

# What is the cost of customs and borders across the supply chain?

## ... and how to mitigate the cost through better coordination and data sharing

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### Abstract

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This conceptual discussion paper examines the costs of customs and borders across the supply chain. It does that by considering relevant literature and looking back at the authors' respective contributions in the subject (of almost one and a half decades) with subsequent reflections. A key component of this paper is a cost model that seeks to describe relevant costs that can arise. That model is complemented with two case studies that explore how costs might be reduced. The first case study concerns the import of meat from Mercosur countries into the United Kingdom. The second case study concerns the shipment of flowers from Kenya into the Netherlands. A key finding is the scope for reform through improved information and data sharing and coordinated border management.

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### 1. Introduction

‘What is the cost of customs and borders across the supply chain?’ A deceptively simple question to ask, but a fiendishly difficult one to answer when considering how many different parties need to work together to move goods from one country to the next. But, finding answers to this question is important, whether it be in support of trade facilitation policy, performance measurement, cost–benefit-type investment decisions, or simply to advance the current understanding of trade costs. Perhaps most importantly, the ability to understand and describe costs also helps inform discussion about how to reduce them (Table 1).

And researchers have not shied away from the question. There are several helpful macrolevel studies (e.g. Mann, 2012) that provide valuable estimates about the cost of trade and customs procedures, and there are also several studies about the macroeconomic benefits derived from implementing trade facilitation type projects (e.g. Busse, Hoekstra & Königer, 2012). This literature has also helped make the economic case for trade facilitation (e.g. Wilson, Mann & Otsuki, 2005) and why the subject should be at the heart of contemporary trade and customs policy (e.g. WTO, 2017). There are also several studies that go beyond macroeconomic aspirations by focusing on the time and costs experienced at the macrolevel. This includes the largely unpublished WCO time-release studies (Matsuda, 2012; WCO, 2011) and the more broad-brush trade diagnostic studies funded by the World Bank and others (World Bank, 2016).

*Table 1: Examples of motivations for better understanding the costs of trade and customs procedures; by subject*

<b>Motivation by subject</b>	<b>Examples</b>
<b>Trade facilitation policy</b>	To better understand the administrative impact of trade and customs procedures upon the business community at home and abroad
	Hold other countries accountable to their trade facilitation related performance
	Hold own country accountable to its trade facilitation related performance
	Enable the setting of cost-related performance targets
<b>Performance measurement</b>	Inform trade policy makers about the cost of inefficient procedures
	Establish whether the price paid for outsourced services is fair
	Enable cost-focused benchmarking
	Support better definition of key performance indicators (KPIs)
<b>Cost–benefit analysis</b>	Enable informed investment decisions
	Identify which trade facilitation measures need to be prioritised
	Help companies justify investment into trade compliance capabilities (e.g. AEO)
<b>Research</b>	Test macroeconomic models from a microeconomic perspective
	Better understand the relevance of trade and customs-related costs for logistics and supply chain management
<b>Cost management</b>	To be able to clearly describe costs and better understand the circumstances in which they arise

While macroeconomic models in the evaluations of costs have their place, we argue that the devil is in the detail and must not be overlooked. All too often we hear businesses and policy makers refer to the challenges that follow on from not having cost figures that are robust enough or detailed enough. Subsequently, governments may delay investments in trade facilitation type measures, or not make them at all. Likewise, businesses may fail to enhance their customs management capabilities (e.g. into AEO type programs) and take advantage of advantageous customs procedures (Grainger, 2016). One might joke that ‘senior management does not like to say no to trade- and customs-related investment requests, it asks for a cost–benefit analysis instead’—which in the absence of robust cost figures is (almost) the same as saying no.

The challenge of determining costs—and for that matter, identifying scope for improvements—has not gone unrecognised. UN Economic and Social Commission for Asia and the Pacific (ESCAP), for example, recommends the application of business process analysis (BPA) principles in the evaluation of international supply chains and bottlenecks with Customs and other border agencies (UN ESCAP, 2012).

By taking inspiration from the current ‘as-is’ situation—as opposed to the abstract models prevalent in macroeconomic studies (and some microeconomic studies)—it is easier to identify scope for improvement and find ways to reduce the costs.

What makes the assessment of costs difficult is the fact that any cross-border operation requires a multitude of parties to work together, yet seldom does any one party have full visibility of the operation (Hesketh, 2010). Amongst contracting business, the parties involved in trade include:

- Traders: such as buyers, sellers, their agents and distributors
- Transport operators: such as shipping lines, airlines, railway companies, logistics and trucking companies
- Providers of trade services: such as banking, finance and insurance
- Operators of transport infrastructure: such as port terminals, airports, stevedores and handling agents, warehouses and port/business community systems
- Specialist service providers: such as freight forwarders, shipping agents and logistics service providers (Grainger, 2012).

The regulatory side of trade is equally diverse. While most trade and customs procedures are specific to the control of goods, related controls targeting the vehicles moving the goods (transport) and people operating the vehicles (drivers, seafarers, flight crews) or running the companies (owners, directors and employees) can be equally, if not more, disruptive. Depending on how one categorises the regulatory procedures, the number of regulatory requirements in a country like the UK or Netherlands can easily exceed 60 (e.g. Clark, 2003; Grainger, 2007) and concern themselves with: revenue collection; safety and security; environment and health; consumer protection; and trade policy (Grainger, 2011).

By reflecting back on our research—spanning almost one and a half decades—we wish to flesh out how costs attributable to trade and customs procedures can be categorised. By reference to two case studies, we also wish to share insights into how costs could be reduced. This paper is structured into five parts: a brief review of relevant literature; an overview of our methodology; our proposed trade costs model with specific focus on the costs associated with trade and customs procedures; two detailed case studies in the SPS area—one concerning the trade in meat between Mercosur and the United Kingdom and the other concerning the trade in flowers between Kenya and the Netherlands—with relevant recommendations; and a conclusion that highlights the value of making cost data transparent, for example by building data pipelines—an idea first published in the *World Customs Journal* by David Hesketh (2009).

## 2. Context

The subject of customs-related costs is not new, although it is still evolving. As mentioned in the introduction, there is an emerging body of macroeconomic literature (Mann, 2012) that concerns itself with our questions. Early examples include the models of Walkenhorst and Yasui (2003), which suggests a 1 per cent reduction in trade-related transaction costs can equate to an estimated worldwide aggregate welfare gain of USD 40 billion, and that of Wilson, Mann, Otsuki, and World Bank Development Research Group Trade (2003), which made a strong case for trade facilitation.

At the risk of overgeneralising, most macroeconomic-orientated authors concede that the detail is fiendishly complex. The details at the micro level are largely avoided or just touched upon in broad terms. But early work by the OECD (2001) does provide for a broad framework that distinguishes between direct and indirect costs. Direct costs are those related to making declarations (e.g. preparing the paperwork and submitting it), while indirect costs are those subsequent to inefficient trade and customs procedures (e.g. missed business opportunities and the loss of competitiveness).

Some inspiration for categorising costs can also be taken from the direct cost literature, where there is an ongoing debate (that unfortunately does not yet extend to the customs domain) about tax compliance costs. Relevant categories, inspired by the helpful work of Chris Evans (2008) are outlined in Table 2. Though, as Evans highlights, untangling costs is not without its challenges. And in international supply chain operations it is equally difficult to untangle costs, especially since responsibilities for shipment and compliance are usually split between the buyer, seller and their respective intermediaries (e.g. ICC, 2010). The overall exposure to cost is difficult to ascertain. Likewise, certain types of costs are fixed in nature (e.g. set-up costs and investment into supporting IT systems) and independent of the number of shipments and declarations. Businesses with low trade volumes (e.g. occasional and smaller traders) will find that the cost of trading is disproportionately higher than for those businesses with high volumes (e.g. freight forwarders) who are able to spread the fixed costs across a wider base (e.g. Verwaal & Donkers, 2003). Another challenge in identifying and allocating costs is that intermediaries, such as freight forwarders and shipping companies, often bundled their border-related services into a wider logistics offering that includes transport and storage. Subsequently, the actual costs incurred by these intermediaries are not transparent to the users of their services.

