3. Rapid productivity growth – customs regulation

There is no inevitable law that means public sector organizations have to be characterized by lagging or flat productivity. Our simple antidote to this widespread view is to consider an area where substantial productivity growth has been successfully achieved. We focus here on the customs regulation of exports and imports in the UK, an area of operation that is one of the oldest and most fundamental 'business-facing' activities of the modern nation state. From the earliest period of the transition from mediaeval feudalism to Renaissance era states, the ability of monarchs and republics to regulate international trade was a cornerstone of their ability to raise revenues and to encourage (or depress) national economic activity.

In the modern period, we first briefly discuss how the growth of international trade has produced greater economic and political pressures for the speedier and streamlined implementation of customs checks. The second section examines how in an exceptionally open economy the UK government moved at an early date to effectively automate its customs operations and to shift from volumetric to risk-based methods of controlling shipments in and out of the country. Section 3.3 then shows in detail how the UK customs agency achieved rapid productivity growth in the decade from 1999, and traces the influences involved.

3.1 CUSTOMS REGULATION IN AN ERA OF TRADE GLOBALIZATION

The ability to monitor and to control the shipment of economic goods into and out of a territory has historically been one of the oldest and most fundamental functions of the state. In Europe the function began with the regulation of local markets by feudal barons and overlords and then extended to cover international trade with the growth of the first nation states. By the sixteenth century early modern states (often pushing towards absolutist monarchical forms at this period) developed comprehensive systems for regulating trade through ports and policing illicit evasion of revenue payments (smuggling) through permanent navies and extensive administrative

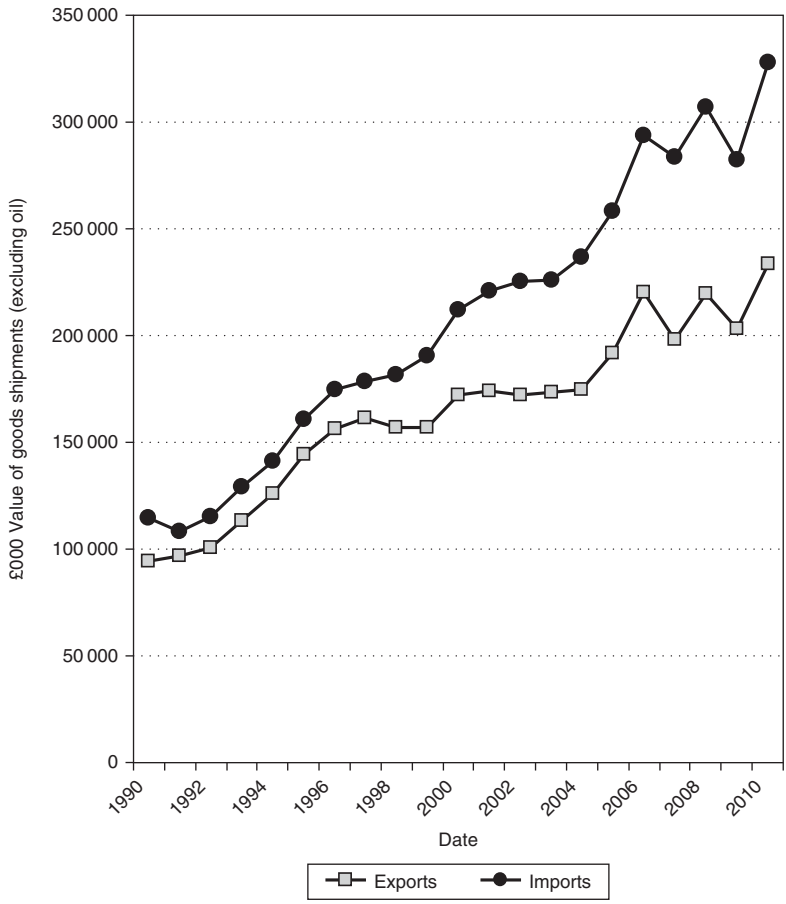
checks. The economic and fiscal salience of this administrative function increased markedly in the era of the mercantilist states. Even in the free trade era in the mid-nineteenth century, promoted by the UK as the first industrialized state, the importance of customs rules remained great. The subsequent outbreak of protectionism, first at imperial scale in the late nineteenth century, and later amongst inter-war nation states, greatly reboosted the policy salience of the trade regulation function.

In the modern period the control of shipments in and out of countries has declined as a source of revenue at the nation state level because duty levels on imports have generally fallen. The European Union countries created a single, pooled customs area, and for a time the EU drew some significant revenues from external tariffs, now greatly diminished. Other kinds of controls remain pretty important within the EU area, because of differing VAT tax rates and regulations across member countries, creating new risks (such as 'carousel fraud'). Increasing numbers of bilateral trade agreements, and the much wider general push back towards free trade under the World Trade Organization process, have both tended to lower tariffs further. But the security and legal regulation aspects of exports and imports have tended to increase because of the international movements of illegal drugs, human trafficking linked to trade transport, and concerns about the movements in or out of weapons and of sophisticated technologies and substances with weapons-related implications. Even just for statistical and economic policy purposes, effectively monitoring imports and exports remains a key government function.

