly involved in exports. They will sell their products to other farmers and/or traders for export and will share the rent with them or even lose the rent to them.
- Export VAT refund rent. The rent occurs in a VAT system with full or partial refund for exports when small farms exports are wrongly declared resulting in export VAT refunds. As in the case of the export market rent, this rent will probably be shared with other farmers and/or traders or will be even passed on to them.

Small farms VAT exemption will have the following implications, as compared to no exemption (and in a system with full VAT refunds for exports):

- Domestic prices, consumer prices and producer prices are not affected.
- Consumption, production and trade quantities are not affected.

- There will be a domestic market rent and probably an export VAT refund rent (in case of wrong export VAT refund declaration); the rent is equal to the government's VAT revenue loss.
- The rent will be shared among consumers, small farmers and other farmers and/or traders (in case of wrong export VAT refund declaration).
- The rent reduces consumer and producer taxation (which in fact is an indirect subsidisation of small farms since they do not pay VAT); and it is possibly an increased VAT refund payment for other farmers and/or traders (in case of wrong export VAT refund declaration).
- The rent increases consumers' and producers' income, correspondingly, to the disadvantage of government's budget.
- There is no change in welfare.

In such a system with small farms VAT exemption, a VAT rate reduction will have the following implications, as compared to the original VAT rate (and in a system with full VAT refunds for exports):

- Consumer prices decrease and consumption goes up.
- Exports and foreign exchange decrease (due to increased domestic consumption).
- The domestic market rent and the export VAT refund rent (in case of wrong export VAT refund declaration) go down due to the reduced margin on markets. This is equal to a rent decrease for consumers and a subsidisation decrease for small farms (and for other farmers and/or traders in case of wrong export VAT refund declaration).
- Government's VAT revenue and consumer taxation go down.
- There is an overall income/welfare gain for the country.

It is difficult to assess the implications of VAT policy options in complex VAT systems like in Ukraine, including various export VAT refund options and small farms VAT exemption. Plausibility and intuition will not help to assess the implications in such a system properly. A thorough and systematic analysis, possibly based on explicit modelling, is necessary instead.

The Excel based VAT market model for Ukrainian agricultural markets (version 2.0) explicitly considers these features of the VAT system: full, partial or no export VAT refund and small farms VAT exemption.

We have argued that the specific features of the Ukrainian VAT system may create rents and induce rent-seeking behaviour in a market. The Excel based VAT market model cannot integrate and model such rent-seeking behaviour; but: It can reveal the rents involved and thus point to the dimensions of the problem.

Again, an immediate implication for policymaking is straightforward: VAT policymaking should avoid arbitrary incentives and/or disincentives and reduce rent-seeking behaviour in a market.

Promoting value chains by VAT rate differentiation?

There is an interesting proposal in the current VAT debate: VAT rates should differ between commodities to support value chains. Rates should be highest for primary commodities and lower for commodities along the value chain.

Input subsidisation and/or taxation may in fact influence cost structures and factor price ratios changing the incentives for production; however, a VAT rate differentiation policy will not do this. The "classical" VAT is a consumer tax and production-neutral. VAT payments of producers may thus be different for different VAT rates, but economic calculations and business decisions are not affected.

In a VAT system with payment exemptions, rent-seeking behaviour and/or administrative shortcomings things may be different and specific producer incentives may occur within the value

chain. However: This is rather a case for proper governance, VAT implementation and fiscal control than for value chain support policies.

There is quite some international experience on policies supporting value chains:

- Market interventions are, rarely, considered as first-best policy approaches to support value chains. The distortions and welfare losses created are real, but the intervention may not lead to dynamic chain improvements as expected.
- If production support policies are considered at all, this would be a case for proper investment policies (emphasising returns on public investments).
- Better: Value chain policies should focus on post-production (post-harvest) activities and directly support value chains. This refers to: quality management and assurance; market preparation and development; processing; logistics and distribution.
- Also: Policies to support collective action within value chains are particularly recommended in a development context emphasising: economies of scale; inclusion of small farms; market access; negotiation partner of retail chains.
- In general, the following policy instruments are typically recommended to support value chains: research and innovation policies; training and capacity building; public infrastructure support (laboratories, certification, transport and storage capacities); local infrastructure support (to develop local value chains); supporting institutions (for value chain management).