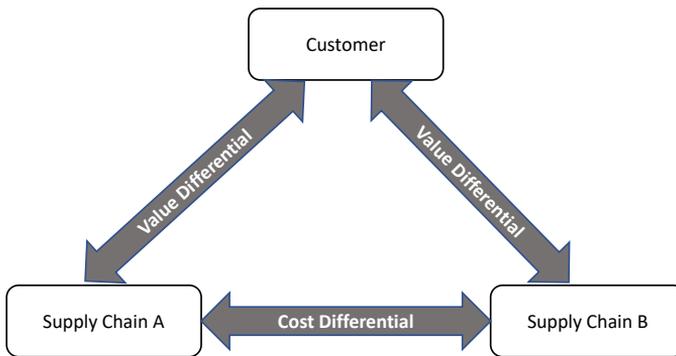
*Table 2: Identified compliance cost categories in the related direct tax literature*

<b>Cost categories</b>	<b>Examples</b>
Hard core (or direct) compliance costs	The cost of labour and time consumed, the costs of expertise purchased and supporting services, incidental expenses (e.g. computer equipment, software, travel and postage)
Psychological costs	Fear, stress, anxiety and frustrations experienced by those preparing tax declarations
Computational costs	Mandatory requirements associated with paying taxes; for example, the cost of applying for a VAT number or registering with the tax authority
Tax planning costs	The cost of seeking advice or putting special tax planning measures in place
Commencement costs	Any costs that arise from changes, e.g. in procedures, practices and legislations

*Source:* adapted from the work of Evans (2008)

Yet, understanding costs is critical for businesses if competitiveness is to be assured. One might say that in today’s business environment competition does not necessarily take place between competing firms, it takes place between competing supply chains (Christopher, 1992). Ideally, the organisations across the supply chain coordinate their efforts sufficiently well to minimise costs as much as possible. Competitive advantage thus stems from where one supply chain—as opposed to a single business—is able to serve its customers better in terms of cost and value than that of another supply chain (Figure 1). The challenge for managers concerned with weeding out costs is to make invisible—or difficult to disentangle—customs- and border-related costs more transparent. This, we argue, provides opportunities to better manage and reduce them; which in turn aids overall competitiveness.

Figure 1: Value and cost differentials as the source for competitive advantage



Adapted from (Christopher, 1992; Ohmae, 1983)

### 3. Method

We adopted a mixed method approach. Our cost model builds on various studies over a period of one and a half decades. Some of those studies concern the costs of trade and customs procedures explicitly (Grainger, 2013a, 2013b, 2014), while other studies touch upon those costs in the margins (Grainger, 2010, 2011, 2016). We have also let relevant literature from related fields guide our analysis, such as that of the direct tax literature (e.g. Evans, 2008), that of macroeconomics (e.g. Anderson & van Wincoop, 2004; Mann, 2012), and that of information technology with application in the cross-border domain (Rukanova, Huiden, & Tan, 2017; Tan, Bjørn-Andersen, Klein, & Rukanova, 2011).

Two case studies are presented for illustrative purposes and have also enabled us to test our understanding of costs. The first case study focuses on the meat trade between Mercosur and the UK. It draws on work first conducted in 2009 (Grainger, 2009) for the European Commission and then updated in 2013 (Grainger, 2013b) with specific focus on the cost of UK imports. Although the applicable trade and customs procedures have evolved since this research was originally undertaken, most of the findings—especially with regard to the duplication of costs—still apply. The second case study concerns the flower trade between Kenya and the Netherlands. It draws on recent research that was funded by the European Union and takes advantage of a trade data pipeline initiative—an idea that was first presented in this journal by David Hesketh (2009). It also shows how clever sharing of information can give rise to solutions that drastically reduce costs.

Our reflections about costs, their impact upon the supply chain, and ways to manage them better, were developed in a series of workshops amongst the authors in the first instance. They were then discussed with key informants for further validation and sense making (Klein & Myers, 1999; Miles & Huberman, 1994). Subsequent consultation cycles then led to this paper.

### 4. Our cost model

The literature in modelling trade costs is well established, although its focus is the macroeconomic (country) level. Key variables include transportation costs, retail and wholesale margins, and the border-related barrier costs (Anderson & van Wincoop, 2004). However, discussions about experienced trade and customs cost—other than in very broad terms (e.g. Sourdin & Pomfret, 2012)—are generally glossed over. One exception is the work of Walkenhorst and Yasui (2003), who distinguish between direct and indirect compliance costs. Considerable work has also been done in business and supply chain

modelling (Neely, 2005), which in turn can be applied to help better manage performance—for example through benchmarking and the setting of key performance indicators (KPIs) (e.g. Grainger & Shaw, 2018; Kaplan & Norton, 1992). Helpful work with a specific focus on the wider activities necessary to trade goods has led to the United Nations CEFAC’s ‘Buy-Ship-Pay Model’, which often is also referred to as the International Supply Chain Reference Model (Clark, 2003).

Table 3 builds upon that work by describing the types of trade costs, while Tables 4 and 5 expand upon those costs specific to complying with trade and customs procedures. We wish to point out that the costs experienced by businesses are also experienced by the administering border agencies—every document that is declared needs to be checked and approved by an official. The corresponding costs of the administrations need to be considered too (Table 6).

*Table 3: Trade cost model: transport, insurance, bank and finance, and value chain (excluding compliance costs)*

Key variable	Sub variables	Examples of cost areas
Transport costs	Operational costs	Vehicle specific: fuel, crew, depreciation, utilisation
		Route specific: cargo consolidation, storage, route fees and charges, levies
		Terminal specific: handling fees, booking and collecting fees, infrastructure levies, impact of congestion
	Transaction costs with the transport company or freight forwarder	Contracting costs between the buyer/seller and the transport company; performance and service monitoring; integration of IT systems between the shipper and the shipping company; communication costs; cost of making payment for services received
Insurance costs	Managing insurable risks	Cost of identifying and understanding risks; cost of implementing insurable risk reducing measures
	Transaction costs between companies and their underwriter	Procuring policies; amending and adjusting policies; making claims; paying out on claims

Key variable	Sub variables	Examples of cost areas
Bank and finance costs	Securing trade finance	Arrangement fees; charges and interest rates
	Transaction costs	Contracting costs; due diligence checks; fees and charges
	Invoicing and paying for fees and services	Cash-flow costs and credit arrangements; making payment; receiving payment; exchange rate risks (and the cost of any mitigating financial instruments); risk of non-payment for delivered goods and services
Value chain costs	Identifying business partners	Export marketing, cost of building and developing relations, access to 'social capital'
	Cultural costs	Language barriers, conflicting legal systems, conflicting business cultures
	Tariff and other market access barriers	Import duties, requirements to become established in the export market or appoint representatives
Trade compliance cost	Direct costs	See Table 4
	Indirect costs	See Table 5

Table 4: Trade cost model (continued): trade compliance costs, direct (1<sup>st</sup> level cost category)

