KVL Economic Policy Research

From the SelectedWorks of Henk LM Kox

Fall December 1, 2011

Compliance costs and dissimilarity of value-added tax (VAT) regimes in the European Union

Henk L.M. Kox, KVL Economic Policy Research



Available at: https://works.bepress.com/henk_kox/78/

See discussions, stats, and author profiles for this publication at: https://www.researchgate.net/publication/259061515

Compliance costs and dissimilarity of value-added tax (VAT) regimes in the European Union

Chapter · December 2011

citations 2	reads 158
1 author:	
Henk L.M. Kox KVL Economic Policy Research, Netherlands ('s-Hertogenbosch) 105 PUBLICATIONS SEE PROFILE	
Some of the authors of this publication are also working on these related projects	s:
Project Globalization View project	



All content following this page was uploaded by Henk L.M. Kox on 02 November 2019.

Final report TAXUD/2010/DE/328 FWC No. TAXUD/2010/CC/104

Client: European Commission, TAXUD

Institute for Fiscal Studies (Project leader)

In consortium with:

CPB Netherlands Bureau for Economic Policy Analysis (Consortium leader)

CAPP	CASE
CEPII	ETLA
IFO	IHS

London, 1 December 2011

This report was commissioned by the European Commission (DG TAXUD) and prepared by a consortium under the project leader IFS. The views and opinions expressed in this report are not necessarily shared by the European Commission, nor does the report anticipate decisions taken by the European Commission.

Contributors to this report

CONSORTIUM MEMBERS

Institute for Fiscal Studies (project leader) Stuart Adam, David Phillips and Stephen Smith

CPB Netherlands Bureau for Economic Policy Analysis (consortium leader) Leon Bettendorf, Stefan Boeters, Henk Kox, Bas Straathof and Kasper Stuut

CAPP

Massimo Baldini, Monica Ferrari, Silvia Giannini, Paolo Onofri, Stefania Tomasini and Lorena Vincenzi

CASE

Luca Barbone, Richard Bird and Luis Jaime Vázquez Caro

ETLA

Tarmo Valkonen and Niku Määttänen

IFO

Christian Breuer, Alexander Ebertz and Chang Woon Nam

IHS

Johannes Berger and Ludwig Strohner

ADDITIONAL CONTRIBUTORS

CenEA Michal Myck

DIW Berlin Stefan Bach, Martin Beznoska and Richard Ochmann

IEF Nuria Badenes, Olga Cantó and José María Labeaga

Independent economic consultants Alain Trannoy, Nicolas Ruiz and Vanessa Denis

KU Leuven André Decoster and Dirk Verwerft

3

This report is dedicated to the memory of Luis Jaime Vázquez Caro, who died unexpectedly on 28 September 2011, during the final stages of this project, on which he worked as part of the CASE team. Jaime, a 1973 graduate of the International Tax Program at Harvard University, was a well-known professional in the area of tax policy and administration, having been the deputy tax commissioner of Colombia, and having spent over fifteen year of his career working on tax administration reform issues first at the IMF, and then at the World Bank. In the mid-1990s he was involved in several projects to help in the implementation of tax and tax administration reforms in central Europe, and was particularly concerned with the emergence of different types of VATbased frauds, discussed in this report. At the time of his passing, he was also working on a project on tax administration reform in Armenia. Our condolences go to his wife Maria Teresa and his son José Camilo, who live in Bogotá, Colombia.

Contents

Pr	eface.		9					
1	Exe	ecutive Summary (IFS)	13					
2	2 Introduction: VAT in the European Union (IFS)							
	Sumr	nary						
	2.1	Introduction	29					
	2.2	VAT as a source of revenue	29					
	2.3	Taxing consumption	32					
	2.4	How VAT works						
	2.5	Standard rates, reduced rates, zero rates and exemptions.						
	2.6	International trade and compliance costs	47					
3	VA	T, production efficiency and the internal market (IFS).	50					
	Sumr	nary	52					
	3.1	Introduction	53					
	3.2	Taxation of intra-EU trade	54					
	3.3	Exemptions and the scope of VAT	68					
	3.4	Compliance costs and small businesses	75					
4	The	e costs of VAT: a review of the literature (CASE)	95					
	Sumr	nary	96					
	4.1	Introduction						
	4.2	Definition and Measurement of Compliance Costs	100					
	4.3	Estimates of Compliance and Administrative Costs	109					
	4.4	Compliance Costs and Non-Compliance	127					
5	Со	mpliance costs and dissimilarity of VAT regimes (CPB).	155					
	Sumr	nary	155					
	5.1	Introduction	157					
	5.2	VAT regime dissimilarity indices	161					
	5.3	Complementary indicators of VAT-related trade costs	165					
	5.4	Some descriptive results for both types of indicators	168					
Aı	nnex A	A. Methodology for constructing dissimilarity indicators	177					
Aı	nnex H	3. Items used for construction of dissimilarity indices	184					
6	VA	T compliance costs and trade (CPB)	194					
	Sumr	nary	195					
	6.1	Introduction	197					
	6.2	Estimation strategy	199					

	6.3	Data	.200
	6.4	Regression results for trade in goods	.203
	6.5	Regression results for trade in services	.216
	6.6	WorldScan computable general equilibrium simulations	.222
	6.7	Synthesis of estimation and simulation results	.234
Aı	nnex C	. Countries included in the gravity analysis	.239
Aı	nnex D	. The robustness of gravity analysis for services	.240
Aı	nnex E.	Calibrating non-tarriff barriers in the Worldscan model	.244
7	VAT	[and external competitiveness (CAPP)	.248
	Summ	ary	.248
	7.1	Introduction	.249
	7.2	Effects via macroeconomic channels	.252
	7.3	Effects via production costs and export prices	.267
8	The	effect of VAT on price-setting behaviour (IHS)	285
0	Summ	ary	285
	8 1	Introduction	287
	8.2	Theoretical results	288
	83	Empirical evidence	298
	8.4	Discussion of case studies	318
Aı	nnex F.	Details of the analysis for hotels in Germany	.342
Aı	nnex G	. Details of the analysis for restaurants in France	.355
9	Qua	ntitative analysis of VAT rate structures (IFS)	.361
9	Qua Summ	ntitative analysis of VAT rate structures (IFS)ary	.361 .361
9	Qua Summ 9.1	ntitative analysis of VAT rate structures (IFS) ary Introduction	.361 .361 .363
9	Qua Summ 9.1 9.2	ntitative analysis of VAT rate structures (IFS) ary Introduction The distributional impact of VAT	.361 .361 .363 .364
9	Qua Summ 9.1 9.2 9.3	ntitative analysis of VAT rate structures (IFS) ary Introduction The distributional impact of VAT Impact on spending patterns and consumer welfare	.361 .361 .363 .364 .395
9	Qua Summ 9.1 9.2 9.3 9.4	ntitative analysis of VAT rate structures (IFS) ary Introduction The distributional impact of VAT Impact on spending patterns and consumer welfare The impact of VAT in the context of wealth and asset prices	.361 .363 .364 .395 .426
9 A1	Qua Summ 9.1 9.2 9.3 9.4 nnex H	ntitative analysis of VAT rate structures (IFS)ary Introduction The distributional impact of VAT Impact on spending patterns and consumer welfare The impact of VAT in the context of wealth and asset prices . Modelling VAT payments at the household level	.361 .363 .364 .395 .426 .444
9 A1 A1	Qua Summ 9.1 9.2 9.3 9.4 nnex H nnex I.	ntitative analysis of VAT rate structures (IFS)ary ary Introduction The distributional impact of VAT Impact on spending patterns and consumer welfare The impact of VAT in the context of wealth and asset prices Modelling VAT payments at the household level Further analysis of the distributional impact of VAT	.361 .363 .363 .364 .395 .426 .444 .452
9 Ai Ai Ai	Qua Summ 9.1 9.2 9.3 9.4 nnex H nnex I. nnex J.	ntitative analysis of VAT rate structures (IFS)ary Introduction The distributional impact of VAT Impact on spending patterns and consumer welfare The impact of VAT in the context of wealth and asset prices . Modelling VAT payments at the household level Further analysis of the distributional impact of VAT Demand Modelling	.361 .363 .364 .395 .426 .444 .452 .509
9 Ai Ai Ai Ai	Qua Summ 9.1 9.2 9.3 9.4 nnex H nnex I. nnex J. nnex K	ntitative analysis of VAT rate structures (IFS)ary Introduction The distributional impact of VAT Impact on spending patterns and consumer welfare The impact of VAT in the context of wealth and asset prices . Modelling VAT payments at the household level Further analysis of the distributional impact of VAT Demand Modelling . A model of VAT and wealth	.361 .363 .364 .395 .426 .444 .452 .509 .533
9 An An An An 10	Qua Summ 9.1 9.2 9.3 9.4 nnex H nnex I. nnex J.	ntitative analysis of VAT rate structures (IFS)ary Introduction The distributional impact of VAT Impact on spending patterns and consumer welfare The impact of VAT in the context of wealth and asset prices . Modelling VAT payments at the household level Further analysis of the distributional impact of VAT Demand Modelling . A model of VAT and wealth	.361 .363 .364 .395 .426 .444 .452 .509 .533
9 An An An An 10	Qua Summ 9.1 9.2 9.3 9.4 nnex H nnex J. nnex K Summ	ntitative analysis of VAT rate structures (IFS)ary Introduction The distributional impact of VAT Impact on spending patterns and consumer welfare The impact of VAT in the context of wealth and asset prices . Modelling VAT payments at the household level Further analysis of the distributional impact of VAT Demand Modelling . A model of VAT and wealth ssessing existing rate structures (IFS) ary	.361 .363 .364 .395 .426 .444 .452 .509 .533 .537
9 A1 A1 A1 A1 10	Qua Summ 9.1 9.2 9.3 9.4 nnex H nnex I. nnex J. nnex K Summ 10.1	ntitative analysis of VAT rate structures (IFS)ary Introduction The distributional impact of VAT Impact on spending patterns and consumer welfare The impact of VAT in the context of wealth and asset prices . Modelling VAT payments at the household level Further analysis of the distributional impact of VAT Demand Modelling . A model of VAT and wealth ssessing existing rate structures (IFS) ary Introduction	.361 .363 .364 .395 .426 .444 .452 .509 .533 .537 .537
9 An An An An 10	Qua Summ 9.1 9.2 9.3 9.4 nnex H nnex I. nnex J. nnex K Summ 10.1 10.2	ntitative analysis of VAT rate structures (IFS)ary Introduction The distributional impact of VAT Impact on spending patterns and consumer welfare The impact of VAT in the context of wealth and asset prices . Modelling VAT payments at the household level Further analysis of the distributional impact of VAT Demand Modelling . A model of VAT and wealth ssessing existing rate structures (IFS) ary Introduction The scope of existing reduced rates of VAT	.361 .363 .364 .395 .426 .444 .452 .509 .533 .537 .537 .538 .539
9 A1 A1 A1 A1 10	Qua Summ 9.1 9.2 9.3 9.4 nnex H nnex I. nnex J. nnex K Summ 10.1 10.2 10.3	ntitative analysis of VAT rate structures (IFS)ary Introduction The distributional impact of VAT Impact on spending patterns and consumer welfare The impact of VAT in the context of wealth and asset prices . Modelling VAT payments at the household level Further analysis of the distributional impact of VAT Demand Modelling . A model of VAT and wealth ssessing existing rate structures (IFS) ary Introduction The scope of existing reduced rates of VAT Using reduced rates as a tool for redistribution?	.361 .363 .364 .395 .426 .444 .452 .509 .533 .537 .537 .538 .539 .542
9 An An An An 10	Qua Summ 9.1 9.2 9.3 9.4 nnex H nnex I. nnex J. nnex K Summ 10.1 10.2 10.3 10.4	ntitative analysis of VAT rate structures (IFS)ary Introduction The distributional impact of VAT Impact on spending patterns and consumer welfare The impact of VAT in the context of wealth and asset prices . Modelling VAT payments at the household level Further analysis of the distributional impact of VAT Demand Modelling . A model of VAT and wealth ssessing existing rate structures (IFS) ary Introduction The scope of existing reduced rates of VAT Using reduced rates as a tool for redistribution? Promoting economic efficiency and changing behaviour	.361 .363 .364 .395 .426 .444 .452 .509 .533 .537 .537 .537 .538 .539 .542 .545

acroeconomic effects of VAT rates and structure	e (CPB)561
ary	561
Introduction	
General growth empirics	
Effect of taxes on growth in theory	564
Empirical evidence on the effect of taxes	566
Simulations with General Equilibrium models	569
Description of variables and data sources	574
Descriptive statistics	579
Estimation results: Economic growth	
Estimation results: Private consumption	
Estimation results: Labour market	594
Estimation results: Government revenues	601
	acroeconomic effects of VAT rates and structure ary Introduction General growth empirics Effect of taxes on growth in theory Empirical evidence on the effect of taxes Simulations with General Equilibrium models Description of variables and data sources Descriptive statistics Estimation results: Economic growth Estimation results: Private consumption Estimation results: Labour market Estimation results: Government revenues

Preface

This is the final report of a project on "The retrospective evaluation of elements of the VAT system."¹ This project has been led by researchers at the Institute for Fiscal Studies, in co-operation with other members of a consortium of organisations (led by CPB Netherlands Bureau for Economic Policy Analysis) carrying out a programme of economic analysis of taxation for the European Commission, and with additional contributions to this project from researchers outside the consortium.