There is no unique policy concept or recommendation to support value chains in a specific country context.

To develop proper policies, value chains have to be analysed and bottlenecks and constraints have to be identified in a first step.

Small farms VAT exemption / exclusion:

- If small farms should be exempted or are excluded from the VAT system the implications should be clear (VAT revenue loss, occurrence of rents and redistribution among consumers, small farmers and other farmers and/or traders, no VAT payments refund for small farmers).
- A flat-rate VAT system for small farms as in several EU countries may help them getting rid of the VAT payment burden (notably supporting investing and growing small farms) but will further reduce government's VAT revenue.
- There is certainly an incentive for small farms to switch to a flat-rate VAT system or even to the regular VAT system to avoid VAT payments or a negative VAT balance, but this incentive is contrasted by the "registration" problem.

In fact: There is a widespread reluctance of small farmers to register as farmers showing a general distrust in economic policymaking. This problem overshadows VAT policymaking and other policy fields. Obviously, this is a key for economic problem-solving and policymaking. Some ideas and comments presented here on VAT policymaking and economic policymaking in general may contribute and be helpful to deal with and overcome the trust problem.

VAT enforcement, administration and control

Market interventions and price policies create incentives/disincentives for private actors on markets who try to avoid constraints and taxes and to benefit from policy gaps and subsidies. Hence, market intervention policies have to be enforced, properly administrated and controlled. This is true for a VAT system, too.

Economists call such activities of private actors due to market interventions rent-seeking behaviour. Rent-seeking is unproductive and ties up resources for distribution struggles; it does not contribute to overall welfare and growth but rather undermines these objectives. This is the key point why rent-seeking should be reduced in economic systems as far as possible. Policymaking can contribute to this objective by implementing a proper institutional framework for the economy; but also by not inviting private actors to rent-seeking behaviour through market interventions. And this is the point to be considered for VAT policymaking here.

We have addressed various special features of the Ukrainian VAT system for agriculture that may create rents and induce rent-seeking behaviour. A key policy objective for VAT policymaking would therefore be to develop the VAT system towards a less rent-seeking-oriented system.

Recommendations for policymaking on VAT in agriculture

- A (VAT) taxation system should be simple, transparent and enforceable/controllable.
- A VAT system has to balance fiscal requirements and negative economic distortions i.e. driving the economy into a “shadow” and “rent-seeking” economy.
- A uniform VAT rate would avoid many rent-seeking activities.
- Equally, a comprehensive VAT system (no/few exemptions for firms/activities) would avoid many rent-seeking activities.

General Recommendations on economic policymaking and taxation policies should be added:

- The fiscal objective to raise money for government activities is considered as the key (and only) objective of VAT taxation by many economists. VAT policymaking can be reduced to a few questions: What role should the VAT play in the taxation system? What should be the VAT rate and why? What exemptions are really necessary? How can the system be enforced?
- Many economists would also argue that other (economic) objectives apart from raising money should be pursued by specific policies and not by taxation. This refers to some key objectives of agricultural policymaking: agricultural sector development, food security, healthy food, small farms development, value chain development, rural development, environment and climate protection, animal welfare, ...). It would be rather arbitrary and inefficient to use price policies and VAT policies in particular to achieve these objectives.
- If price policy interventions are considered on a market, it should be clear what objective is pursued and whether the price policy applied can achieve this. An example: A “no export VAT refund” policy opens up a totally new policy field for VAT policymaking and this is producer taxation. Is this the relevant policy objective to be pursued and, if so, is a “no export VAT refund” policy the proper policy instrument? What about the basic idea of a VAT as a consumer tax? How can the various policy objectives underlying the VAT discussion really be addressed and pursued in a goal-oriented and efficient way?