2nd level cost category	3rd level cost category	Examples
Transaction costs with specialist third parties (e.g. brokers, agents and freight forwarders)	Initial contract set-up costs (often tied into wider transport/logistics services)	Tenders and negotiation costs; contract award and implementation costs; due diligence checks
		Learning costs that arise at the beginning of the contract, e.g. resulting from bedding-in systems and procedures (the risk of mistakes and operational errors can be very high during this period)
	Communication of instructions	Traditional systems (paper, phone, fax, email); development and implementation costs associated with integrating IT systems between contracting parties
	Performance monitoring	Agreement and monitoring of performance measures (e.g. KPIs)
	Barriers to exiting contract	Legal costs and penalties if contracts are terminated early; sunk costs in shared infrastructure and systems that cannot be recovered once the contract ends
		Opportunity costs that arise through being tied to a specific service provider and unable to use competitors (especially if they are cheaper or more efficient)
	Firefighting	When goods, for whatever reason, are stuck at the border and additional actions need be taken in order to clear the goods (e.g. finding missing documents, correcting wrong information)
Cost of losing visibility and control	Increased non-compliance risk, loss of strategic capabilities to manage trade directly, increased risk of exposure to 'gold plated services', risk of being unable to work out what good service and a fair price might look like	
Staff costs	Employment, supervision and support	Recruitment and management of professionals and experts with all the related administrative overheads
	Training	Specialist training for staff, including the costs of securing professional qualifications that are mandated by law
	Travel to the ports and borders	Vehicles, taxis, public transport

2nd level cost category	3rd level cost category	Examples
Initial set-up costs (so the company can be compliant)	Registration and authorisation costs	Research costs to establish relevant requirements to become registered/authorised
		Applications for permission to trade, take advantage of special trade and customs procedures (e.g. AEO, customs warehousing, etc.); the expense of registering and interfacing with relevant systems (e.g. port community systems, customs systems, veterinary systems, import VAT, excise control, import licencing applications, etc.)
		The cost of so-called ‘economic tests’ that justify the expense of the administration to give the operator special treatment
		Support services from experts and consultants
		The cost of meeting relevant authorisation conditions (e.g. IT systems, staff and infrastructure)
		The cost of financial securities/bonds needed to take advantage of certain types of customs procedures (e.g. transit, bonded warehousing, duty deferment)
		Inspection and audit costs where authorities seek to periodically verify that authorisation conditions are still met
	Planning costs	To work out the impact of customs duties and other trade taxes upon supply chain location and procurement decisions
Cost–benefit analysis (to establish whether it is worth applying for relevant authorisations)	Cost of researchers and consultants; cost of collating relevant information	
Transaction costs with the authorities	Submitting documents and information to relevant parties as and when required	Interface costs for each and every regulatory agency: electronic systems, software solutions, third party service fees, postage/fax/ phone
		Monitoring document and decision status; correcting and updating declared information
	Receiving Information	Acting on information: corrections, appeals, cost of making payments (e.g. import duties)
	Inspection	Inspection related stevedoring and handling; demurrage charges and storage fees; terminal handling charges; lab and testing fees
Post-clearance costs	Out-gate arrangements (e.g. booking a collection slot for a truck to pick-up a container); document storage	

Table 5: Trade cost model (continued): trade compliance costs, indirect

2nd level cost category	3rd level cost category	Examples
Cascading costs; costs that follow on or result from delay	Additional handling and transport costs	Where pre-booked transport connections are missed, and more expensive onward transport options have to be taken
		Demurrage costs arising from prolonged delay at the ports and borders
		Additional handling fees charged by the port or shipping in the event of a prolonged delay
		Additional container rental costs if exceeding the booked period
		Additional handling costs to safeguard the integrity of the cargo while delayed (e.g. refrigeration for temperature-controlled goods, feeding and watering for live animals, security for high value goods)
	Additional staff activities	Rearrangement of delivery slots at the customer's premises (e.g. where access is scheduled, as is the case at large distribution centres)
		Additional communication costs with all parties up and down the supply chain
	Fines and penalties	Disposal costs (e.g. through reselling) where customers have rejected goods because of a missed delivery deadline
		Contractual penalties where delivery deadlines have not been met
	Appeals and other legal expenses	Legal costs; staff costs and time resulting from any appeals and legal challenges against administrations; the perceived risks (including repercussions) associated with confronting government agencies
Correction costs	The time and expense associated with making corrections to the documents and declarations that gave rise to the delay; and the time and cost related to any requests from the authorities for additional information (e.g. site of supporting commercial documents)	
Loss of competitiveness	Economic	Where inefficient procedures undermine profit (and shareholder expectations)
	Impact on customer obligations	Where customer performance expectations are not met
		Loss of business
	Loss of reputation	Repercussions from shareholders, business partners and end customers, e.g. where the risk of non-compliance is high or where the direct costs are deemed excessive
Rerouting and relocation	The cost of making arrangements to ship cargo via ports/border crossings that are more favourable in the administration of trade and customs procedures but less optimal in terms of transport costs	

2nd level cost category	3rd level cost category	Examples
Psychological costs	For employed staff	Stress, reluctance, fears and anxieties amongst key staff (especially where the law makes them personally liable for compliance breaches or where organised crime has undermined the integrity of officials and operators)
	For employers	Risk of key staff leaving; risk of increased exposure to organised crime in the absence of robust staff support systems; undermined organisational productivity
Opportunity costs	Economic	Where red tape ties up money that could be put to better economic use (e.g. investment into new business ventures)
		Where businesses choose to forgo international business opportunities because compliance cost are too prohibitive, too complex, or where trade and customs procedures are viewed as a risk not worth taking
	Infrastructure	Where scarce land (e.g. at ports) is not optimally utilised, for example because space has to be made for government buildings and facilities, or because spaces are blocked by goods that are held longer than need be
	People	Where staff are tied-up in non-profit bearing activities
Commencement costs (when procedures are changed or where new procedures are introduced)	Infrastructure	Build, change, reconfigure supporting IT systems
		Reconfiguration of supporting physical infrastructure (e.g. inspection facilities, storage facilities, port facilities, new buildings) to accommodate the physical aspects of any changes to trade and customs procedures
	Staff	Training and/or recruitment
	Business risk	Increased exposure to non-compliance risks while staff (and the administrations) become familiar with the new or changed requirements

Table 6: Direct and indirect costs of trade and customs procedures for government agencies

First level	Second level costs	Examples
Direct Costs	Administrative	Cost of building administrative systems (legal, technology, staff)
	Processing	Analysis and processing of declarations (paper and/or electronic)
	Communication	Communicating decisions about declarations back to the relevant parties (paper, fax, electronic, phone, in person)
	Inspection	Inspection staff to verify declared information is correct Inspection staff to investigate non-compliant operators and criminals
	Infrastructure	Building and inspection facilities (only applies to instances where the provision of such facilities is not the responsibility of the private sector, e.g. as part of their authorisation conditions)
Indirect costs	Misallocation of resources	Taxes are not spent in the most efficient way
	Inefficiency	Added costs to the administration (and businesses) resulting from false-positives, e.g. where certain types of shipments have been consistently selected for inspection and there is nothing wrong
		Increased scope for organised crime and corruption and other adverse impacts upon society
	Loss of tax revenue	Increased smuggling if smuggling is an easier way for clearing goods across the border
		Deliberate misdeclarations by less reputable businesses
	Undermined national competitiveness	Loss of FDI; reduced tax base; less employment; less economic development
Societal costs	Border-related crimes can quickly have adverse impacts on society at large (e.g. resulting from smuggling of weapons, drugs, money); counterfeit and non-safe goods may harm consumers; the authority of government is undermined	

## 5. Two case studies

Following on from our cost model we would like to look at how customs- and border-related trade costs are experienced—the ‘as is’, as well as the scope for making improvements—the ‘to be’. In our first case study, we examine the trade in meat between Mercosur and the UK. Our second case study concerns the flower trade between Kenya and the Netherlands.

### 5.1 Case 1: The meat trade between Mercosur and the United Kingdom (by sea)

Trade and customs procedures and their requirements are complex. The meat trade between Mercosur and the EU is subject to customs controls, tariff quotas (import and export licencing), and veterinary controls. Figure 2 summarises the various compliance steps.<sup>1</sup>

Depending on the Incoterms (ICC, 2010) agreed, either the seller or the buyer contracts the shipping line. Common in the UK’s international meat trade is to procure on either CIF (Cost Insurance Freight) or FOB (Free on Board) terms, which means that the seller will arrange for export clearance and the buyer for import clearance. However, in order to enable the trade, the buyer needs to secure an import quota (import licence) first. Without such a licence, import tariffs would be prohibitive. In an attempt to better manage the use of tariff quotas, authorities in some countries control how their business community uses them and exporters need to apply for a corresponding export licence. To prove origin (a condition for taking advantage of import tariff quotas), a certificate of origin issued by the relevant authorities in the country of export is required, too.