We gratefully acknowledge the support, guidance and comments we have received from European Commission staff throughout this project, as well as helpful suggestions from Ingvil Gaarder and Jonathan Kesselman and detailed comments on an earlier draft from David Holmes and Michael Keen. None of these are responsible for the views expressed or remaining deficiencies, however.

The terms of reference for this project asked us to address the following 12 evaluation questions:

- (1) To what extent do the *current VAT arrangements for cross border supplies of goods and services* maximise the potential of a genuine EU single market for businesses and customers (for both businesses and private individuals)? What is the range of GDP loss that could be attributed to the special rules, obligations and risks associated to EU trade? What are the related administrative burdens and collection costs? What are the main reasons for any infringements and/or fraudulent activity and their extent at EU level?
- (2) To what extent is the *current method of collecting VAT* efficient, effective and robust, e.g. in terms of minimising the compliance cost for the enterprises and maximising the tax revenue for national administrations whilst preventing fraud?
- (3) What are the cost and impacts² (positive, negative, intended, unintended) of the current restrictions applied to the *right to deduct VAT* including through the determination of the deductible proportion (businesses carrying on exempt and taxed activities, linked to question 4) for tax revenue (estimates of the additional tax revenue for member states), businesses (estimates of the VAT actually borne) and

¹ Specific Contract no. TAXUD/2010/DE/328 implementing Framework Service Contract no. TAXUD/2010/CC/104 for the provision of economic analysis in the area of taxation.

² For example, impacts on (distortion of) competition, consumption patterns (distortion and/or deflection of trade), etc.

the customers? Is non-deductible VAT on business inputs the most appropriate/efficient way of taxing such businesses?

- (4) What are the cost and impacts of the current *exemptions* for tax revenue, businesses and final consumers? What percentage of the member states' total consumption is VAT-exempted?
- (5) What are the cost and impacts of the current *diversification of the VAT rates*, including *reduced VAT rates*, on compliance for businesses in particular for cross border transactions and on collection/control costs? What percentage of the member states' total consumption is subject to reduced VAT rates/ standard VAT rate?
- (6) To what extent and how do the different *cost factors of the VAT* impact the *medium/large and pan-European businesses*?
- (7) To what extent does the current VAT framework for small businesses³ help to create the right conditions for them to grow and prosper in the single market? To what extent and how do the different cost factors of the VAT impact them?
- (8) To what extent does the current VAT acquis applied on *services provided internationally*⁴ guarantee adequate taxation (no double taxation or tax avoidance)?
- (9) What are the cost and impacts of the current national VAT arrangements applied in the member states on *the bona fide traders* in the context of the VAT fraud?
- (10) To what extent do the current *derogations, exemptions* and *options*⁵ continue to be relevant as compared with the needs they aim to satisfy? Do the benefits they bring validate the cost?
- (11) To what extent does the current *diversification of the VAT rates*, including the *reduced VAT rates*, continue to be relevant as compared with the needs they aimed to satisfy? Do the original motives⁶ for their introduction still justify their application?
- (12) To what extent and how does the current VAT system impact the *price-setting mechanism* in the short and long run?

³ Different scopes and thresholds applied in member states, exemptions, simplified procedures, special schemes for farmers, etc.

⁴ Including services provided by branches/ head-offices situated in third countries to EU branches or head-offices.

^b Exemptions for certain activities in the public interest (i.e. for social, educational and cultural reasons), exemptions for other activities subject to technical concerns about applying VAT to the underlying transactions or interference with other taxes (i.e. postal and financial services, gambling activities, immovable property, etc.) and exemptions applied before the introduction of the VAT or at the time of the countries' accession to the EU (i.e. passenger transportation, etc).

⁶ For example, social justice, historical motives, environmental motives, technological difficulties, etc.

In doing so, we were asked to focus specifically (though not exclusively) on the following seven elements:

- (A) The evaluation should provide estimates of the total volume and value of domestic and cross-border (intra-EU and extra-EU) transactions carried out by pan-European enterprises and estimates of the administrative burden and compliance cost as a percentage of the total administrative burden and in euros. It should also enlighten estimates of differences in price-setting mechanisms between pan-European (linked) companies and businesses that are independent from each other, with a view of potential differences in VAT revenues collected.
- (B) Analysis of the aspects of non-distortion of competition in the EU, including in cross-border relations. In particular, the evaluation should analyse in detail the impact of the VAT system and of the unequal treatment of intra-EU supplies as compared to domestic supplies on the internal market, e.g. if and to what extent it leads to a change in consumer choice, higher or lower prices, the creation of barriers for new suppliers and service providers, the facilitation of anti-competitive behaviour or emergence of monopolies, market segmentation, etc. It should also look at the impact it has on trade barriers and if it provokes relocation of economic activities.
- (C) The analysis set out in point (B) above should cover both B2B and B2C transactions, and notably the specific regimes (distance selling, supplies of new means of transport, intra-Community acquisitions by non-taxable legal persons or taxable persons without a right of deduction) which have been introduced in 1993 in order to avoid distortions of competition resulting from the differences in VAT rates.
- (D) Analysis of the impact of the VAT system on competitiveness of EU firms as opposed to firms established outside the EU, e.g. what impact it has on the global competitive position of EU firms, if it influences and to what extent the withdrawal of certain products or services from the market, if it leads to new or the closing down of business and if some products/ businesses are treated differently from others in a comparable situation.
- (E) Quantitative evidence of the impact of the diversity of rates, exemptions and schemes applied to goods and services in the EU under the current VAT system on the job creation, value added, economic growth, welfare gain, consumption, labour market, national revenues, and the proper functioning of the internal market.
- (F) Analysis in the more general context of the welfare and equity impacts of the VAT system. In particular, a number of derogations applied by the member states have been introduced for reasons of social justice (i.e. redistribution of income) or for historical reasons (grandfathering clauses). A question to be answered in this context is whether the redistribution effect has been achieved, if any, by applying

specific elements of the VAT system. Also, the share of the exempt, zero, reduced and standard rate in the total theoretical tax revenue should be estimated.

(G) Evaluation of the welfare impact of the multiple-rate VAT system. In particular, the evaluation should examine the economic effect of the adjustments in the VAT rates on real relative price changes.

The chapters of this report are broadly (though not precisely) organised in line with these seven elements. At the start of each chapter we note which element(s) the chapter addresses; we also note which of the 12 evaluation questions the chapter helps to address, though individual chapters are not structured as head-on our answers to individual questions: answers to several of the questions are spread across chapters. Chapter 1 summarises the findings of the report as a whole.

5 Compliance costs and dissimilarity of VAT regimes (CPB)

This chapter contributes towards answers to the following evaluation questions in the project Terms of Reference:

(1) To what extent do the current VAT arrangements for cross border supplies of goods and services maximise the potential of a genuine EU single market for businesses and customers (for both businesses and private individuals)? What is the range of GDP loss that could be attributed to the special rules, obligations and risks associated to EU trade? What are the related administrative burdens and collection costs? What are the main reasons for any infringements and/or fraudulent activity and their extent at EU level?

(6) To what extent and how do the different cost factors of the VAT (i.e. compliance costs and other effects of the VAT regime) impact the medium/large and pan-European businesses?

(9) What are the cost and impacts of the current national VAT arrangements applied in the member states on the bona fide traders in the context of the VAT fraud?

Summary

This chapter presents the indicators that will be used (in the next chapter) to assess the impact of the current VAT systems in the European Union on intra-EU trade in goods and services. These indicators are also informative in their own right, quantifying the extent of differences in VAT regimes across the European Union.

• The current VAT system in the European Union leaves considerable operational and administrative freedom to national governments. This means that, despite European co-ordination on the basic structure of the VAT system, the situation is still such that firms operating in the internal market have to deal with a complex and heterogeneous patchwork of different national VAT rules.

- This could negatively affect the level of cross-border trade and direct investment in the internal market. Dealing with different national VAT systems may create a fixed-cost trade barrier, because of the costs involved for the trading firms in adapting to other countries' VAT regimes. Such fixed-cost trade barriers could have a negative impact on participation in trade, particularly for small and medium-sized enterprises. In order to detect whether these effects are important, we need indicators that capture the degree of heterogeneity in national VAT regimes.
- This chapter develops quantitative indicators that are comprehensive enough to pick up all the aforementioned types of impacts, yet are flexible enough to allow a finegrained decomposition that allows us to identify key VAT areas with a large internal market impact. Two types of indicators are proposed: VAT-regime dissimilarity indices, and national level indices for specific VAT elements.
- The main indicators are the VAT-regime dissimilarity indicators. National VAT regimes have various aspects and functional domains that can be numerically compared across countries. The VAT regime aspects that we subject to intercountry comparison include rate structures, the heterogeneity of administrative procedures, and the compliance cost burdens created by national VAT regimes. Each of these aspects is split into a number of functional domains.
- The VAT dissimilarity indicators are calculated for all 676 (=26x26) bilateral country pairs in the EU. The VAT dissimilarity indicators are calculated *per country pair* in order to allow maximum accuracy in detecting the VAT influences on bilateral trade between member states.
- The VAT dissimilarity indicators are comprehensive, covering 116 comparison elements per member state. The indicators can be decomposed for finer-grained regulatory VAT domains, thus allowing us to detect which elements of the intra-EU VAT heterogeneity have the largest trade impact.
- Over the past 20-30 years the older EU member states (EU15) have not achieved convergence in their administrative VAT procedures. It is noteworthy that the accession countries that joined the EU after 2004 have less administrative differences in their VAT regimes than exist between the EU15 countries.
- This chapter complements the VAT dissimilarity indicators with a set of indicators that proxy *per member state* (as opposed to *per country pair*) the level of VAT-related compliance costs, VAT complexity, and the impact of VAT on small and medium-sized firms.
- If there were a clear ranking of countries on the basis of the VAT-related burden for individual firms then we would expect a high correlation between the individual country indicators. However, we find that the country rankings for the individual-country items differ considerably. It means that there is no uniform, unequivocal

ranking possible for the VAT-related burden for individual firms. It further means that no single indicator can be considered as a *pars pro toto* for the remaining country indicators.

5.1 Introduction

As described in Chapter 2, VAT in the European Union is the result of a combination of EU-wide rules and the policies of individual member states. Within the constraints of the VAT Directive, national governments retain considerable discretion over VAT rate structures and administrative procedures. The VAT Directive identifies a number of VAT implementation options, from which member states have made their choices. Some EU member states have however added elements to their domestic VAT regimes that go beyond the implementation options stated in the EU Acts on VAT.¹⁰⁷ The result is that the EU as a whole operates with a complex and heterogeneous patchwork of different national VAT rules.