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Annexes

Annex 1: Figure 4.1 Excel based VAT market model for the Ukrainian wheat market (Version 1.0)

Supply price	Demand price	Domestic market price	World market price		Supply quantity	Demand quantity	Export quantity		Producer revenue	Consumer expenditure	Foreign exchange
(USD/ton)	(USD/ton)	(USD/ton)	(USD/ton)		(m tons)	(m tons)	(m tons)		(m USD)	(m USD)	(m USD)
210,00	252,00	210,00	210,00		26,80	8,80	18,00		5628,00	2217,60	3780,00
210,00	252,00	Parameters of calibration			26,80	8,80					
Parameters		Constants		Elasticities							
		of supply	of demand	of supply	of demand						
		5,388513877	80,36054778	0,3	-0,4						
Price policy parameters		Protection rate (%)	Producer tax rate (%)	VAT rate (%)	Export VAT refund (%)						
		0%	0%	20%	100%						

Government budget						Consumer taxation	Producer taxation
Protection	Producer tax	VAT revenue	Export VAT refund	VAT total	Total		
(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)
0,00	0,00	1125,60	756,00	369,60	369,60	369,60	0,00

Total benefit	Cost	Producer surplus	Consumer surplus	Welfare (activities)	Welfare (distribution)
(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)
4096,97	1298,77	4329,23	1879,37	6578,20	6578,20

Source: Own design and calculations based on JECHLITSCHKA, KIRSCHKE and SCHWARZ, 2007, chapter 1-4 and data from figure 4. 2.

Annex 2: Figure 4.3: Excel based VAT market model for the Ukrainian soybean market (Version 1.0)

Supply price	Demand price	Domestic market price	World market price		Supply quantity	Demand quantity	Export quantity		Producer revenue	Consumer expenditure	Foreign exchange
(USD/ton)	(USD/ton)	(USD/ton)	(USD/ton)		(m tons)	(m tons)	(m tons)		(m USD)	(m USD)	(m USD)
321,43	385,71	321,43	360,00		4,30	2,20	2,10		1382,14	848,57	756,00
321,43	385,71	Parameters of calibration			4,30	2,20					
Parameters		Constants		Elasticities							
		of supply	of demand	of supply	of demand						
		0,760927206	23,81929869	0,3	-0,4						
Price policy parameters		Protection rate (%)	Producer tax rate (%)	VAT rate (%)	Export VAT refund (%)						
		0%	0%	20%	40%						

Government budget						Consumer taxation	Producer taxation
Protection	Producer tax	VAT revenue	Export VAT refund	VAT total	Total		
(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)
0,00	0,00	276,43	54,00	222,43	222,43	56,57	165,86

Total benefit	Cost	Producer surplus	Consumer surplus	Welfare (activities)	Welfare (distribution)
(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)
1086,86	318,96	1063,19	238,28	1523,90	1523,90

Source: Own design and calculations based on JECHLITSCHKA, KIRSCHKE and SCHWARZ, 2007, chapter 1-4 and data from figure 4. 2.

Annex 3: Figure 4.4: Excel based VAT market model for the Ukrainian wheat market (Version 2.0)

Supply price	Demand price	Domestic market price	World market price		Supply quantity (Small farms)	Supply quantity (Large farms)	Supply quantity (Total)	Demand quantity		Export quantity (Small farms)	Export quantity (Large farms)	Export quantity (Total)
(USD/ton)	(USD/ton)	(USD/ton)	(USD/ton)		(m tons)	(m tons)	(m tons)	(m tons)		(m tons)	(m tons)	(m tons)
210,00	252,00	210,00	210,00		8,04	18,76	26,80	8,80		2,76	15,24	18,00
210,00	252,00	Parameters of calibration			8,04	18,76		8,80				
Parameters		Constants of supply		Constant of demand	Elasticities of supply			Elasticity of demand				
		(Small farms)	(Large farms)		(Small farms)	(Large farms)						
		1,616554163	3,771959714	80,36054778	0,3	0,3		-0,4				
Price policy parameters		Protection rate	Producer tax rate	VAT rate	Export VAT refund rate							
		(%)	(%)	(%)	(%)							
		0%	0%	20%	100%							
Small farms parameters		Production share	Domestic market share	Export VAT refund share	Rent shares							
					Domestic market	Export market	Export VAT refund					
		(%)	(%)	(%)	(%)	(%)	(%)					
		30%	60%	10%	50%	50%	50%					