Once the trade is initiated, the meat needs to be loaded and sealed in the country of export under the supervision of an official veterinarian. That veterinarian is required to work towards the rules of the EU and issue a health certificate. That health certificate (along with the certificate of origin) needs to be sent (e.g. via express carrier) to the importer. The importer, usually with the help of an agent or freight forwarder, then needs to pre-notify the port health authority (using an electronic system called TRACES). The port health authority in turn is obliged to check the identity of the imported consignment against the original health certificate. That check, as well as any subsequent physical inspections, must take place at a dedicated inspection facility (a border inspection post). Once checked and approved by port health, a common veterinary entry document (CVED) is issued. The CVED in turn needs to be passed on by the importer (i.e. buyer or buyer’s agent) to the customs administration. Although, since the research was originally conducted, the UK has now implemented a system that transmits the CVED information held in the TRACES system automatically to the CHIEF customs computer; the importer is no longer required to pass on that information.

The customs administration in the importing country, too, needs to be pre-notified. At the very least, this will normally include an electronic copy of the shipping line’s cargo manifest. Once Customs is satisfied that its checks and those of other border agencies (e.g. port health) have been completed, cargo will be released from their control. The port stevedore will release the cargo from the terminal upon confirmation from the shipping line, which in turn will only release the cargo over to the importer’s haulier if relevant charges and fees have been paid (e.g. those levied by the shipping line to pay for inspection related terminal expenses). Depending on the customs procedure chosen by the importer, additional information may have to be sent to customs at a later time. Usually, full customs declarations will also require copies of related commercial documents, such as the commercial invoice.

Figure 2: Business process analysis of the applicable trade and customs procedures in the meat trade between Brazil and the United Kingdom (for illustrative purposes only; based on work by Andrew Grainger [2009, 2013b])

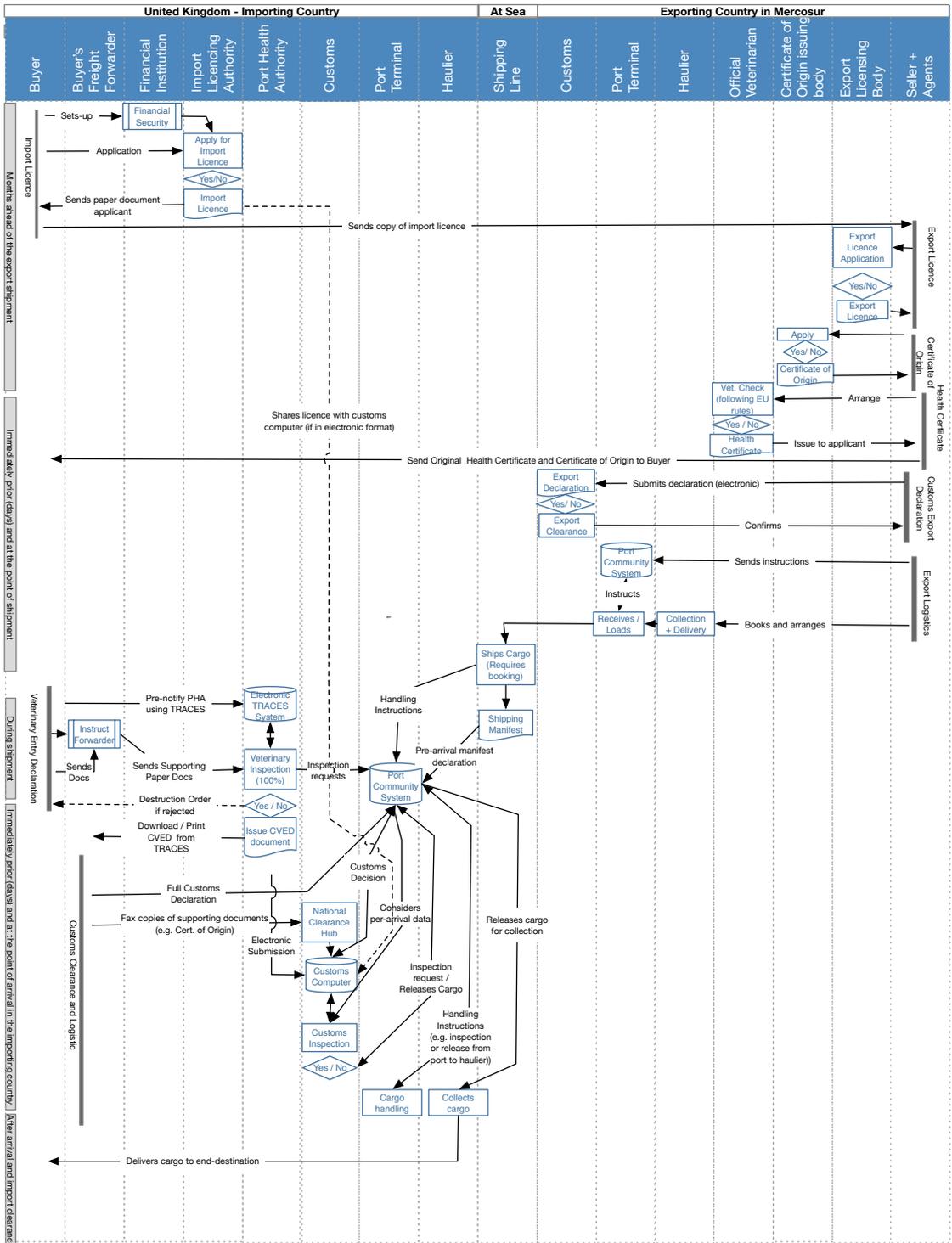


Table 7: Direct compliance costs for United Kingdom meat importers and their agents

Type of direct cost	Specifying organisation	Description of costs
Initial set-up costs; authorisation costs	Rural payment agency (Import licencing)	Fees and charges levied by the bank to set-up the required block guarantee
		The importer's time and staff costs relating to setting up and monitoring the block guarantee arrangements
	Port health authority (veterinary controls)	Set-up a facility with the authority to automatically pay fees and inspection charges
		Time and effort associated with becoming familiar with the (free of charge) electronic system for making veterinary declarations
	Customs	Time and effort associated with registering the company on the electronic customs system
	The respective UK airports	Connection fees charged by the telecoms operator for access to the respective electronic port systems at UK airports
	The respective maritime ports and airports	Annual subscription fees and connection charges for using the respective electronic platforms at UK maritime ports and airports
		Staff and staff training related to the use of electronic systems
Employment of staff to book collection slots and manage the collection of cargo from the ports		
Transaction costs; import clearance	Port health authority (veterinary controls)	Charges levied by the authority for veterinary checks (100%)
	Importer's agent	Service fees for checking the importer's documents before submitting them to the authorities
	Port operator	Fees levied by the port for each container containing goods subject to veterinary controls and requiring use of specialist inspection facilities, so-called BIPs (100%; except for meat originating from New Zealand)
	Importer's agent	Transaction fees levied by the port community system to use their platform for making customs declarations (usually passed on to the importer at cost)
		Service fees by the agent to the importer when making declarations (veterinary and customs) on behalf of the importer
	Shipping line	Load-on and load-off (LOLO), terminal handling charges (THC), and port equipment charges (paid by the agent and passed on to the importer)
	Port operator	Port security charges (paid by the agent and passed on to the importer)
		Infrastructure charges (levied on all handled containers) relating to investments by the port into UK railway infrastructure
Vehicle booking charges (paid by the agent and passed on to the importer) for the collection of containers		
Fines and penalties when booked collection slots are not used		