A core element of the European Union is its single market programme for trade in goods and services. The question asked here is: to what extent does the heterogeneity in national VAT regimes affect the operation and development of intra-EU trade flows. This is to be tested by gravity analysis of bilateral trade flows in the union. For this purpose we need quantitative indicators that document the differences between the VAT regimes of the EU member states. Chapters 5 and 6 of the study set out to quantify whether and how the national difference in VAT regimes influences the operation and development of the Single Market in goods and services.

VAT-related obligations have been identified as an important source of compliance cost burden for European firms, because of their pervasive role in everyday transactions.¹⁰⁸ Table 5.1 indicates 25 priority areas in the VAT legislation by their contribution to the compliance cost burden of European companies. Eight of these priority areas specifically pertain to border-crossing activities. However, in the imaginary case that the EU would have one unified VAT regime, there would also be an compliance cost burden impact on the behaviour of individual firms.¹⁰⁹ The fact that

¹⁰⁷ cf. Annacondia and Van der Corput (2010).

¹⁰⁸ cf. High Level Group of Independent Stakeholders on Administrative Burdens (2009), and <u>http://ec.europa.eu/enterprise/policies/better-regulation/administrative-burdens/priority-</u>

areas/tax/index_en.htm; Ministry of Finance, et al. (2005); Diemer (2010); Skatteverket (2006), Verwaal and Cnossen (2002).

¹⁰⁹ Chapter 3 discusses the distortionary impacts that arise from the tax treatment of cross-border transactions.

VAT-related administrative obligations result in real administrative costs for firms, says nothing about the impact of the national differences in VAT regimes on intra-EU trade.

The European Commission (2003) in its Internal Market Scoreboard reports: "In November 2000 a Commission survey showed that 26% of businesses considered difficulties related to the VAT system and VAT procedures to be an obstacle to doing business in the Internal Market. In September 2001 a further survey showed that VAT payments and refunds were rated third among regulatory burdens that are the most costly for companies. The multiplicity and complexity of the VAT requirements in the 15 member states, combined with difficulties in obtaining foreign refunds leads to substantial costs and represents a real barrier to cross border activities."

Table 5.1 Top 25 administrative burdens for firms associated with the VAT Directive	e,
prioritised according to their level of cost, their complexity, and their burden potential	

Rank	Type of information obligation	Prioritisation
1	VAT bookkeeping in sufficient detail for inspection by tax authorities	***
2	Issuing of an invoice	***
3	Taxable persons providing intra-community supplies	***
4	Storage of invoices for inspection	***
5	Notification of the start of working activity as a taxable person	***
6	Application for a VAT refund	***
7	Submission of a periodical VAT return	***
8	Provision of proofs of exemption on exports	**
9	Submission of an intra-community acquisitions listing	**
10	Submission of a summary annual VAT return	**
11	Guaranteeing authenticity of origin and integrity of content of e-invoices	*
12	Formalities relating to the exportation of goods	*
13	Submission of VAT returns for the intra-community acquisition of goods other than means of transport and excise goods	*
14	Notifications relating to storage	*
15	Storage data guaranteeing authenticity, integrity and legibility of invoices	*
16	Obtaining an import certificate for the purpose of import VAT deductions	*
17	Notification of change or cessation of working activity as a taxable person	*
18	Notification of cessation of conditions of exemption for EC acquisitions	*

19	Keeping separate accounts for special margins and other transactions	*
20	Obtaining certificates of VAT taxable status in order to qualify for refunds	*
21	Delivery of certificates attesting that no transactions have been performed for which a business can be held liable for VAT	*
22	Keeping a register of shipments without transfer of ownership	*
23	Keeping accounts of intra-EU transfers of movable tangible property	*
24	Submission of a VAT return in case of intra-community acquisitions of new means of transport	*
25	Obligations related to intra-community supplies of new means of transport	*

Source:http://ec.europa.eu/enterprise/policies/better-regulation/administrative-burdens/priority-areas/tax/index_en.htm

We distinguish four channels through which national differences in VAT regimes can have an impact on trade flows in the internal market:

a) *Border-cost effects*. Different VAT regimes in EU member states may create additional trade costs for border-crossing trade flows. Exporting firms selling their products in another member state incur additional costs for having to deal with different administrative procedures by country, country-specific VAT rates that must be incorporated in sales promotion activities, cost in relation to familiarising themselves and adapting to country-specific VAT refund rules and administrative practices. These requirements may form the source of real business costs. We therefore expect that the

degree of differences in the VAT regimes of two member states has a negative impact on their bilateral trade.

b) *Impact on the choice of foreign supply modes (*exports versus setting up a local subsidiary).¹¹⁰ Differences in VAT rates, in administrative thresholds, refunding practices, and in the efficiency of national VAT authorities could affect a firm's choice between serving a foreign market through exports or through FDI. The fixed or variable costs of dealing with a foreign country's VAT regime could tip the balance in such strategic firm decisions. This seems of particular importance for firms that organise complex trade networks in intermediary goods.

c) *Impact on structure of demand*. VAT rates, VAT exemptions and the compliance cost burden associated with a national VAT regime may have domestic price and volume effects that also affect the structure of a country's foreign trade. The application

¹¹⁰ Specifically for services trade we must consider a wider trade concept than standard cross-border trade. The WTO definition of services trade includes trade through 'commercial presence' (services sales in another country through a local subsidiary of a services multinational firm) and services provision through temporary stay of employees abroad.

of multiple VAT rates and exemptions affect the structure of relative prices in a country. This may push up the demand for low-rated or exempted goods and services, while putting a brake on the demand for other items. Trade-distorting effects could easily arise when neighbouring or distance-trading member states apply different VAT rates for similar goods:

(i) Border regions in the member states with the higher VAT rates may experience stronger effects, as consumers in border regions buy in the country that has the lowest VAT rates;

(ii) Industries that provide services or goods that are easily traded over large distances (books, software, electronic products, online music services and other media carriers, some services) may find themselves put in disadvantaged positions when other member states provide these goods against reduced VAT tariffs.¹¹¹

d) Impact on the export participation decision of firms due to VAT-related costs that are not scale-neutral. Some of the administrative procedures associated with VAT rules create one-off, fixed setup costs. It means that such costs are more or less independent of firm size, and hence, press relatively more heavy on small and medium-sized enterprises (SME).¹¹² The VAT regulations are quite complex in some countries. SME companies may lack the knowledge required to use the correct policies, time schedules and rates for all their transactions. The onus rests on firms to conduct their VAT affairs properly, certainly because countries apply financial and even criminal sanctions for failing to do so. Dealing with foreign VAT authorities and different VAT rules thus tends to be a real market-entry barrier for SME companies. Often this barrier can only be surpassed by using expensive tax advice.¹¹³ Compared with a system of uniform European VAT rules, the persistence of national VAT regimes might create an anti-SME bias in intra-EU trade participation.

This chapter develops quantitative indicators that are comprehensive enough to pick up the effects of all the aforementioned types of impacts, yet are flexible enough to allow a finer-grained decomposition that allows identification of key VAT-regulation areas with a large internal market impact. We found that both purposes can be served

¹¹¹ cf. Copenhagen Economics (2007, Chapter 4).

¹¹² cf. Skatteverket (2006: 43, 55-57). Most likely, the very small companies just above the VAT threshold bear the heaviest burden in tems of administrative burden costs (e.g. Ministry of Finance *et al.*, 2005; CapGemini, Deloitte & Ramboll Management, 2009).

¹¹³ "A complicated VAT system is good for lawyers and other advisers, but it is bad for business" (De Witt, 1995: 49).

with two types of indicators: VAT-regime dissimilarity indices, and national level indices for specific VAT elements. Both approach routes are explained below.

5.2 VAT regime dissimilarity indices

National VAT regimes have various aspects, functional domains and sub-domains that can be numerically compared across countries. The VAT regime aspects that we put to inter-country comparison include: the complexity of VAT rates structure, administrative procedures, and the compliance cost burden created by the national VAT regime. Each of these aspects is split in a number of functional domains. For instance, the comparison of administrative procedures is based on the following functional domains: registration thresholds, refunding thresholds, Intrastat reporting threshold, border-crossing aspects, requirements for storage of invoices, filing and payment deadlines, timing of invoicing, structure of penalties and Intrastat statistical reporting obligations. For each of these functional domains, a number of specific VAT items are used. The structure of the comparison is shown in Table 5.2. The comparison is quite comprehensive and includes no less than 116 different VAT elements per country.

The bilateral differences by VAT regime aspect are summarised in six VAT dissimilarity indices (shown by their abbreviation) and one umbrella indicator, named HV_ALL. The later includes the information of all 116 regulatory VAT elements. These indicators are used in the next chapter to test for their trade impact.

How national VAT regimes affect individual firms is not only determined by the structure of formal regulations, but also by the efficiency of the national tax apparatus. We have therefore complemented the comparison with a number of items that may proxy the national differences in administrative and regulatory efficiency. For these items we derive a specific VAT dissimilarity index (HVADREG), as shown at the bottom of Table 5.2.

Table 5.2 also shows that the dissimilarity indices are decomposable, i.e. when we would find a significant trade affect for a particular VAT aspect, we may dig deeper to find out which VAT domain drives the trade results.¹¹⁴

Calculating of the bilateral VAT dissimilarity indices per country pair

¹¹⁴ Because the VAT dissimilarity indices are averages over a number of specific VAT elements, we can only dig deeper through more detailed indicators if enough comparison items are available, over which the average is calculated, otherwise the representativeness of the index drops.

VAT regime dissimilarity indices are summary indicators that capture the degree to which two EU member states differ in their policies (or practices) for a specific domain of their VAT regimes. The full procedure for calculating the indices and their properties is explained in Annex A. This section presents only the main elements.

The VAT dissimilarity indices are specific for each country pair. So, for instance for Estonia, we calculate a specific dissimilarity index Estonia-Poland, Estonia-France, Estonia-Italy, etc. The underlying idea is that VAT-related trade barriers for firms in a country differ by trade origin and by trade destination. As a consequence of the bilateral nature we get per country 26 different bilateral indices. In total that yields 676 country-pair-specific dissimilarity indicators.

The CPB-developed VAT dissimilarity indices aggregate the information of both numerical and qualitative comparison items.115 Per VAT comparison item we assess whether a country pair had an identical regulation or not. If the two countries are not identical, the item gets a dissimilarity score of 1, and a 0 otherwise.116 Afterwards we sum the scores over all comparison elements per VAT domain and divide by the number of non-blank scores, to arrive at the bilateral dissimilarity index for the relevant VAT domain. The score is always between 0 and 1. The closer it is to 1, the more the two countries differ. When the score is 0, the two countries have identical policies in place with regard to the VAT domain that is being compared.

¹¹⁵ Similar indices have been developed by CPB in order to analyse the potential impact of the EU Services Directive (cf. De Bruijn et al. 2008; Kox et al. 2004, 2006;) and have more recently been adopted by the OECD Trade Division (cf Nordås et al. 2009, Kox et al 2007) to study the impact of heterogeneous regulation on OECD services trade..

¹¹⁶ For comparison items that allow us to distinguish a yes-no answer, the application of the dissimilarity score is straightforward. For items of numerical nature we do not want very small differences to result in a score of 1. We therefore follow a coarse-graining procedure for numerical comparison items by reducing the possible scores into 3-6 numeric intervals. The standard is 3 numeric intervals, but this is widened to a maximum of 6 if the distribution of country scores is very skewed. The procedure is explained further in Annex A.