Annex 3: Figure 4.4: Excel based VAT market model for the Ukrainian wheat market (Version 2.0); continued

Producer revenue			Consumer expenditure	Foreign exchange	Rent/VAT budget loss due to small farms VAT exemption				Rent/Private sector gains due to small farms VAT exemption			
(Small farms)	(Large farms)	(Total)			(Domestic market)	(Export market)	(Export VAT refund)	Total	(Small farms)	(Large farms)	(Consumers)	Total
(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)
1805,08	3945,40	5750,47	2106,72	3780,00	221,76	0,00	11,59	233,35	116,68	5,80	110,88	233,35

Government budget							Consumer taxation	Producer taxation		
Protection	Producer tax	VAT revenue	Export VAT refund	VAT budget total (via payments)	VAT budget total (via rents)	Budget total		(Small farms)	(Large farms)	(Total)
(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)
0,00	0,00	787,92	651,67	136,25	136,25	136,25	258,72	-116,68	-5,80	-122,47

Total benefit	Cost		Producer surplus		Consumer surplus	Welfare (activities)	Welfare (distribution)
	(Small farms)	(Large farms)	(Small farms)	(Large farms)			
(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)
4096,97	389,63	909,14	1415,45	3036,26	1990,25	6578,20	6578,20

Source: Own design and calculations based on JECHLITSCHKA, KIRSCHKE and SCHWARZ, 2007, chapter 1-4 and data from figure 4. 2.

Annex 4: Figure 4.5 Excel based VAT market model for the Ukrainian wheat market (Version 2.1) - VAT rate: 7%

Supply price	Demand price	Domestic market price	World market price		Supply quantity (Small farms)	Supply quantity (Large farms)	Supply quantity (Total)	Demand quantity		Export quantity (Small farms)	Export quantity (Large farms)	Export quantity (Total)
(USD/ton)	(USD/ton)	(USD/ton)	(USD/ton)		(m tons)	(m tons)	(m tons)	(m tons)		(m tons)	(m tons)	(m tons)
210,00	224,70	210,00	210,00		8,04	18,76	26,80	9,21		2,51	15,07	17,59
210,00	252,00	Parameters of calibration			8,04	18,76		8,80				
Parameters		Constants of supply		Constant of demand	Elasticities of supply		Elasticity of demand					
		(Small farms)	(Large farms)		(Small farms)	(Large farms)						
		1,616554163	3,771959714	80,36054778	0,3	0,3						-0,4
Price policy parameters		Protection rate	Producer tax rate	VAT rate	Export VAT refund rate							
		(%)	(%)	(%)	(%)							
		0%	0%	7%	100%							
Small farms parameters		Production share	Domestic market share	Export VAT refund share	Rent shares							
					Domestic market	Export market	Export VAT refund					
		(%)	(%)	(%)	(%)	(%)	(%)					
		30%	60%	10%	50%	50%	50%					

Annex 4: Figure 4.5 Excel based VAT market model for the Ukrainian wheat market (Version 2.1) - VAT rate: 7%; continued

Producer revenue			Consumer expenditure	Foreign exchange	Rent/VAT budget loss due to small farms VAT exemption				Rent/Private sector gains due to small farms VAT exemption			
(Small farms)	(Large farms)	(Total)			(Domestic market)	(Export market)	(Export VAT refund)	Total	(Small farms)	(Large farms)	(Consumers)	Total
(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)
1730,88	3941,45	5672,32	2029,53	3693,27	81,26	0,00	3,69	84,95	42,48	1,85	40,63	84,95

Government budget							Consumer taxation	Producer taxation		
Protection	Producer tax	VAT revenue	Export VAT refund	VAT budget total (via payments)	VAT budget total (via rents)	Budget total		(Small farms)	(Large farms)	(Total)
(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)
0,00	0,00	275,77	225,29	50,48	50,48	50,48	94,80	-42,48	-1,85	-44,32

Total benefit	Cost		Producer surplus		Consumer surplus	Welfare (activities)	Welfare (distribution)
	(Small farms)	(Large farms)	(Small farms)	(Large farms)			
(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)
4195,26	389,63	909,14	1341,25	3032,31	2165,73	6589,76	6589,76

Source: Own design and calculations based on JECHLITSCHKA, KIRSCHKE and SCHWARZ, 2007, chapter 1-4 and data from figure 4. 2.