Table 7: continued

Type of direct cost	Specifying organisation	Description of costs
Inspection costs (in instances where the cargo is examined)	Port operator	Surcharges in addition to the port’s standard inspection charges
		Handling charges for taking cargo to the inspection facilities (i.e. customs shed, X-ray scanner and/or the veterinary checks facility [BIP])
	Port health authority	Third party laboratory charges (paid by the agent and passed on to the importer)
	Shipping line	Demurrage fees (levied by the shipping line when goods are delayed at the port; paid by the agent and passed on to the importer) [Note: demurrage fees can vary from one line to the next, irrespective of the charges by the port to the shipping line]

Source: adapted from Grainger (2013b)

The direct costs are extensive and can be attributed to different parties. Table 7 provides a summary of those experienced by UK importers and the agents acting on their behalf. Indirect costs in this case study were specific to each of the interviewed organisations, though it was highlighted that any mistakes in securing preferential tariff quotas (import licencing) can quickly translate into costs associated with higher import duties or finding customers in other markets. It was also highlighted that the cost of delays at UK ports quickly multiplies at ports where the veterinary inspection facilities are not serviced on weekends and where inspection backlogs arise.

Several importers also gave reports of rent-seeking behaviour where shipping lines offer considerably discounted shipping rates to the exporter when selling on a CIF basis.<sup>2</sup> Upon arrival, however, the importer is required to pay above-market rates for the shipping line’s terminal handling and demurrage charges (these are charges levied by shipping lines to pay for services provided by the port terminal). Since the importer is not party to the contract between the seller and the shipping line, there is little choice but to accept the shipping line’s charges. However, if once burnt, the importer may choose to procure future consignments on a FOB basis<sup>3</sup>, or renegotiate the price or buy the meat from another supplier.

What was particularly striking in our research is the overall effort it takes to clear meat for imports into the UK. We counted at least 26 distinct transactional steps. Some activities, like applying for import licences, need to be prepared months ahead. Other activities, like customs clearance, start weeks ahead of the arrival or at the point of arrival. A few activities, such as release from special procedures (such as customs warehousing or inland clearance), take place after the goods are cleared through the port (Grainger, 2013b). We observed that most importers in our case study rely on a select few agents (with less than 10 dedicated staff) to ensure that import clearance is smooth. It was suggested that standard service levels offered by global logistics and freight forwarding companies were insufficient.

We also identified a considerable level of duplication in activities up and down the supply chain (Table 8). Thus, many of the direct costs described in Table 4 may occur more than once. There is considerable scope for exploring how duplication of control and check related activities can be reduced, thus yielding significant cost savings.

Table 8: Levels of duplication with impact on supply chain costs

Duplication of activity	Impact on cost	Cost mitigating measures
Duplication of veterinary checks	<p>The goods are checked by officials in the country of export, who are obliged to work towards EU rules. The goods are checked again in the country of import by officials who also work towards EU rules.</p> <p>The exporter needs to arrange for an inspection, supervised loading and the production of a health certificate. That certificate needs to be sent to the importer, who in turn has to arrange for checks at the port of arrival.</p>	<p>Explore ways by which regulatory objectives can be met with less layers of control without compromising the overall control objectives</p> <p>For example, the EU import check requirements for meat from NZ are considerably less stringent than for meat from other countries. They benefit from reduced check requirements in the EU which in turn reduces the overall costs for the importer.</p> <p>Moreover, NZ authorities are also able to automatically prepopulate key data in the EU's electronic TRACES system. This makes it considerably easier for importers to pre-notify EU authorities that goods are coming. It also reduces possible mistakes that arise when compared to communicating key information in the form of paper documents.</p>
Duplication of EU import licence supervision and duplication of origin checks	<p>The import of meat on preferential terms (with significant duty savings) is subject to an EU import licence. The licence is usually allocated on a first-come-first-served basis. Some countries seek to regulate how their business community takes advantage of these quotas. Subsequently, exporters have to bear the cost of export licencing requirements while importers have to bear the costs of import licencing requirements. Both also have to carry the cost relating of time and postage when sharing relevant documents.</p> <p>Import quotas are country specific. The customs administrations in the EU require a certificate of origin as proof of origin. That certificate needs to be issued in the country of export by the exporter at the exporter's expense. The original document needs to be posted to the importer.</p>	<p>Explore ways by which regulatory objectives can be combined with other regulatory requirements.</p> <p>For NZ meat there is no need to apply for an import licence. The origin certificate issued by the New Zealand Meat Board doubles-up as an EU import licence.</p>

Table 8: continued

Duplication of activity	Impact on cost	Cost mitigating measures
Duplication of customs controls	Every import declaration follows an export declaration in the country from where the goods have been sent. Required information is similar. The exporter needs to bear the costs in the country of export and the importer needs to bear the cost in the country of import.	Explore ways how data can be more efficiently shared. This can be achieved where the contracting businesses share electronic platforms, as is often the case for inter-firm shipments (i.e. the seller and buyer are related). Another model would be for increased cooperation between the two customs authorities, where one authority recognises the controls of the other. This is already happening in customs administered supply chain security controls (the mutual recognition of supply chain security programs (Widdowson, Blegen, Kashubsky, and Grainger, 2014)). It would not be a big leap to imagine similar levels of cooperation for other types of customs controls.
Duplication of activities between the buyer and the authorities	Several importers explained that the value of meat is very high. To ensure that they receive the meat that they ordered, some will arrange for an independent inspection in the country of export or upon arrival.	Explore how official controls can be designed to provide a valued service to the buyer over and above the official requirements. Explore how independent inspection and the subsequent lower risk of non-conformity can provide for preferential treatment at the ports and borders (akin to the trusted trade concept).

Source: extracted from the work of Grainger (2013b)

## 5.2 Case 2: The flower trade between Kenya and the Netherlands (by air)

The second case study (see also Rukanova, Huiden & Tan, 2017) concerns the import of cut flowers from Kenya to the Netherlands in which flowers land at Amsterdam Airport Schiphol and transported on to the warehouse of an auctioneer. That facility is authorised by both customs and the Dutch phytosanitary authority as an allocation at which inspections may take place.