VAT regime	functional VAT domains	abbre-	No. of separate
aspects		viation for	VAT elements
-		index	used for calcu-
			lating index per
			domain
Overall structure	* General structure of VAT rates		9
and complexity of	* VAT exemptions applied		10
VAT regime	* Domestic VAT rate variability		3
	* Distinctive national VAT legislation		4
	Total	HVGEN	26
General	* VAT registration thresholds		4
administrative	* Border-crossing aspects		4
procedures VAT	* VAT Refunding thresholds		2
	* Optimal reverse charge, contracting party		11
	liability, postponed accounting imported goods		
	* Excess input tax		2
	* Requirements on storage invoices		2
	* Filing and Payment deadline, penalties		5
	* Intrastat reporting thresholds, penalties		3
	* Timing invoicing		2
	Total	HVADM	39
Administrative	* Aggregate AB measures for VAT		3
burden measures	* AB measures for specific VAT items		7
related to VAT	Total	HVAB_	10
VAT rates applied	* Specified goods, partly tradable a)		8
for specified goods	* Specified services, mostly non-tradable		11
and services	Total	HVSRAT	19
VAT rates on specifie	ed internationally traded goods	HVTG_	18
VAT rates on specifie	ed services subject to international trade b)	HVTS_	7
All VAT domains, all	l aforementioned items of VAT regimes	HVALL	116
PM: General adminis	trative and regulatory efficiency	HVADREG	11
Note: Annex B of the the data sources from	report provides more detailed information on the i which the relevant information has been derived.	ndividual compa	arison items and

Table 5.2 Composition of VAT dissimilarity indices by VAT aspects and functional domains

The dissimilarity indices are built up in a hierarchical way. The HVALL_ dissimilarity index is a comprehensive 'umbrella' index. It covers all bilateral comparison items for the EU VAT regimes. As a consequence it is strongly correlated with all other dissimilarity indices, as Table 5.3 shows. Each of the other indices measures bilateral heterogeneity in a different VAT domain. The pair-wise correlation of these other indices is rather low, so that they can be applied simultaneously in the regression analysis. This does not hold for the two indices that measure the dissimilarity with respect to the VAT rate structure of internationally traded goods (HVTG_) and services (HVTS_). The fact that these indices have a high mutual correlation follows from the fact that the VAT rates for traded goods and services generally do not diverge much.

	HVALL_	HVTGEN	HVTG_	HVTS	HVADM	HVSRAT
HVALL_	1.00					
HVTGEN 0.56		1.00				
HVTG0.60		0.03	1.00			
HVTS0.60		0.23	0.47	1.00		
HVADM 0.47		0.23	0.05	0.37	1.00	
HVSRAT 0.34		0.36	-0.19	0.15	0.07	1.00
Note: Variables a	nd their names a	are defined in Ta	able 5.2. Source	own calculatio	ns CPB.	

Table 5.3 Correlation analysis VAT dissimilarity indices, EU27, 2008

The VAT dissimilarity indices are symmetric between both compared countries. If the index has a high value (close to 1), this says that VAT-related adaptation costs could play a role as trade barrier between two countries. But because of its symmetry, it does not tell us in which trade direction (imports or exports) the trade barrier is largest. Normally this is not a problem in empirical trade analysis, because we have to choose beforehand whether we consider trade from the import side or from the export side. If the VAT dissimilarity index turns out to be statistically significant and negative in import regressions then we know that VAT-related adaptation costs hamper import trade.

As can be read in the technical annex (Annex A), we have deliberately assigned equal weights for all numerical and qualitative comparison items, because this gives maximal transparency. Though an equal-weights scheme is in itself also a subjective choice, we think that at this stage it is better to avoid making hidden political judgements. Our

method is however very flexible and it would be quite easy to add an 'expert weights' vector with which we weigh all bilateral differences.¹¹⁷ However, the achievement of an undisputed expert-weights vector is a process that would require much more effort than is possible in the context of the present study.

Summing up, the VAT dissimilarity indices are comprehensive proxies for fixed or variable VAT-related adaptation costs for firms trading with other EU member states. The index summarises the degree of bilateral disparity in national VAT regimes. And as such, this may help to explain why we find strong or, conversely, limited trade between different country pairs.

5.3 Complementary indicators of VAT-related trade costs

Each cross-border transaction requires firms (or establishments of firms) on both sides of the border, importing firms and exporting firms.¹¹⁸ For policy reasons it is important to know whether exporters or importers are most affected by the adaptation costs. Complementary indicators may help to answer that question. VAT dissimilarity indices do not say which of both countries has the most strict, complex and inefficient VAT regime. It is useful therefore to complement the VAT dissimilarity indices with indicators that quantify the level of VAT-related costs and/or compliance cost burden *per country* rather than per *country pair*.

Table 5.4 includes factors that, according to the literature, may be a nuisance for trading firms or that may proxy VAT-related administrative burden costs for firms: variation in national VAT rates (variation coefficient); national VAT requirements that go beyond EU requirements; VAT items that increase the within-country compliance cost burden; and specific VAT-related administrative burden for small- and medium-sized enterprises (SME).

 ¹¹⁷ Cf. for example the procedure chosen by the OECD to add expert weights in the construction of their comparative indicators for national product-market regulation (Nicoletti, Scarpetta and Boylaud, 2000).
 ¹¹⁸ And, of course, vice versa for trade regressions using the export side.

	Comparison item	Measurement	Expected trade impact	Variable
	Complexity of VAT	Coefficient of variation of VAT	Higher trade costs	cov_rate
	structure in a country	rates across 25 goods/services		
	Non-EU elements in	No. of national VAT obligations	Higher trade costs	nonEUobl
	national VAT legislation	going beyond EU requirement		
	Non-EU elements in	% of estimated VAT admin.	Higher trade costs	nonEU_ab
	national VAT legislation	burden due to national obligations		
		beyond EU VAT requirements		
	VAT-related entry costs for	Primary VAT registration	If low : more burden	regcutoff
	SME companies	threshold (in 1000 E);	for SME	
	VAT-related burden for	Threshold for annual VAT refund	If high: more waiting	anrefund
	SME companies	(in 1000 E)	costs for SME	
	VAT-related burden for	Threshold for quarterly VAT	If high: more waiting	qtrefund
	SME companies	refund (in 1000 E)	costs for SME	
	Compliance cost burden	Obligatory storage of invoices (in	If high: more adm.	inv_yrs
•		years)	burden	
Compliance cost burden		VAT filing deadline (in days)	If low: more frequent	filedays
			adm. burden	
	Compliance cost burden	Adm. burden costs VAT as % of	Measure of tax	abvat_rev
		national VAT revenue	inefficiency	
	Compliance cost burden	Adm. burden costs of VAT as %	If high: more adm.	abvat_gdp
		of GDP	burden	
	Compliance cost burden	Estimated avg. adm burden costs	If high: more adm.	logabfirm
		per firm (total of 5 categories,	burden	
		expressed in log)		
	Compliance cost burden	Number of export documents	If high: more adm.	no_expdoc
		needed for standard export event	burden for exporters	
		(WB)		
	Compliance cost burden	Number of import documents	If high: more adm.	no_expdoc
		needed for standard import event	burden for importers	
		(WB)		
	Compliance cost burden	No. of separate tax payments;	If high: more frequent	antaxpmt
		includes corp. & inc. tax (WB)	adm. burden	
	Compliance cost burden	firm time needed for tax	If high: more adm.	antaxtime
		payments (hours) (WB)	burden	

 Table 5.4
 Indicators for VAT-related costs and administrative burden per country

If there were a clear ranking of countries on the basis of the VAT-related burden for individual firms then we would expect a high correlation between the individual (complementary) indicators. Apparently, there is not such a clear country ranking. Table 5.5 shows the correlation between the country scores for the complementary indicators.

The correlations are highest for items that represent administrative burden indicators of VAT. However, most correlation coefficients are quite low, meaning that the country rankings for these items are very different. So, the complementary indicators do not tell one story: the country ranking differs strongly by comparison item.¹¹⁹ Due to this finding, it is not allowed to pinpoint a single country indicator that can reliably serve as as a *pars pro toto* for the remaining country indicators.¹²⁰

	cov_ rate	non- EU obl	non- EU_ ab	reg cut- off	an_ re fund	qt_ re fund	inv_ yrs	file days	abvat 	abvat	log ab firm	antax pmt	antax time	no_ exp doc
nonEUobl	0.13	001	uo	011	Tunu	Tunu			101	Bap				uot
nonEU_ab	-0.01	0.15												
regcutoff	0.11	-0.02	-0.03											
anrefund	-0.10	-0.15	0.04	-0.02										
qtrefund	-0.16	-0.14	0.01	-0.12	0.77									
inv_yrs	0.01	0.18	0.22	0.07	-0.18	-0.16								
filedays	-0.28	-0.58	-0.25	-0.10	0.36	0.36	-0.29							
abvat_rev	-0.31	-0.12	0.14	-0.16	-0.19	-0.29	-0.17	0.16						
abvat_gdp	-0.18	-0.18	-0.08	-0.30	-0.28	-0.21	-0.12	0.33	0.82					
logabfirm	-0.07	0.09	0.62	-0.21	0.05	0.00	0.35	0.04	0.51	0.52				
antaxpmt	-0.28	0.10	-0.09	0.09	0.04	0.00	-0.02	0.03	0.04	-0.23	-0.21			
antaxtime	-0.07	-0.07	-0.04	-0.09	0.43	-0.03	0.03	0.25	0.40	0.08	0.13	0.04		
no_expdoc	-0.34	0.16	0.42	0.07	0.13	-0.05	-0.11	-0.07	0.39	-0.02	0.18	0.30	0.26	
no_impdoc	-0.46	0.08	0.14	0.05	0.24	-0.07	-0.01	0.06	0.38	-0.03	0.07	0.22	0.54	0.82

 Table 5.5
 Correlation analysis of complementary indicators for VAT-related costs and administrative burden per country , 2006-2008, 27 EU member states

¹¹⁹ Section 2.3 presents similar results by country.

¹²⁰ On the positive side, we may infer that different level indicators can be jointly used in the gravity trade regressions without the estimation results and thir interpretation being hampered by multicollinearity issues.

5.4 Some descriptive results for both types of indicators

In this section we show some descriptive results for the VAT-regime dissimilarity indicators and for the complementary country indicators. Table 5.6 describes the results for the dissimilarity indicator HVADM, which deals with VAT-related administrative procedures. The indicator is calculated on the basis of some 30 different comparison items for most country pairs. The dissimilarity index equals on average 0.38 for the EU15 countries, which means that on average more than 11 out of the 30 administrative and procedural VAT regime elements differ between each EU15 country pair.

Most of the older EU member states introduced their VAT system in the 1970s. Table 5.6 implies that over the past 20-30 years these older EU member states, apparently, have not been able to converge their administrative VAT procedures.¹²¹ The ten member states that joined the EU in 2004 (EU16_24) have less mutual administrative differences in their VAT regimes than the EU15 countries have among each other. A possible reason is that these countries were able to start a VAT tax system from scratch and have chosen to adapt best-practice procedures from the EU15 countries.¹²²

The first column of Table 5.6 indicates the mean dissimilarity that each member state had with the 26 other EU countries. Ireland had on average the most differences (0.44) with the rest of the EU, while Poland (0.28) had the lowest mean difference. These are averages, however. The second data column provides for each country the standard deviation around this mean. The UK for instance has a dissimilarity mean of 0.43 and a standard deviation of 0.11, which indicates that the UK's bilateral dissimilarities with most other countries range between 0.54 (=0.43+0.11) and 0.32 (=0.43-0.11). The two last columns show, per member state, the countries with which their administrative VAT procedures differ, respectively, the least and the most. The UK has the smallest differences with Malta and the largest differences with Bulgaria.

Table 5.7 shows that the 'old' EU15 countries are much more dissimilar in their VAT rates than the 10 accession countries. Finally, Table 5.8 shows the main results for the other dissimilarity indices, including the umbrella index HVALL_. The latter displays a relatively small variation between the countries. Tables 5.9 and 5.10 are different. They present the national level indices that may proxy elements of trade costs and administrative burdens for firms.

¹²¹ Cf. Vos et al. (1994); Somers (1995); De Witt (1995).

¹²² Cf. Van der Corput (2004).