Annex 5: Figure 4.6 Excel based VAT market model for the Ukrainian wheat market (Version 2.2) - Export VAT refund rate: 50%

Supply price	Demand price	Domestic market price	World market price		Supply quantity (Small farms)	Supply quantity (Large farms)	Supply quantity (Total)	Demand quantity		Export quantity (Small farms)	Export quantity (Large farms)	Export quantity (Total)
(USD/ton)	(USD/ton)	(USD/ton)	(USD/ton)		(m tons)	(m tons)	(m tons)	(m tons)		(m tons)	(m tons)	(m tons)
190,91	229,09	190,91	210,00		7,81	18,23	26,04	9,14		2,33	14,57	16,90
210,00	252,00	Parameters of calibration			8,04	18,76		8,80				
Parameters		Constants of supply		Constant of demand	Elasticities of supply			Elasticity of demand				
		(Small farms)	(Large farms)		(Small farms)	(Large farms)						
		1,616554163	3,771959714	80,36054778	0,3	0,3		-0,4				
Price policy parameters		Protection rate	Producer tax rate	VAT rate	Export VAT refund rate							
		(%)	(%)	(%)	(%)							
		0%	0%	20%	50%							
Small farms parameters		Production share	Domestic market share	Export VAT refund share	Rent shares							
					Domestic market	Export market	Export VAT refund					
		(%)	(%)	(%)	(%)	(%)	(%)					
		30%	60%	10%	50%	50%	50%					

Annex 5: Figure 4.6 Excel based VAT market model for the Ukrainian wheat market (Version 2.2) - Export VAT refund rate: 50%; continued

Producer revenue			Consumer expenditure	Foreign exchange	Rent/VAT budget loss due to small farms VAT exemption				Rent/Private sector gains due to small farms VAT exemption			
(Small farms)	(Large farms)	(Total)			(Domestic market)	(Export market)	(Export VAT refund)	Total	(Small farms)	(Large farms)	(Consumers)	Total
(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)
1620,81	3504,95	5125,75	1989,62	3549,54	209,43	44,45	4,44	258,33	129,16	24,45	104,72	258,33

Government budget							Consumer taxation	Producer taxation		
Protection	Producer tax	VAT revenue	Export VAT refund	VAT budget total (via payments)	VAT budget total (via rents)	Budget total		(Small farms)	(Large farms)	(Total)
(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)
0,00	0,00	696,10	282,68	413,42	413,42	413,42	69,81	20,00	323,60	343,61

Total benefit	Cost		Producer surplus		Consumer surplus	Welfare (activities)	Welfare (distribution)
	(Small farms)	(Large farms)	(Small farms)	(Large farms)			
(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)
4179,14	344,23	803,19	1276,58	2701,75	2189,52	6581,27	6581,27

Source: Own design and calculations based on JECHLITSCHKA, KIRSCHKE and SCHWARZ, 2007, chapter 1-4 and data from figure 4. 2.