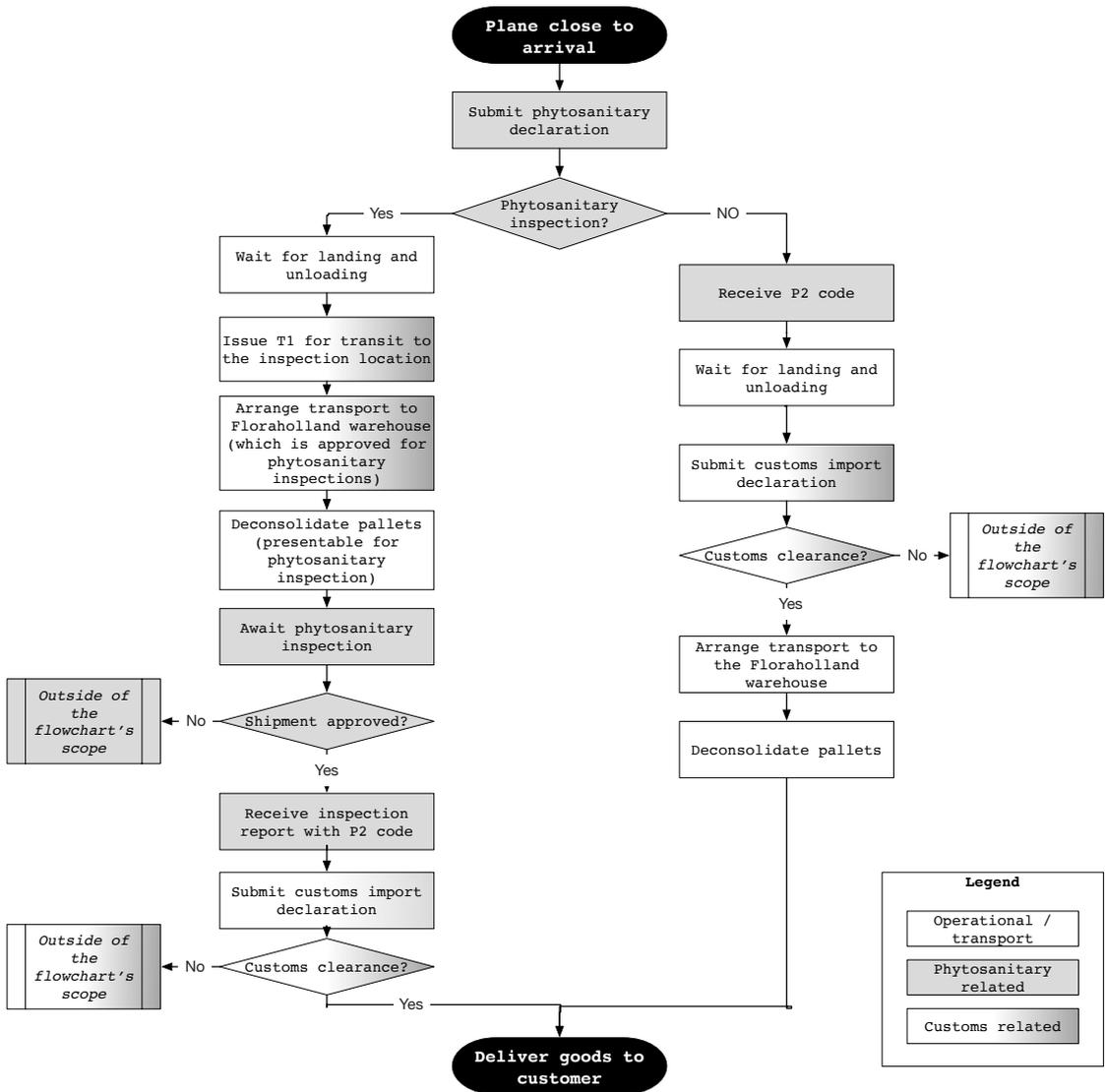
Like Case 1, the trade in flowers is also subject to complex commercial and regulatory arrangements. Import clearance into the Netherlands involves three risk assessment processes: a safety and security risk assessment by Customs at entry into the EU; a phytosanitary risk assessment by the Netherlands Food and Consumer Product Safety Authority (NVWA); and a Customs import risk analysis related to the fiscal aspect and related import duties.

Import compliance steps start with the airline submitting an electronic entry summary declaration (ENS), which contains high level data about the cargo, to Dutch Customs. This must be submitted at least four hours prior to arrival. Dutch Customs uses the ENS information in support of their risk assessment about safety and security. That assessment is made before the plane lands. Providing Customs do not wish to see the goods at the airport, they may be transported on to the auctioneer's warehouse.

However, before the plane lands, the importer or freight forwarder acting on the importer's behalf must also submit a phytosanitary declaration to the Dutch NVWA. The organisation decides whether the flowers need to be subjected to a phytosanitary inspection. That inspection, which applies to about 5 per cent of all shipments, must be made at an approved inspection facility, which in our case is at the auctioneer's warehouse.

Subsequent procedures depend on whether goods have been selected for phytosanitary control or not (see Figure 3). Where they have been selected for a physical examination, they are shipped under customs transit arrangements (EU Community Transit: T1/Domestic) to the auctioneer's warehouse. Once they arrive at that warehouse, relevant phytosanitary checks are performed. One condition for these checks is that the phytosanitary inspector must have the original phytosanitary certificate (which was issued by the Kenyan authorities) to hand. Upon completion of the phytosanitary inspection the freight forwarder is issued with a 'P2' code (which is an electronic message from the Dutch NVWA to confirm the release from phytosanitary control). This code provides the necessary proof that the phytosanitary authority has completed its part of the import control process. With the confirmed P2 code, the freight forwarder is now permitted to make the customs declaration. Following that declaration, Customs may also choose to conduct an inspection, which occurs in about 1 per cent of all cases.

Figure 3: Import clearance sequence for cut flowers into the Netherlands



In the 95 per cent of cases where flowers have not been selected for phytosanitary inspection, the freight forwarder is issued with the P2 code before the plane lands at Airport Schiphol. The freight forwarder can then submit the customs declaration as soon as the plane is unloaded. Providing there is no customs inspection request, the flowers are then released for onward transport to the auctioneer’s warehouse. Once at that warehouse, the flowers are auctioned off for sale. However, the importer remains responsible for making sure that the phytosanitary certificate is presented to the NVWA for a document check within 48 hours of the plane’s arrival.

The arrangements for phytosanitary and customs control in this specific way gives rise to a number of observable inefficiencies, which add to costs (Table 9). The main issues are:

1. The freight forwarder is only able to lodge the phytosanitary declaration when the plane is about to land.
2. The Dutch phytosanitary authority only notifies relevant parties about the outcome of the decision on whether to inspect only after the plane has landed; and relevant parties can only make onward transport and inspection arrangements after that decision has been made.
3. If a phytosanitary inspection is needed, onward transport to the warehouse (where the inspection takes place) must be made under domestic transit arrangements (which has a compliance cost).
4. Given the uncertain traffic conditions, it is only possible to alert inspectors and warehouse handling staff that an inspection is about to take place when the estimated time of arrival for the goods at the warehouse is reasonably certain, which is usually about one hour beforehand.
5. Depending on the outcome of the phytosanitary inspection decision, the customs declaration must either be declared at the warehouse (i.e. where a phytosanitary inspection is required) or at the airport (i.e. where there is no phytosanitary inspection).
6. Although only 5 per cent of all shipments are subjected to a physical phytosanitary inspection, the uncertainty about the outcome of the inspection decision with subsequent operational implications affects all imports.

Table 9: Costs associated with the inefficiencies in the information flow relating to flower imports into the Netherlands

Problem statement (as-is)	Type of cost(s): examples
Tight procedural timeframes that require actions to be made at a specific point in time (e.g. ENS 4 hours beforehand; phytosanitary declaration when the plane is about to land)	<p><b>Opportunity cost</b> resulting from the inability to plan and schedule resources</p> <p>Increased <b>transaction costs with third parties</b> related to monitoring time frames and their actions</p>
Uncertainty about when and where the customs declaration needs to be lodged	<p><b>Loss of competitiveness (economic):</b> Importers first need to wait for the phytosanitary inspector to make an inspection decision, and then for the customs officer. It would be more efficient if decisions could be reached in parallel as opposed to in sequence.</p> <p>Increased <b>transaction costs with the authority</b> resulting from having to work out where to make the declaration as well as from having to maintain the capabilities to be able to submit at both locations.</p> <p>It is not always clear when exactly cargo will be released, even for those shipments where the phytosanitary officials do not decide to inspect (as is the case for 95% of the shipments). It thus becomes difficult to plan, schedule and coordinate resources. The resulting cost is an <b>opportunity cost</b></p> <p>Increased <b>communication costs</b> resulting from having to give relevant parties the necessary instructions</p> <p><b>Fines and correction costs</b> arise in instances where there is miscommunication and goods are accidentally released from the warehouse even though the authorities have not cleared them yet</p>
Uncertainty about if and when a phytosanitary inspection needs to be provided for	<p><b>Cascading costs</b> resulting from having to make customs transit arrangements in the event of an inspection</p> <p>Increased <b>communication costs</b> resulting from having to give relevant parties the necessary instructions</p> <p><b>Cascading costs</b> resulting from delays which can quickly result in missed collection and delivery slots. Delays are particularly long when officers are not immediately available, for example when out of hours or over weekends</p> <p><b>Opportunity costs</b> resulting from the inability to reliably plan for inspections (and allocate the necessary resources), especially in adverse traffic conditions between the airport and the warehouse</p>
Customs declarations contain inaccurate or wrong information (which can easily happen when considering the many different document requirements and the number of locations involved)	<p><b>Correction costs:</b> relating to the time and effort involved in making corrections and providing supporting information where requested</p> <p><b>Cascading costs:</b> relating to operational delays, such as those associated with additional handling and storage or making changes to onward transport arrangements</p>