Reference	mean	standard	avg. no. of	smallest	largest HVADM
country	HVADM	deviation	bilateral	HVADM	dissimilarity
	dissimilarity	bilateral	data points	dissimilarity	with:
	with EU27	HVADM		with:	
AT	0.42	0.07	32	FR (0.29)	IT (0.52)
BE	0.35	0.09	31	EE (0.21)	SI (0.56)
BG	0.42	0.10	30	LU (0.24)	UK (0.71)
CY	0.31	0.11	30	EE (0.14)	AT (0.48)
CZ	0.35	0.09	28	RO (0.15)	EL (0.53)
DE	0.38	0.09	29	SK (0.24)	BG (0.59)
DK	0.41	0.08	29	LT (0.21)	FR (0.53)
EE	0.31	0.11	29	IT (0.11)	AT (0.52)
EL	0.39	0.09	32	LU (0.17)	UK (0.55)
ES	0.36	0.10	29	IT (0.19)	BG (0.50)
FI	0.33	0.07	30	CY (0.20)	UK (0.45)
FR	0.37	0.06	31	SK (0.24)	DK (0.53)
HU	0.30	0.09	30	PL (0.10)	SI (0.47)
IE	0.44	0.07	28	LT (0.31)	SI (0.63)
IT	0.33	0.11	29	EE (0.11)	AT (0.52)
LT	0.31	0.07	29	HU (0.17)	AT (0.43)
LU	0.37	0.09	32	EL (0.17)	UK (0.60)
LV	0.36	0.09	31	HU (0.16)	DE (0.53)
MT	0.32	0.10	29	EE (0.15)	BG (0.52)
NL	0.39	0.07	30	RO (0.28)	SI (0.50)
PL	0.28	0.06	31	HU (0.10)	SI (0.40)
РТ	0.35	0.10	31	CY (0.16)	UK (0.50)
RO	0.31	0.10	28	CZ (0.15)	IE (0.52)
SE	0.41	0.07	30	PL (0.29)	IE (0.61)
SI	0.43	0.10	30	LU (0.25)	IE (0.63)
SK	0.30	0.07	31	PL (0.19)	IE (0.45)
UK	0.43	0.11	29	MT (0.24)	BG (0.71)
EU15	0.38	0.08	30	IT (0.11)	UK (0.71)
EU16_24	0.33	0.09	30	PL (0.10)	SI (0.63)
Variables and the	eir names are decla	red in Table 5.2. C	Country codes a	re standard EU abb	reviations for
member states. S	ource: own calcula	tions. Detailed tab	oles available or	n request.	

 Table 5.6
 HVADM: Dissimilarity index for administrative VAT procedures, 2008

Reference	mean	standard	avg. no. of	smallest	largest HVSRAT
country	HVSRAT	deviation	bilateral	HVSRAT	dissimilarity
	dissimilarity	bilateral	data points	dissimilarity	with:
	with EU27	HVSRAT		with:	
AT	0.43	0.13	18	CZ (0.26)	BE (0.74)
BE	0.75	0.08	17	ES (0.58)	IE (0.84)
CY	0.37	0.15	18	LT (0.16)	BE (0.74)
CZ	0.44	0.38	18	HU (0.00)	PL (1.00)
DE	0.41	0.12	18	SK (0.26)	IT (0.74)
DK	0.36	0.14	18	MT (0.16)	BE (0.74)
EE	0.33	0.17	18	MT (0.11)	BE (0.84)
EL	0.33	0.15	18	SI (0.11)	BE (0.79)
ES	0.44	0.11	18	PL (0.21)	LU (0.63)
FI	0.42	0.13	18	DK (0.21)	BE (0.74)
FR	0.53	0.11	18	PL (0.32)	BE (0.79)
HU	0.33	0.19	18	SI (0.05)	BE (0.79)
IE	0.41	0.17	18	EE (0.16)	BE (0.84)
IT	0.59	0.13	18	SE (0.32)	IE (0.79)
LT	0.33	0.17	18	LV (0.11)	BE (0.84)
LU	0.49	0.09	18	EL (0.32)	BE (0.68)
LV	0.36	0.17	18	LT (0.16)	BE (0.84)
MT	0.30	0.18	18	HU (0.05)	BE (0.84)
NL	0.47	0.10	18	UK (0.32)	IT (0.68)
PL	0.39	0.15	18	ES (0.21)	BE (0.79)
РТ	0.47	0.12	18	IE (0.26)	BE (0.79)
SE	0.46	0.10	18	UK (0.32)	BE (0.68)
SI	0.35	0.18	18	HU (0.05)	BE (0.79)
SK	0.41	0.14	18	SI (0.21)	IT (0.74)
UK	0.40	0.13	18	EL (0.26)	BE (0.84)
EU15, avg.	0.46	0.12	18	EL (0.11)	BE (0.84)
EU1624, avg	0.36	0.19	18	CZ (0.00)	PL (1.00)
Variables and the	eir names are decla	red in Table 5.2. C	Country codes a	re standard EU abb	reviations for
member states So	ource: own calculat	tions. Detailed tabl	les available on	request.	

Table 5.7HVSRAT: Dissimilarity index of domestic VAT rates, EU25, 2008

reference	mean dissimilarity with EU27 variation coefficient of dissimilarity				arity			
country					(sta	andard deviat	tion / mean))
	HVTGEN	HVALL	HVTG_	HVTS_	HVTGEN	HVALL	HVTG_	HVTS_
AT	0.56	0.49	0.55	0.67	0.22	0.17	0.58	0.34
BE	0.58	0.51	0.53	0.59	0.17	0.13	0.59	0.40
BG	0.56	0.51	0.55	0.49	0.28	0.19	0.62	0.65
CY	0.49	0.50	0.87	0.79	0.26	0.14	0.19	0.27
CZ	0.45	0.46	0.58	0.55	0.28	0.15	0.49	0.35
DE	0.51	0.46	0.53	0.66	0.26	0.18	0.52	0.36
DK	0.51	0.54	0.96	0.76	0.26	0.14	0.19	0.28
EE	0.53	0.44	0.64	0.47	0.22	0.20	0.48	0.55
EL	0.50	0.50	0.57	0.57	0.24	0.14	0.47	0.39
ES	0.54	0.54	0.80	0.83	0.19	0.11	0.23	0.21
FI	0.48	0.47	0.76	0.46	0.23	0.12	0.25	0.47
FR	0.49	0.47	0.54	0.53	0.21	0.14	0.52	0.30
HU	0.41	0.42	0.54	0.50	0.24	0.18	0.59	0.45
IE	0.59	0.51	0.58	0.67	0.17	0.09	0.44	0.29
IT	0.50	0.51	0.58	0.57	0.22	0.12	0.50	0.41
LT	0.52	0.50	0.67	0.44	0.23	0.16	0.44	0.55
LU	0.50	0.53	0.88	0.68	0.18	0.09	0.19	0.32
LV	0.42	0.45	0.67	0.50	0.28	0.19	0.44	0.37
MT	0.50	0.46	0.67	0.47	0.24	0.21	0.44	0.77
NL	0.47	0.47	0.55	0.68	0.27	0.15	0.50	0.33
PL	0.54	0.50	0.78	0.55	0.17	0.11	0.23	0.36
РТ	0.50	0.50	0.61	0.51	0.18	0.12	0.38	0.38
RO	0.41	0.42	0.53	0.47	0.30	0.21	0.57	0.77
SE	0.50	0.55	0.96	0.77	0.22	0.12	0.19	0.26
SI	0.42	0.48	0.59	0.64	0.25	0.16	0.50	0.37
SK	0.53	0.46	0.53	0.63	0.23	0.18	0.56	0.50
UK	0.50	0.50	0.74	0.51	0.22	0.18	0.31	0.37
EU15	0.52	0.50	0.68	0.63	0.21	0.13	0.36	0.33
EU16_24	0.48	0.47	0.65	0.55	0.24	0.17	0.42	0.44
Variables a	nd their names	are declared	in Table 5.	.2. Country	codes are sta	ndard EU ab	breviations.	
Source: ow	n calculations.	Detailed tab	les availabl	e on reques	st.			

 Table 5.8
 Other bilateral dissimilarity indices for EU VAT regimes, EU27, 2008

country code	cov_rate 2006	nonEU obl 2007	filedays 2008	regcutoff 2008	anrefund 2008	qtrefund 2008	antaxpmt 2008	no_impdoc, 2008	no_expdoc, 2008
AT	0.25	5	45	30	36	360	22	5	4
BE	0.34	16	20	6	25	200	11	5	4
BG		3	45	26	256	511	17	7	5
CY	0.38	4	40	16	26	205			
CZ	0.44	5	25	40	31	61	12	7	4
DE	0.28	8	10	18	25	200	15	5	4
DK	0.45	5	25	7	25	189	9	3	4
EE	0.34	1	20	16	26	192	7	4	3
EL	0.41	7	20	10	25	200	21	6	5
ES	0.36	6	20	0	25	201	8	8	6
FI	0.34	0	45	9	25	200	20	5	4
FR	0.48	7	15	76	25	200	19	5	4
HU	0.30	6	20	20	28	203	14	7	5
IE	0.72	7	19	70	25	200	9	4	4
IT	0.46	7	16	0	25	200	15	4	4
LT	0.34	7	15	29	29	204	15	6	6
LU	0.62	6	15	10	25	200			
LV	0.34	3	25	14	31	207	7	6	5
MT	0.00	0	45	37	23	188			
NL	0.48	2	30	1	25	200	9	5	4
PL	0.53	6	25	14	25	200	40	5	5
PT	0.56	4	40	10	20	160	8	5	4
RO		6	25	35			108	6	5
SE	0.37	3	26	3	51	406	2	3	3
SI	0.39	4	30	25	50	210	22	8	6
SK	0.00	6	25	45	25	198	31	8	6
UK	0.54	2	30	86	24	198	8	4	4
The varial Sources. <i>c</i>	The variables themselves have been described in Table 5.4. Country codes are standard EU abbreviations for member states. Sources. <i>cov_rate</i> : own calculations based on data from European Commission (2006); <i>nonEUobl</i> : data from CapGemini, Deloitte & Ramboll Management (2000); <i>filedays_regentedf_gurafind_gtrafind_dtrafind_dtrafind_dtrafind_dtrafind_c</i>								

Table 5.9 Selected complementary indicators for VAT-related firm costs by country, 2006-2008

Deloitte & Ramboll Management (2009); filedays, regcutoff, anrefund, qtrefund: data from van der Corput and Annacondia (2008); antaxpmt : data from Djankov et al. (2008); no_expdoc, no_impdo: data from World Bank Cost of Doing Business database.

country code	abvat_rev 2007	abvat_gdp 2007	nonEU_ab 2007	logabfirm 2007	inv_yrs 2008	antaxtime 2007	antaxpmt 2007
AT	7.3	0.52	2.1	7.88	7	170	22
BE	7.9	0.57	1.3	7.86	7	156	11
BG	6.4	0.27	7.2	8.17	5	616	17
CY	12.0	1.00	0.2	8.13	7		
CZ	13.4	0.48	0.4	7.88	10	808	12
DE	6.3	0.42	4.4	7.98	10	196	15
DK	3.4	0.44	0.0	7.44	5	135	9
EE	10.7	0.53	0.0	7.64	7	81	7
EL	17.5	0.98	3.3	8.47	6	264	21
ES	17.6	0.93	6.1	8.03	4	298	8
FI	8.7	0.77	0.0	8.02	6	269	20
FR	6.2	0.49	1.2	7.71	10	132	19
HU	16.6	0.72	0.4	7.57	5	340	14
IE	5.3	0.44	2.2	7.73	6	76	9
IT	11.0	0.68	6.1	8.41	10	340	15
LT	15.2	0.53	54.5	9.75	10	166	15
LU	8.2	0.50	8.3	8.38	10		
LV	8.0	0.33	14.2	6.91	5	279	7
MT	28.7	1.50	0.0	8.69	6		
NL	7.0	0.54	0.2	7.68	7	180	9
PL	21.4	0.91	1.7	7.77	5	418	40
PT	17.6	1.22	7.1	8.81	10	328	8
RO	7.8	0.24	0.5	7.15	7	202	108
SE	6.2	0.68	0.0	7.85	10	122	2
SI	8.5	0.53	0.1	7.70	10	260	22
SK	8.8	0.29	1.9	7.58	10	325	31
UK	4.4	0.28	0.1	7.06	6	105	8

 Table 5.10
 Selected national level variables for VAT-related administrative burden for firms, 2007-2008

The variables themselves have been described in Table 5.4. Country codes are standard EU abbreviations for member states. Sources. *abvat_rev, abvat_gdp, nonEU_ab* and *logabfirm*: data and calculations based on data from CapGemini, Deloitte & Ramboll Management (2009); *inv_yrs*: data from van der Corput and Annacondia (2008); *antaxpmt* and *antaxtime* : data from Djankov et al. (2008).