Annex 6: Figure 4.7: VAT scenario calculations for a VAT rate reduction to 7% and an export VAT refund rate reduction to 50%

Scenario	Supply price	Demand price	Domestic market price	World market price	Supply quantity	Supply quantity	Supply quantity	Demand quantity	Export quantity	Export quantity	Export quantity
	(USD/ton)	(USD/ton)	(USD/ton)	(USD/ton)	(Small farms)	(Large farms)	(Total)	(m tons)	(Small farms)	(Large farms)	(Total)
					(m tons)	(m tons)	(m tons)	(m tons)	(m tons)	(m tons)	(m tons)
Present VAT policy	210,00	252,00	210,00	210,00	8,04	18,76	26,80	8,80	2,76	15,24	18,00
VAT rate reduction to 7%	210,00	224,70	210,00	210,00	8,04	18,76	26,80	9,21	2,51	15,07	17,59
Export VAT refund rate reduction to 50%	190,91	229,09	190,91	210,00	7,81	18,23	26,04	9,14	2,33	14,57	16,90

Scenario	Foreign exchange	Rent/VAT budget loss due to small farms VAT exemption				Rent/Private sector gains due to small farms VAT exemption			
		(Domestic market)	(Export market)	(Export VAT refund)	Total	(Small farms)	(Large farms)	(Consumers)	Total
	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)
Present VAT policy	3780,00	221,76	0,00	11,59	233,35	116,68	5,80	110,88	233,35
VAT rate reduction to 7%	3693,27	81,26	0,00	3,69	84,95	42,48	1,85	40,63	84,95
Export VAT refund rate reduction to 50%	3549,54	209,43	44,45	4,44	258,33	129,16	24,45	104,72	258,33

Scenario	VAT revenue	Export VAT refund	Total VAT budget	Consumer taxation	Producer taxation			Producer surplus		Consumer surplus	Welfare
					(Small farms)	(Large farms)	(Total)	(Small farms)	(Large farms)		
	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)
Present VAT policy	787,92	651,67	136,25	258,72	-116,68	-5,80	-122,47	1415,45	3036,26	1990,25	6578,20
VAT rate reduction to 7%	275,77	225,29	50,48	94,80	-42,48	-1,85	-44,32	1341,25	3032,31	2165,73	6589,76
Export VAT refund rate reduction to 50%	696,10	282,68	413,42	69,81	20,00	323,60	343,61	1276,58	2701,75	2189,52	6581,27

Annex 7: Figure 5.1 VAT scenario calculations for the Ukrainian wheat market

Scenarios	Supply price	Demand price	Domestic market price	World market price	Supply quantity	Demand quantity	Export quantity	Government budget			Consumer taxation	Producer taxation	Welfare
								VAT revenue	Export VAT refund	Total			
	(USD/ton)	(USD/ton)	(USD/ton)	(USD/ton)	(m tons)	(m tons)	(m tons)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)	(m USD)
0 Baseline	210,00	252,00	210,00	210,00	26,80	8,80	18,00	787,92	651,67	136,25	258,72	-122,47	6578,2
1 No export VAT refund	175,00	210,00	175,00	210,00	25,37	9,47	15,91	621,65	0,00	621,65	-99,39	721,04	6566,0
2 No trader export VAT refund	187,50	225,00	187,50	210,00	25,90	9,21	16,70	679,98	220,11	459,87	34,53	425,34	6579,4
3 VAT rate reduction	210,00	224,70	210,00	210,00	26,80	9,21	17,59	275,77	225,29	50,48	94,80	-44,32	6589,7

Baseline scenario assumptions													
World market price (USD/ton):							210,00						
Parameters:				Elasticities of supply (abs.):			0,30	All assumptions equal to baseline scenario, but:					
				Elasticity of demand (abs.):			-0,40	Price policy parameters:					0,00
Price policy parameters:				Protection rate (%):			0,00	No trader export VAT refund scenario assumption:					
				Producer tax rate (%):			0,00	All assumptions equal to baseline scenario, but:					
				VAT rate (%):			20,00	Price policy parameters:					40,00
				Export VAT refund share (%):			100,00	No trader export VAT refund scenario assumption:					
Small farms parameters:				Production share (%):			30,00	All assumptions equal to baseline scenario, but:					
				Domestic market share (%):			60,00	Price policy parameters:					7,00
				Export VAT refund share (wrong declaration) (%):			10,00						
				Rent share - domestic market (%):			50,00						
				Rent share - export market (%):			50,00						
				Rent share - export VAT refund share (%):			50,00						

Source: Own calculations based on the Excel based VAT market model for the Ukrainian wheat market (Version 2.0).