Problem statement (as-is)	Type of cost(s): examples
The risk of failing to present the original phytosanitary certificate during a physical inspection, or failing to submit the phytosanitary certificate within the 48-hour window where no phytosanitary inspection was necessary	<p><b>Cascading costs</b> resulting from: having to find and submit missing documents; or from having to request new documents if feasible</p> <p><b>Cascading costs</b> resulting from additional staff activities</p> <p><b>Cascading costs</b> resulting from a delayed or rejected consignments</p> <p><b>Cascading costs</b> resulting from potential fines and penalties for the importer should the 48-hour deadline be missed</p>

These inefficiencies and the costs associated with them can be removed. Through CORE, an EU-funded project, a redesigned electronic infrastructure was designed that draws on electronic data pipeline principles (Hesketh, 2009). Its two key components are:

- a. An electronic facility that enables Kenyan authorities to send the phytosanitary certificate (in electronic format) directly to the NVWA. That certificate also contains accurate information about the seller which can be used by Dutch Customs to validate correlating information in the customs declaration.
- b. An electronic platform that gives Customs access to relevant business information to enhance the risk assessment process (e.g. the proforma invoice, which contains detailed and accurate goods descriptions).

By having access to this new electronic infrastructure (coupled with recent legislative changes) Dutch Customs, just like the phytosanitary officials, are now able to make decisions about whether to inspect or not before the goods land (Rukanova et al., 2017)—a concept currently referred to as ‘clearance at landing’. The resulting cost savings are significant since most administrative procedures in this trade lane now take place prior to landing; this significantly reduces the number of administrative and physical requirements after landing. Figure 4 compares the two scenarios, the ‘as-is’ with the ‘to-be’.

Figure 4: Clearance at landing—from the as-is to the to-be

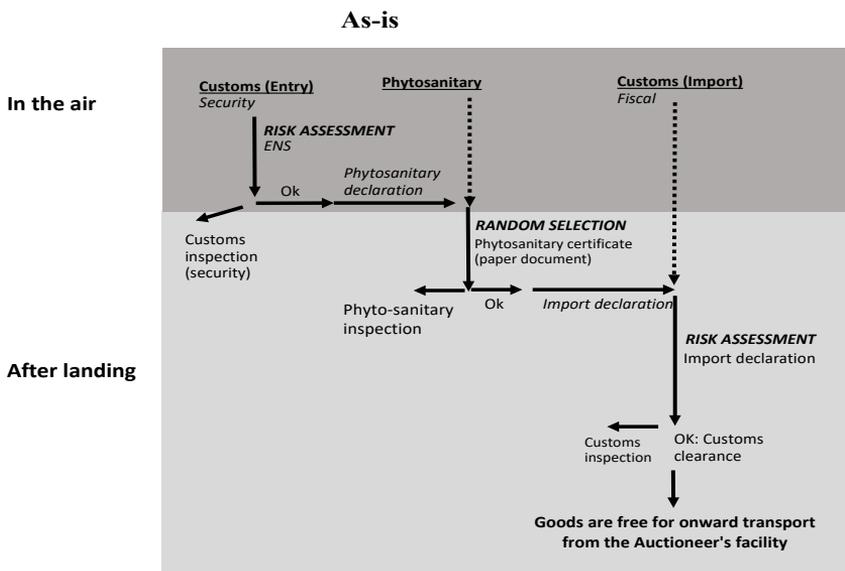
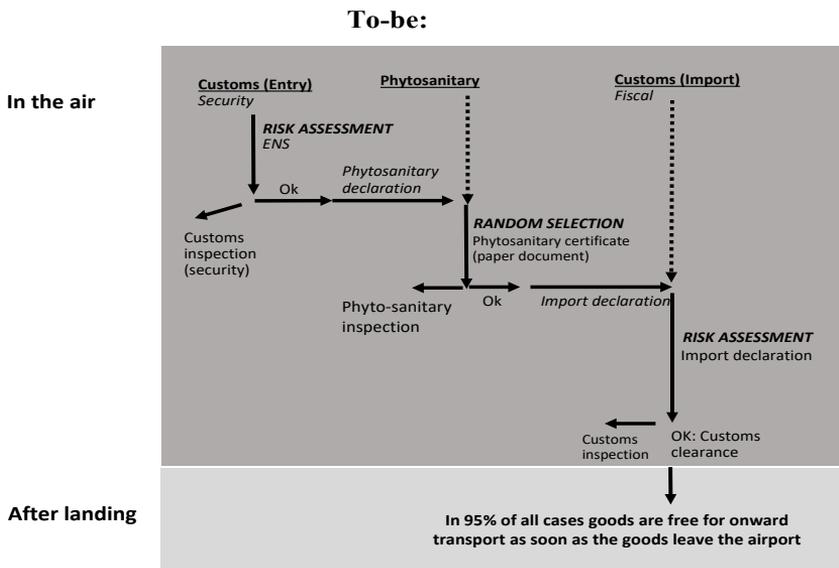


Figure 4: continued



Source: Adapted from Rukanova et al. (2017)

Following on from this case study, it would be useful for the respective parties to explore how these cost-saving benefits can be extended, for example by including shipments made by sea, or by applying it to other types of trades and procedures, for example, to meat imports (as in the first case study) where all imports must be presented to dedicated inspection posts (BIPs), irrespective of the type of checks and subsequent inspections.

## 6. Conclusion

In this paper we have described the many types of costs that can be found in international trade operations, especially those specific to trade and customs procedures. A key finding is that many of those costs are interdependent, often hidden from decision-makers and not easily untangled. By giving them names and categories, it is easier to discuss and analyse them. It is also easier to explore ideas about how they can be reduced. By knowing and describing the ‘as-is’ it becomes possible to explore what the ‘to-be’ might be and to make the cost savings that can arise from a ‘to-be’ situation more transparent.

A commitment amongst the many parties involved in trade operations to participate in research is an essential prerequisite. As our two case studies show, documenting the ‘as-is’ provides us with valuable pointers towards the ‘to-be’, and how costs can or could be reduced. In our two cases, that would be through improved cooperation—especially between Customs and other border agencies (coordinated border management)—and through information sharing (e.g. by developing electronic data pipeline type solutions) that may help businesses mitigate the impact of supply chain disruptions at the border.

The latter point is particularly interesting in the context of trade facilitation policy. While every effort should be made to weed out costs, we also need to be open to solutions that help mitigate the impact of any remaining costs. Reflecting on our second case study, we would argue that the sharing of key information as soon as it is created, as opposed to when it is declared, could significantly help reduce any cascading costs (such as those described in Table 9). For example, the sooner operators become aware of potential risks that could translate into delays at the border, mitigating measures can be put into action, such as by

pre-alerting end customers to potential delay and enabling them to rebook onward transport. The more difficult to calculate, but nevertheless very real, indirect costs can thus be significantly mitigated.

We would also like to propose further discussions about how costs can be translated into performance indicators, which in turn could be used to hold various parties across the supply chain accountable—including government agencies (Grainger & Shaw, 2018). Cost accountability is of course an implied feature within the WTO Trade Facilitation Agreement. Our sense is that research into the details concerning the costs of trade and customs procedures has only begun. We certainly would not want to claim that this paper offers a comprehensive answer to the question of what the costs of customs and borders across the supply chain are. However, we do hope that this paper will spark further discussions and lead to a refined—and perhaps more standardised—cost model which is supported by relevant international organisations.