References

Annacondia, F. & W. van der Corput (eds.), 2010, EU VAT Compass 2010 / 2011, IBFD.

- Annacondia, F. & W. van der Corput, 2008, VAT registration thresholds in Europe, *International VAT Monitor*, Nov/Dec 2008, 453-457
- CapGemini, Deloitte & Ramboll Management, 2009, *Final report: Measurement data and analysis, Report on Tax Law (VAT) Priority Area*, EU Project on baseline measurement and reduction of administrative costs (ENTR/06/061), March 2009, Brussels.
- Copenhagen Economics, 2007, Study on reduced VAT applied to goods and services in the member states of the European Union, Final report + Annexes, Commissioned by EC, DGTAXUD, Copenhagen.
- Corput, W. van der, 2004, VAT Options exercised by the New member states, *International VAT Monitor*, Sept/Oct. 2004, 318-332.
- Corput, W.van der and F. Annacondia, 2008, VAT Compass 2008, IBFD, Amsterdam.
- De Bruijn, R., H. Kox and A. Lejour, 2008, Economic benefits of an integrated European market for services, *Journal of Policy Modeling* 30(2), 2008, 301-319
- de la Feria, R., 2009, *The EU VAT System and the Internal Market*, Doctoral Series vol. 16, International Bureau of Fiscal Documentation.
- de Witt, G., 1995, The European VAT experience, Tax Notes International, 10(2), 49-54.
- Diemer, R., 2010, *Implementation of the sectoral reduction plan in the field of VAT*, Presentation before HLG of Independent Stakeholders on Administrative burdens, May 20th, 2010, European Commission /Taxation and Customs Union, Brussels.
- Djankov, S. et all., 2008, *Paying Taxes*, World Bank Cost of Doing Business project and PriceWaterhouseCooper, Washington 2008.
- Djankov, S., R. La Porta, F. Silanes, and A. Schleifer, 2003, Courts, *The Quarterly Journal of Economics*, May 2003.

Ernst & Young, 2008, The 2008 worldwide VAT and GST guide, Ernst & Young UK.

European Commission, 2003, Internal Market Scoreboard, EC, Brussels.

- European Commission, 2006, VAT rates applied in the member states of the European Union, DOC/1829/2006, European Commission, ECFIN-TAXUD, Brussels.
- Eurostat/ European Commission, 2010, *Taxation trends in the European Union data for the EU member states, Iceland and Norway, 2010 edition*, Eurostat/ European Commission
- High Level Group of Independent Stakeholders on Administrative Burdens, 2009, *Opinion of the High Level Group: priority area Taxation (VAT)*, 29 May 2009, Brussels.
- Kox, H. and A. Lejour, 2006, The effects of the Services Directive on Intra-EU Trade and FDI, *Revue Economique* 57(4), 2006, 747-769.
- Kox, H., A. Lejour and R. Montizaan, 2004, *The free movement of services within the EU*, Document no. 69, Revised October 2005, CPB , The Hague. <u>http://www.cpb.nl/sites/default/files/publicaties/download/free-movement-services-within-eu.pdf</u>
- Kox, H. and H. K. Nordås (2007), Services Trade and Domestic Regulation, OECD Trade Policy Working Papers, No. 49, OECD Publishing. doi: 10.1787/154365452587
- Le Jeune, I. et al., 2010, Study on the feasibility of alternative methods for improving and simplifying the collection of VAT through the means of modern technologies and/or financial intermediaries, Commissioned by EC, DGTAXUD, Final report, Price Waterhouse Coopers.
- Ministry of Finance, et al., 2005, *International comparison of measurements of administrative burdens related to VAT in the Netherlands, Denmark, Norway and Sweden*, Co-production of Ministry of Finance, the Netherlands, Danish Commerce and Companies Agency, Ministry of Trade and Industry, Norway and Swedish Business Development Agency.
- Nicoletti, G., S. Scarpetta, and O. Boylaud, 2000, *Summary indicators of product market regulation with an extension to employment protection legislation*, OECD Economic Department Working paper no. 226, Paris.
- Nordås, H. K. and H. Kox (2009), Quantifying Regulatory Barriers to Services Trade, OECD Trade Policy Working Papers, No. 85, OECD Publishing. <u>http://www.oecd-</u> ilibrary.org/trade/quantifying-regulatory-barriers-to-services-trade_5kgkcjqsm6kd-en

- OECD, 2006, *International VAT/GST Guidelines*, OECD Centre for Tax Policy and Administration, Paris.
- Skatteverket, 2006, *Compliance costs of value added tax in Sweden*, report 2006/3b, Solna, http://www.skatteverket.se/download/18.906b37c10bd295ff4880002550/rapport200603B
- Somers, J. (ed.), 1995, *VAT* & sales taxes worldwide a guide to practice and procedures in 61 countries, Ernst & Young International, London: John Wiley & Sons.
- Verwaal, E. and S. Cnossen, 2002, Europe's New Border Taxes, *Journal of Common Market Studies*, 40 (2), 309-330.
- Vos, R., N. Lawrence and D. Jordorson (eds.), 1994, *Tolley's VAT in Europe*, Nexia International, Tolley, Croydon

World Bank, 2011, Cost of Doing Business Database, World Bank

Annex A. Methodology for constructing dissimilarity indicators

An indicator of the dissimilarity of different countries' VAT regimes has to address the multi-dimension problem that is inherently present in comparing different institutional VAT settings. There are several dimensions in which the relevant national VAT regulations may differ between countries. The bilateral VAT dissimilarity index may grasp how much national VAT policy differences between to trading countries differ.

A.1. Desired properties of the VAT dissimilarity indicator

The indicator should preferably be a decomposable, bilateral quantitative index. Moreover, since we cannot – and do not want to – judge the appropriateness of individual VAT policies in individual countries, the VAT dissimilarity index and the way it is aggregated should therefore be independent of judgements on specific policy items. The indicator should have the following seven properties: (a) increase in the degree of VAT regime differences, regarding regulation contents and implementation form; (b) allow aggregation over multiple dimensions with respect to which regulation items may differ; (c) yield a single numerical indicator; (d) be specific for each country pair; (e) allow aggregation independent of a set of subjective weights; (f) be independent of judgements on a priori criteria about specific VAT policies in countries, no matter whether these criteria are subjective or based on specified objective; and (g) be decomposable with respect to specified VAT regulation aspects.

A.2. VAT dissimilarity analysis based on qualitative policy data

The basic principle of the VAT dissimilarity indicator is that multiple-dimension qualitative policy information is reduced to dimensionless binary information. The latter can be aggregated to heterogeneity indicators that satisfy the seven criteria specified in the preceding section.

Specific for each country pair

Let there be some regulation attribute R for which it can unequivocally be assessed whether or not it applies in a country. This gives logical information: $R \in \{1,0\}$, so that regulation attribute R can also be used to compare two countries. For any two countries (*i* and *j*) dissimilarity indicator h_{ij}^R has the value of *I* when both countries are dissimilar with respect to *R*, and *0* in the opposite case. The dissimilarity indicator h_{ij}^R is specific for each possible country pair. For *n* countries we have:

$$h_{ij}^{R} \in \{1,0\} \quad for \ \forall i, j \subset (1,..,n)$$

$$\tag{1}$$

From a perspective of informational content, not all dissimilarity indices are interesting. Trivial are the cases of self-similarity (h_{ii}^R, h_{jj}^R) and the cases of bi-directional similarity, i.e. $h_{ij}^R \equiv h_{ji}^R$. The pair-wise comparisons can be gathered in a $n \times n$ dissimilarity matrix H^R . Weeding out the cases of self-similarity (matrix diagonal) and bi-directional similarity (below diagonal) we get a dissimilarity matrix with many blank elements. For a case of four countries (a,b,c,d) the dissimilarity matrix for regulation attribute *R* looks like:

$$H^{R} = \begin{bmatrix} h_{aa}^{R} & h_{ba}^{R} & h_{ca}^{R} & h_{da}^{R} \\ h_{ab}^{R} & h_{bb}^{R} & h_{cb}^{R} & h_{db}^{R} \\ h_{ac}^{R} & h_{bc}^{R} & h_{cc}^{R} & h_{dd}^{R} \\ h_{ad}^{R} & h_{bd}^{R} & h_{cd}^{R} & h_{dd}^{R} \end{bmatrix} = \begin{bmatrix} . & h_{ba}^{R} & h_{ca}^{R} & h_{da}^{R} \\ . & . & h_{cb}^{R} & h_{db}^{R} \\ . & . & . & . & h_{dc}^{R} \\ . & . & . & . & . \end{bmatrix}$$
(2)

The system can easily be expanded from single-attribute indicators to a system dealing with multiple regulation attributes. Suppose countries are compared over a set of R_s (s=1,2,..,m) different regulation attributes, resulting in *m* dissimilarity indicators for each country pair. This produces a $n^2 \times m$ dissimilarity matrix H^{Rs} . After again weeding out the informational redundancies the matrix in the four-country case reads as:

How large should m be? A single policy attribute for which we compare two countries is just a sample for policy heterogeneity. We are not interested in this particular policy item as such. Rather, we consider it as a specimen from which we can derive that the

two countries could have structural or pervasive policy differences in place. With m close to unity it is more likely that the policy-difference picture blurred by incidental sampling errors. One then may easily find average heterogeneity values that are either close to zero or close to unity. Using a larger number of observations diminishes the probability of sampling errors with respect to structural policy differences between countries. Structural (dis)similarities in policy are asymptotically approximated by a larger number of regulation attributes. In practical terms, by considering more than - say- hundred different policy attributes, it is very unlikely that we only get an incidental or atypical picture of bilateral policy differences.

Aggregation possible over multiple dimensions

Matrix H^{R_s} reduces the dimensions of regulation attributes R_s to *m* dimensionless numbers that can be aggregated in several directions: per country pair, across countries, across subsets of regulation attributes.

Yield a single numerical indicator

Average bilateral VAT dissimilarity per country pair over the *m*-dimension set R_s regulation attributes is:

$$HG_{ij}^{Rs} = \frac{1}{m} \sum_{r}^{m} h_{ij}^{Rs} \qquad \forall i, j ; s = 1,...,m$$
(4)

The elements of the set h_{ij}^{Rs} are either zero or one, so that: $0 \le HG_{ij}^{Rs} \le 1$. If the indicator is close to unity, both countries have very dissimilar policies. Matrix H^{Rs} may also be used to identify countries with strongly diverging policies vis-à-vis all other countries. This is measured by the country deviancy indicator. For country *i* it can be defined as:

$$DV_{i}^{Rs} = \frac{1}{n \cdot m} \sum_{i}^{n} \sum_{s}^{m} h_{ij}^{Rs}$$
(5)

The country deviancy indicator can if necessary be expressed in relative terms by normalising it with the average for all countries. Note that two countries with a low score on the deviancy indicator do not necessarily have similar policies, since the indicator just registers the existence of regulation differences, not the actual content of regulations.

Decomposable with respect to specified VAT regulation areas

Finally, matrix H^{R_s} can be used to calculate average heterogeneity across any preferred subset of the R_s regulation vector, or for any sub-set of countries.