## References

- Anderson, J. E., & van Wincoop, E. (2004). Trade costs. *Journal of Economic Literature*, 42(3), 691–751.
- Busse, M., Hoekstra, R., & Königer, J. (2012). The impact of aid for trade facilitation on the costs of trading. *Kyklos*, 65(2), 143–163.
- Christopher, M. (1992). *Logistics and supply chain management: Strategies for reducing costs and improving services*. London: Pitman.
- Clark, C. (2003). *BPAWG reference model of the international supply chain*. UN/CEFACT. Retrieved from [http://www.disa.org/cefact-groups/tbg/Docs/tbg14/BPDomainModel\(BP044\)2003March.doc](http://www.disa.org/cefact-groups/tbg/Docs/tbg14/BPDomainModel(BP044)2003March.doc)
- Evans, C. (2008). Taxation compliance and administrative costs: An overview. In M. Lang, C. Obermair, J. Schuch, C. Staringer, & P. Weninger (Eds.), *Tax compliance costs for companies in an enlarged European Community* (pp. 447–468). London: Kluwer Law International.
- Grainger, A. (2007). Supply chain security: Adding to a complex operational and institutional environment. *World Customs Journal*, 1(2), 17–29.
- Grainger, A. (2009). A case study focusing on trade procedures as applicable to the EU import of beef and poultry products (products of animal origin). In C. George, C. Kirkpatrick, M. L. Dardaine, A. Grainger, F. Masi, & M. B. Servín (Eds.), *Trade sustainability impact assessment (SIA) of the Association Agreement under negotiation between the European Community and Mercosur: Sector study for trade facilitation*. Brussels: European Commission.
- Grainger, A. (2010). The role of the private sector in border management reform. In G. McLinden, E. Fanta, D. Widdowson, & T. Doyle (Eds.), *Border management modernization* (pp. 157–174). Washington: World Bank.
- Grainger, A. (2011). Trade facilitation: A conceptual review. *Journal of World Trade*, 45(1), 39–62.
- Grainger, A. (2012). Trade facilitation. In K. Heydon & S. Woolcock (Eds.), *Ashgate research companion to international trade policy*. Aldershot: Ashgate.
- Grainger, A. (2013a). *Measuring-up customs: A trade compliance costs perspective*. Paper presented at the 8th WCO PICARD Conference, St. Petersburg.
- Grainger, A. (2013b). *Trade and customs procedures: The compliance costs for UK meat imports*. Retrieved from Nottingham: <http://eprints.nottingham.ac.uk/2143/>
- Grainger, A. (2014). Trade and customs compliance costs at ports. *Maritime Economics & Logistics*, 16(4), 467–483. doi:10.1057/mel.2014.8
- Grainger, A. (2016). Customs management in multinational companies. *World Customs Journal*, 10(2), 17–35.

- Grainger, A., & Shaw, D. (2018). A method for measuring trade facilitation. *WCO news* (85), 21–23.
- Hesketh, D. (2009). Seamless electronic data and logistics pipelines shift focus from import declarations to start of commercial transaction. *World Customs Journal*, 3(1), 27–32.
- Hesketh, D. (2010). Weaknesses in the supply chain: Who packed the box? *World Customs Journal*, 4(2), 3–20.
- ICC. (2010). *Incoterms 2010* (2010 ed.). Paris: ICC Publication.
- Kaplan, R. S., & David P Norton. (1992). The balanced scorecard—measures that drive performance. *Harvard Business Review*, 70(1), 71–79.
- Klein, H. K., & Myers, M. D. (1999). A set of principles for conducting and evaluating interpretive field studies in information systems. *MIS Quarterly*, 23(1), 67–93. doi:10.2307/249410
- Mann, C. L. (2012). Supply chain logistics, trade facilitation and international trade: A macroeconomic policy view. *Journal of Supply Chain Management*, 48(3), 7–14. doi:10.1111/j.1745-493X.2012.03270.x
- Matsuda, S. (2012). The time release study as a performance measurement tool for a supply chain and an international corridor. *World Customs Journal*, 6(1), 79–92.
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd edn). Thousand Oaks, California, and London: Sage.
- Neely, A. (2005). The evolution of performance measurement research: Developments in the last decade and a research agenda for the next. *International Journal of Operations & Production Management*, 25(12), 1264–1277. doi:10.1108/01443570510633648 (Permanent URL)
- OECD. (2001). *Business benefits of trade facilitation*. Paris: OECD.
- Ohmae, K. (1983). *The mind of the strategist*. New York, NY: Penguin Books.
- Rukanova, B., Huiden, R., & Tan, Y.-H. (2017). Coordinated border management through digital trade infrastructures and trans-national government cooperation: The FloraHolland case *EGOV2017: Proceedings of IFIP WG 8.5 International Conference, EGOV2017* (pp. 240–252): Springer.
- Sourdin, P., & Pomfret, R. (2012). *Trade facilitation: Defining, measuring, explaining and reducing the cost of international trade*. Cheltenham: Edward Elgar
- Tan, Y.-H., Bjørn-Andersen, N., Klein, S., & Rukanova, B. (2011). *Accelerating global supply chains with IT-innovation: ITAIDE tools and methods*. Berlin: Springer.
- UN ESCAP. (2012). Business process analysis guide to simplify trade procedures. Retrieved from <http://www.unescap.org/resources/business-process-analysis-guide-simplify-trade-procedures>
- Verwaal, E., & Donkers, B. (2003). Customs-related transaction costs, firm size and international trade intensity. *Small Business Economics*, 21(3), 257–271.
- Walkenhorst, P., & Yasui, T. (2003). *Quantitative assessment of the benefits of trade facilitation*. Paris: OECD.
- WCO. (2011). *Guide to measure the time required for the release of goods (Version 2)*. Brussels: World Customs Organisation. Retrieved from [http://www.wcoomd.org/files/1.%20Public%20files/PDFandDocuments/Procedures%20and%20Facilitation\\_2/instruments/Final%20TRS%20Guide%20Version%20II%20EN.pdf](http://www.wcoomd.org/files/1.%20Public%20files/PDFandDocuments/Procedures%20and%20Facilitation_2/instruments/Final%20TRS%20Guide%20Version%20II%20EN.pdf).
- Widdowson, D., Blegen, B., Kashubsky, M., & Grainger, A. (2014). Review of accredited operator schemes: an Australian study. *World Customs Journal*, 8(1), 17–34.
- Wilson, J. S., Mann, C. L., & Otsuki, T. (2005). Assessing the benefits of trade facilitation: A global perspective. *World Economy*, 28(6), 841–871.

- Wilson, J. S., Mann, C. L., Otsuki, T., & World Bank Development Research Group. Trade. (2003). *Trade facilitation and economic development: Measuring the impact*. Washington, DC: World Bank, Development Research Group, Trade.
- World Bank. (2016). Country Trade Diagnostic Studies. Retrieved from <http://go.worldbank.org/99WGL1CJI0>
- WTO. (2017, 22 February). WTO's Trade Facilitation Agreement enters into force. Retrieved from [https://www.wto.org/english/news\\_e/news17\\_e/fac\\_31jan17\\_e.htm](https://www.wto.org/english/news_e/news17_e/fac_31jan17_e.htm)

## Notes

- 1 This figure applies to a specific context and should only be used for illustrative purposes. It draws on historic data from 2009 to 2013 and was updated through recent follow-up interviews. A detailed discussion about the UK import procedures, including direct cost details, can be found in Grainger (2013b).
- 2 CIF is an Incoterm (ICC, 2010) that requires the exporter to arrange for export and shipment. The importer is responsible for port and import clearance.
- 3 FOB is an Incoterm (ICC, 2010) where the importer arranges for shipment and thus has greater influence over the shipping line's port and import clearance related charges.

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