Increase in the degree of regulation differences

So far we dealt with *binary* regulation attributes that either apply or do not apply in a country: $R_i \in \{1,0\}$. In principle any regulation could be described in binary terms, but this may either be too unpractical due to the required amount of detailed taxonomic work, or simply because the necessary regulation data are not available for international comparison. Many comparison items are of a more complex nature than simple yes-no questions, meaning that difference between countries can only be described in terms of distinct implementation modes. This can be labelled *categorical* regulation information. The actual implementation of a regulation is grouped into a limited number of discrete and mutually exclusive implementation modes. Consider regulation attribute Rp that can be implemented in *k* different modes $(p_1, p_2, ..., p_k)$, so that for any country *i* we may find k+1 different values for Rp: $R_{pi} \in \{0, p_1, p_2, ..., p_k\}$ as Figure 1 shows. The case of binary policy attributes is a special case, with k=1.



Figure A1. Dealing with categorical VAT regulation attributes (discrete categories)

The introduction of multiple implementation modes increases the number of possible regulation differences. The likelihood that two countries have different policies in place increases. Assume that countries are independent and that the presence of a certain regulation attribute in one country has no impact on its presence in the other country (random draw). For any country *i* we may find k+1 different policies¹²³ in place $(0, R_{p1}, R_{p2}, ..., R_{pk})$. Hence, for any pair of countries 2(k+1) different VAT regulation combinations are possible. The probability of each combination is $[2(k+1)]^{-1}$. Since there are k+1 different policies, the probability that we find identical policies in both countries is: $(k+1)^{-1}$. The probability that we find different (heterogeneous) VAT regimes is:

$$\Pr\left(h_{ij}^{Rp}=1\right) = \frac{k}{k+1} \tag{6}$$

The heterogeneity indicator increases in k, the number of allowed VAT regulation modes. E.g. for k=1, k=5 and k=9 the probabilities are 0.5, 0.8 and 0.9. Especially for continuous numerical variables k goes to infinity. It is useful therefore to apply a coarse-graining procedure that reduces the numerical variety by distinguishing a discrete number of numerical intervals. At the end of this annex, we describe the decision rules for the coarse-graining procedure that was applied applied in the construction of the VAT disimilarity indicators.

Multiple implementation modes magnify the VAT-regime dissimilarity matrix H^{Rs} to dimensions $n^2 \times m \times g$, where g is the maximum number of implementation modes that holds for any of the regulation attributes. Regulation attributes for which it holds that g > k will effectively be represented in the matrix by blank elements for the implementation modes $\{k, ..., g\}$. In the summary indicators we can correct for the number of blanks in the relevant rows or columns.

After adding the implementation modes as comparison dimensions, the country deviancy indicator becomes:

$$DV_{i}^{Rps} = \frac{1}{n \cdot m \cdot k} \sum_{j}^{n} \sum_{s}^{m} \sum_{p}^{k} h_{ij}^{Rps}$$
(7)

¹²³ Including the possibility that a particular country has no VAT regulation in place for a particular policy item.

Aggregation independent of subjective weights

The heterogeneity indicator HG_{ij}^{Rs} is based on an unweighted average over all relevant regulation attributes. This has the advantage that the composite heterogeneity indicator is not based on subjective information elements. In the paper to be produced we will illustrates through an example how the bilateral VAT dissimilarity indicator is calculated and aggregated.

Independent of pre-defined judgements on specific policies

VAT dissimilarity indices and country deviancy indicators are dimensionless numbers. They give no information about the nature of the dissimilarity itself, nor on the question whether a player is high/low, strict/lenient or intensive/extensive with regard to a particular VAT regime characteristic. The indicator is primarily a frequency count for bilateral policy differences. It can be decomposed for policy differences in specific VAT domains. If one is interested in these aspects, the indicators will have to be used in combination with a dimensioned level indicator. The main text proposes a number of level indicators of VAT-related trade costs and administrative burden for firms that may help to identify - for each country pair - which of both is the one where trade costs and VAT-related administrative burdens are probably lowest. It should be realised however that even for a given country pair this hierarchy may differ by VAT comparison item.

A.3. Coarse-graining procedure applied for numerical variables

Some variables used for calculating the VAT dissimilarity indices have a continuous numerical value, e.g. the sales threshold for being eligible for quarterly VAT refund, with sales measured in thousand euros. Continuous numerical variables, by their nature, can have lots of different values. It would make no sense that all different values of a numerical variable, irrespective of their size magnitude, are regarded as a VAT-regime heterogeneity element. To avoid that we may classify, per numerical comparison item, all numerical values into a limited number of intervals. E.g. for a variable that across member states differs between 0 and 20, we might choose for four intervals (less than 1, 1-8, 9 to 15, above 15). This reduces the potential heterogeneity scope for this variables to just four different country scores. This variety-reducing method for continuous numerical variables redistributes all numerical differences to minimally three and maximally six different intervals, depending on the distribution characteristics of the

actual country scores. The same decision rule decides for the choice between either 3, 4, 5 or 6 intervals for a particular numerical item:

- Per variable we first determine the maximum range that contains all numerical values in the sample.
- The range is divided by the standard deviation, yielding a value *K*.
- The next step takes care of the higher moments of the distribution by a correction factor *E* that corrects for the relation between the mean and the standard deviation. The correction factor is calculated as: $E = 1 \frac{M \sigma}{(\sigma M)^2}$ in which *M*

is the mean value and σ is the standard deviation. The denominator is squared so that it is always positive for values $\sigma \neq M$.

Now it is possible to determine the potential number of different value intervals for that numerical variable, using a lower threshold of three categories and a ceiling of maximum six categories:

$$\begin{cases} Z = 6 & if \left| \operatorname{int} (K.E) \right| > 6 \\ Z = \left| \operatorname{int} (K.E) \right| > 6 & if \quad 3 \le \left| \operatorname{int} (K.E) \right| \le 6 \\ Z = 3 & if \quad \left| \operatorname{int} (K.E) \right| < 3 \end{cases}$$

This coarse-graining procedure is applied individually for each continuous numerical variable. Subsequently, for all countries the continuous variable is re-coded according to the number of intervals Z.

Used for indicator:	Comp arison item no.	Description	Nature	Source no.(at bottom)	endnote no.
HVGEN	1	Standard VAT rate	level	7	
HVGEN	2	Using reduced rates?	Y/N	7	
HVGEN	3	Reduced VAT rate 1	level	7	
HVGEN	4	Multiple reduced rates?	Y/N	7	
HVGEN	5	Reduced VAT rate 2	level	7	
HVGEN	6	Does super reduced rate exist?	Y/N	7	
HVGEN	7	Super-reduced VAT rate	level	7	
HVGEN	8	Does Parking VAT rate exist?	Y/N	7	
HVGEN	9	Parking VAT rate	level	7	
HVGEN	10	Regional exemptions within country?	Y/N	1	а
HVGEN	11	No. of goods to which parking rates apply	level	1	
HVGEN	12	No. of services to which parking rates apply	level	1	
HVGEN	13	No. of goods & serv. categories to which super reduced rates apply	level	1	b
HVGEN	14	No. of categories goods & services to which zero rate applies	level	1	
HVGEN	15	Exemptions on Leasing & letting of immovable property?	Y/N	7	
HVGEN	16	Exemptions on financial services?	Y/N	7	
HVGEN	17	Exemptions on supply of other buildings than new buildings?	Y/N	7	
HVGEN	18	Exemptions on land other than building land?	Y/N	7	
HVGEN	19	Full zero rate on provisions of supplies and fuel to sea vessels, recue vessels and war vessels?	Y/N	7	
HVGEN	20	Variability of standard VAT rates across 7 tradable services (CoV)	level	own_calc	С
HVGEN	21	Variability of standard VAT rates across 18 tradable goods (CoV)	level	own_calc	d

Annex B. Items used for construction of dissimilarity indices

Used for indicator:	Comp arison item no.	Description	Nature	Source no.(at bottom)	endnote no.
HVGEN	22	Variability of standard VAT rates across 25 tradable goods/services (CoV)	level	own_calc	е
HVGEN	23	Number of national VAT obligations going beyond EU VAT requirements (options identified in EU Act)	level	16	f
HVGEN	24	Number of national VAT obligations going beyond EU requirement (NOT identified in EU Act)	level	16	f
HVGEN	25	Number of EU VAT requirements NOT transposed in national tax law	level	16	
HVGEN	26	Country's legal origin	categ	17, 18	g
HVADM	27	VAT registration threshold?	Y/N	2	
HVADM	28	Multiple VAT regist. thresholds?	Y/N	2	
HVADM	29	VAT registration threshold 1 (in 1000 euros 2006)	level	2	
HVADM	30	VAT registration threshold 2 (euros 2006)	level	2	
HVADM	31	Distance-selling threshold (in 1000 euros)	level	7	
HVADM	32	Intra-Commun. Acquisition threshold (in 1000 euros)	level	7	
HVADM	33	Does threshold retail export scheme exist (Y/N)	Y/N	7	
HVADM	34	Threshold retail export scheme (in 1000 euros)	level	7	
HVADM	35	Threshold for annual refund of VAT (in 1000 euros)	level	7	h
HVADM	36	Threshold for quarterly refund of VAT (in 1000 euros)	level	7	h
HVADM	37	Optional reverse charge: assembly and installation supplies	Y/N	7	i
HVADM	38	Optional reverse charge: services connected to immovable property	Y/N	7	i
HVADM	39	Optional reverse charge: hiring- out of means of transport	Y/N	7	i
HVADM	40	Optional reverse charge: work on movable goods	Y/N	7	j
HVADM	41	Optional reverse charge: All other supplies	Y/N	7	i

Used for indicator:	Comp arison item no.	Description	Nature	Source no.(at bottom)	endnote no.
HVADM	42	Are suppliers in EU member states obliged to appoint a VAT representative? (Y/N)	Y/N	7	k
HVADM	43	Is voluntary appointment of VAT representative for EU suppliers unconditio-nal? (Y/N)	Y/N	7	k
HVADM	44	Voluntary appointment of VAT representative for EU suppliers? (Y/N)	Y/N	7	k
HVADM	45	Contracting partner's joint and several liability? (Y/N)	Y/N	7	I
HVADM	46	Is contracting partner's joint and several liability conditional? (Y/N)	Y/N	7	I
HVADM	47	Can excess input tax be carried forward unconditio-nally?	Y/N	7	m
HVADM	48	Conditional carry forward of excess input tax?	Y/N	7	m
HVADM	49	Immediate refund of excess input tax?	Y/N	7	m
HVADM	50	Conditional refund possible of excess input tax?	Y/N	7	m
HVADM	51	Postponed accounting VAT imported goods possible?	Y/N	7	n
HVADM	52	Postponed accounting VAT imported goods only conditionally possible	Y/N	7	n
HVADM	53	Storage of invoices: general storage period (in years)	Y/N	7	
HVADM	54	Storage of invoices: do exceptions exist for firms?	Y/N	7	
HVADM	55	Filing deadline (in days)	level	7	
HVADM	56	Do interim payment deadlines exist?	Y/N	7	
HVADM	57	Penalty for late submission of VAT return by VAT-due firms?	Y/N	7	0
HVADM	58	Maximum penalty for late or incorrect submission of VAT return as percentage of VAT amount due	level	8	
HVADM	59	Maximum penalty for late or incorrect submission of VAT return in euros	level	8	

Used for indicator:	Comp arison item no.	Description	Nature	Source no.(at bottom)	endnote no.
HVADM	60	Intrastat reporting thresholds for arrivals (in 1000 euros)	level	8	
HVADM	61	Intrastat reporting thresholds for dispatches (in 1000 euros)	level	8	
HVADM	62	Maximum penalty for late or missing Intrastat declaration (in 1000 euros)	level	8	
HVADM	63	Time limit for the issue of VAT invoices ?	Y/N	7	р
HVADM	64	Time limit for the issue of VAT invoices, goods (in weeks)	Y/N	7	р
HVAB_	65	Administrative burden costs of VAT as % of national VAT income (measure of VAT tax efficiency)	level	16, own calc	q
HVAB_	66	Administrative burden costs of VAT as % of GDP	level	16, own calc	q
HVAB_	67	Share (%) of administrat. burden due to national obligations beyond EU VAT requirements	level	16, own calc	f
HVAB_	68	Average per firm of total administrative burden of VAT- related software (in euros)	level	16, own calc	r
HVAB_	69	Avg. tot. admin. burden p.firm for inspectable VAT bookkeeping (in euros)	level	16, own calc	r, s
HVAB_	70	Avg. tot. admin. burden p.firm for submission of a periodical VAT return (in euros)	level	16, own calc	r, t
HVAB_	71	Avg. tot. admin. burden p.firm for submission of an intra-Community sales listing (in euros)	level	16, own calc	r, u
HVAB_	72	Avg. tot. admin. burden p.firm for the issuance of a VAT invoice (in euros)	level	16, own calc	r
HVAB_	73	No. of separate tax payments (number)	level	17, 19	v
HVAB_	74	Time required for complying with tax payments (hours)	level	17, 19	w
HVSRAT	75	Foodstuffs	level	1	
HVSRAT	76	Water supplies	level	1	
HVSRAT	77	Pharmac	level	1	
HVSRAT	78	Medical equipm. disabled persons	level	1	

Used for indicator:	Comp arison item no.	Description	Nature	Source no.(at bottom)	endnote no.
HVSRAT	79	Books	level	1	
HVSRAT	80	Newspapers	level	1	
HVSRAT	81	Periodicals	level	1	
HVSRAT	82	Agricult. inputs	level	1	
HVSRAT	81	Passeng. transport	level	7	
HVSRAT	82	Admission to cult. services	level	1	
HVSRAT	83	Pay / cable TV	level	1	
HVSRAT	84	Writers / composers	level	1	
HVSRAT	85	social housing	level	1	
HVSRAT	86	hotel accomod.	level	1	
HVSRAT	87	Admiss. sporting events	level	1	
HVSRAT	88	use of sport facilities	level	1	
HVSRAT	89	social services	level	1	
HVSRAT	90	medic. & dental care	level	1	
HVSRAT	91	Waste collecttion	level	1	
HVTG_	92	Spirits	level	1	
HVTG_	93	Wine	level	1	
HVTG_	94	Beer	level	1	
HVTG_	95	Mineral water	level	1	
HVTG_	96	Electricity	level	1	
HVTG_	97	Cut flowers	level	1	
HVTG_	98	Plants for food production	level	1	
HVTG_	99	Children clothing and footwear	level	1	х
HVTG_	100	Adult clothing	level	1	
HVTG_	101	Adult footwear	level	1	
HVTG_	102	Tobacco	level	1	
HVTG_	103	HiFi- video appliances	level	1	
HVTG_	104	CD/ CDRoms	level	1	
HVTG_	105	Household electrical appliances	level	1	
HVTG_	106	Pesticides, plant protection materials	level	1	

Used for indicator:	Comp arison item no.	Description	Nature	Source no.(at bottom)	endnote no.
HVTG_	107	Fertlizers	level	1	
HVTG_	108	Petrol (unleaded)	level	1	
HVTG_	109	Motor vehicles	level	1	
HVTS_	110	Intra-EU and internat. rail transport	level	1	
HVTS_	111	Intra-EU and internat. road transport	level	1	
HVTS_	112	Phone/fax /telex, etc	level	1	
HVTS_	113	Passenger domest. rail transport	level	1	
HVTS_	114	Construction work on new buildings	level	1	
HVTS_	115	Travel agencies	level	1	
HVTS_	116	Treatment of waste and waste water	level	1	У
HVADREG	117	Procedures for starting a business (number)	level	17	
HVADREG	118	Time procedures for starting a business (days)	level	17	
HVADREG	119	Cost of regulation-related procedures for starting a business (% of inc. p. capita)	level	17	
HVADREG	120	Min. capital for starting a business (% of inc.p. capita)	level	17	
HVADREG	121	No. of documents required for export (number)	level	17	
HVADREG	122	Time for approval of export (days)	level	17	
HVADREG	123	No. of documents required for import (number)	level	17	
HVADREG	124	Time for approval of import (days)	level	17	
HVADREG	125	No. of procedures for enforcing of contracts	level	17	
HVADREG	126	Time required for enforcing of contracts (days)	level	17	
HVADREG	127	Cost of enforcing of debt contract (% of debt)	level	17	

Data sources 2008 (or closest available year) for the comparison items

Source no.	Reference
1	EU,ECFIN-TAXUD, VAT rates applied in the member states of the European Union, DOC/1829/2006, European Commission 2006.
2	Annacondia, F. & W. van der Corput, 2008, VAT registration threshold in Europe, Internat. VAT Monitor, Nov/Dec 2008, 453-457
3	Int. VAT Monitor, Sixth VAT Directive text 1 Jan 2006, IBFD, Amsterdam
4	W.v.d.Corput and F Annacondia, 2007, VAT Compass 2007, IBFD, Amsterdam 2007
5	Practical information on European VAT, International VAT Monitor, IBFD , Jan/Febr 2006.
6	Annacondia, F. & W. van der Corput, 2005, VAT registration threshold in Europe, Internat. VAT Monitor, Nov/Dec 2005, 434-436
7	W.v.d.Corput and F Annacondia, 2008, VAT Compass 2008, IBFD, Amsterdam 2008
8	Ernst & Young, 2008, The 2008 worldwide VAT and GST guide, Ernst & Young UK
9	W. v.d. Corput, 2004, VAT Options exercised by the New member states, International VAT Monitor, Sept/Oct. 2004, 318-332.
10	Eurostat/ European Commission, 2010, Taxation trends in the European Union - data for the EU member states, Iceland and Norway, 2010 edition, Eurostat/ European Commission
11	F. Annacondia & W. v.d. Corput, 2005, Overview of general turnover taxes and tax rates, VAT Monitor, Marc/April 2005, 1-11
12	Practical information on European VAT, International VAT Monitor, IBFD , Jan/Febr 2004.
13	R.Vos, N. Lawrence & D. Jordorson (eds.), 1994, Tolley's VAT in Europe, Nexia International, Tolley: Croydon.
14	J. Somers (ed.), 1995, VAT & sales taxes worldwide - a guide to practice and procedures in 61 countries, Ernst & Young International, London: John Wiley & Sons.
15	I. Desmeytere, 2003, VAT registration in Europe, VAT Monitor, May/June 2003, 197-209.
16	CapGemini, Deloitte & Ramboll Management, 2009, Final report: Measurement data and analysis, Report on Tax Law (VAT) Priority Area, EU Project on baseline measurement and reduction of administrative costs (ENTR/06/061), March 2009, Brussels.
17	World Bank, Cost of Doing Business Database, World Bank.
18	Djankov, S., R. La Porta, F. Silanes, and A. Schleifer, 2003, Courts, The Quarterly Journal of Economics, May 2003.
19	Djankov, S. et all., 2003, Paying Taxes, World Bank Cost of Doing Business project and PriceWaterhouseCooper, Washington 2008.

End notes to the comparison items

а	For parts of the country that also form part of the EU and
b	List is non-exhaustive according to data source
C	Calculated as Coefficient of Variation of VAT rates for all 7 listed traded services categories.
d	Calculated as Coefficient of Variation of VAT rates for all 18 listed traded good categories.
е	Calculated as Coefficient of Variation of VAT rates for all 25 listed traded good and services categories.
f	Refers to national VAT requirements that are not stated in the EU Acts on VAT.
g	Similarity of a country pair's legal origins can influence a firm's costs of dealing with legal conflicts with foreign government related to VAT issues.
h	Minimim numbers, applies to non-resident traders.
i	Optional reverse charge mechanism applicable to supplies made by non-resident suppliers.
j	Optional reverse charge mechanism applicable to supplies made by non-resident suppliers. Does not include services rendered to customers identified for VAT purposes in another member state.
k	Where non-resident suppliers are liable to pay the tax, member states may allow them to appoint a tax representative as the person liable for payment of the tax ("voluntary representation").
1	Where non-resident suppliers are liable to pay the tax, Memer States may provide that, in addition to the supplier's tax representative, some other person, usually the customer, may be held jointly and severally liable for the payment of the tax (Art.21.3 of the Sixth Directive; art 205 of Directive 2006/112).
m	When for a given tax period, deductible input taxes exceed output tax, member states may require that the excess is carried forward to following tax period(s).
n	Regarding imported goods, member states may provide that (in designated circumstances) VAT on importation does not need to be paid to the customs officials at the time the goods are released from customs control or periodically ("on deferred terms") but instead by the person for whom the goods are destined, through the latter persons'periodic VAT return ("postponed accounting").
0	This indicator refers to a specific fine or penalty. Apart from that, most countries charge a penalty interest rate on the amount due.
р	member states may impose time limits for the issue of invoices, counting from the date on which the taxable event occurs.
q	Administrative Costs can be split in 'businesss-as-usual' costs (arising from information costs that firms would collect even in the absence of a specific legislation) and 'administrative burden' (information costs arising from a specific legal or regulatory obligation).

r	Average administrative burden per firm (across all firm size classes) for "VAT bookkeeping in sufficient detail for inspection by tax authorities" (in euros). For the countries for which the detailed adm. burden indicators were not measured in the source document (16), we take the value for France as the starting point for extrapolation to the orher EU countries. We used the actually measured countries in source(16) to calculate the optimal weight algorithm, with France as point of departure. The optimal weights, showing the smallest average deviations from the actual values were obtained by the use of the following weights: $(1.5 / 2)$ times the difference with France with respect to subindicator 65; $(0.1 / 2)$ times the difference with France with respect to subindicator 74; and $(0.3 / 3)$ the difference with France with respect to subindicator 67.
S	Average administrative burden per firm (across all firm size classes) for for "VAT bookkeeping in sufficient detail for inspection by tax authorities" (in euros).
t	Each member state has its own unique process for submission of VAT return. "Every taxable person shall submit a VAT return setting out all the information needed to calculate the VAT amount taxable, the VAT amount deductible, as well as, [] the total amount on which VAT is chargeable and deductible, as well as the value of any VAT exempt transaction".
u	"Every taxable person identified for VAT purposes shall submit a recapitulative statement of the acquirers identified for VAT purposes to whom he has supplied goods [], and of the persons identified for VAT purposes to whom he has supplied goods which were supplied to him by way of intra-Community acquisitions []".
v	World Bank/ Price Waterhouse, "Paying Taxes", World Bank Cost of Doing Business 2007: The tax payments indicator reflects the total number of taxes and contributions paid, the method of payment, the frequency of payment and the number of agencies involved for this standardised case during the second year of operation. It includes payments made by the company on consumption taxes, such as sales tax or value added tax. The number of payments takes into account electronic filing. Where full electronic filing is allowed and it is used by the majority of medium-sized businesses, the tax is counted as paid once a year even if the payment is more frequent.
W	 World Bank & PriceWaterhouse, "Paying Taxes", World Bank Cost of Doing Business 2008: Time is recorded in hours per year. The indicator measures the time to prepare, file and pay (or withhold) three major types of taxes and contributions: corporate income tax, value added or sales tax, and labour taxes including payroll taxes and social contributions. Preparation time includes the time to collect all information necessary to compute the tax payable. If separate accounting books must be kept for tax purposes – or separate calculations made – the time associated with these processes is included. This extra time is included only if the regular accounting work is not enough to fulfil the tax accounting requirements. The time estimated also does not include the time spent developing the entries on tax for inclusion in

	the statutory accounts. Filing time includes the time taken to complete all necessary tax forms and to make all necessary calculations and submissions. Payment time is the hours needed to make the payment online, or at the tax office. Where taxes and contributions are paid in person, the time includes delays while waiting. This payment time can also include analysis of forecast data and associated calculations if advance payments are required.
х	In case of Poland: baby clothing.
у	In case of DE and IE : two tariffs (only lowest mentioned.