The invention of 'the Box', that is, steel shipping containers, in the mid-1950s had enormous cumulative impacts by the late 1990s (Levinson, 2006). The previously high labour costs involved in shipping and transshipping goods were revolutionized through 'containerization' – a complex but swiftly implemented process that rapidly closed traditional docks around the world, and led to the opening of new container ports. Containerization produced entirely new classes of massive ships, designed to move hundreds of containers at very low cost between continents. Unloading container ships required massive automation of transshipments, hugely increased capital investment and sophisticated storage and IT systems to track every container individually. As a result, the transaction costs of shipping large amounts of goods from one country to another were greatly reduced. The time needed to offload or load up ships was cut dramatically, and average shipping times also fell.

The WTO tariff reductions, containerization and many other stimuli all meant that international trade volumes in major OECD countries grew dramatically since the late 1990s as Figure 3.1 demonstrates. The economic centrality of international trade (measured as its share of GDP

Figure 3.1 The growth of exports and imports of goods into the United Kingdom, 1990 to 2010



Note: The statistics shown are for goods imports and exports (excluding oil and all services, but including exceptional items, i.e., high-value deliveries, such as complete ships or sets of aircraft, sometimes separated out from monthly data).

Source: Office for National Statistics (2011), 'Value of UK trade in goods and services' dataset, downloaded 16 June 2011.

totals) increased rapidly in the same period, even for previously rather 'closed' (domestically focused) economies, such as that of the United States.

These startlingly swift changes in the commercial sector all piled considerable new pressures on customs regulators, who faced strong

demands from exporters, importers and transport interests that regulatory checks should be radically streamlined to keep pace with the increased tempo of international trade. Time is money, so with all other transport times falling rapidly the resilience, speed and effectiveness of customs services around the world faced more intense scrutiny. The problem that business foresaw was that despite the speeding up of the private sector side of transshipment, the control processes run by government agencies would still introduce long lags to delay trade.

In other areas of inter-country movements, such fears have proven to be well justified. For instance, as late as 2010 a European Court of Auditors report on rail freight movements between EU countries found that many problems of incompatible railway gauges had been successfully combated. Expensive capital investments were made to enable the axles on railway wagons to be changed at frontiers where incompatible rail gauges meet, which could be accomplished in less than 30 minutes per train on the Austria–Italy border. But changing around the train lights, safety notices and other regulatory elements to meet different national laws (often also involving changing train crew who knew the specifics of regulatory rules in the destination country) took as long or longer than replacing all the axles on a train (European Court of Auditors, 2010a).

Traditionally, customs regulation agencies across the world have always been business-facing and claimed to recognize the need to help importers and exporters conduct their business expeditiously. Yet regulation arrangements were also long-lived and primarily focused on 'volumetric' controls. Here customs staff looked at what was declared on paper documentation needed for both imports and exports and proceeded chiefly by opening up or inspecting at random a certain (small) percentage of trade shipments. Containers and other loads were checked to see that the goods listed were correct; that no banned or controlled substances (such as drugs or pornography) were being shipped; and that any values of goods declared were accurately reported, so that the tariffs or taxes being paid were also correct. On average, volumetric controls in the UK and USA meant that between 2 and 5 per cent of shipments were physically inspected (varying with shipment types), with responsibility mainly localized with senior staff in each main port. Inspection rates were much higher in some European countries. Inherently, most purely random volumetric checks draw a blank. So to improve their hit rate, experienced customs inspectors developed over long periods of service their own sense of shipments or shipping companies that looked unusual. As a result, random checks would often be informally guided or supplemented by more focused attention on firms or types of shipments seen as problematic.

These routine primary checks normally absorbed the time and efforts of the large bulk of customs personnel.

In addition, customs agencies maintained small intelligence and investigative branches, which focused on major sources of tariff or tax frauds and of breaches in reporting requirements for exports or imports. They also liaised with overseas customs services, and with the police and security services, to counter organized crime involving imports and exports. Intelligence would be used to alert port inspectors about leads on particular shipments, or to help them focus their non-random volumetric checks somewhat better, on potentially more fertile areas for finding breaches of the law or regulations.

The speeding up and greater volumes of international trade flows have primarily been accommodated by customs services in two ways. First, there has been a growing internationalization of customs standards via multinational and bilateral agreements, originally focusing on removing tariffs on trade between the countries involved, so as to obviate the need for tariffs to be levied. In the post-containerization period, the increased importance of getting goods through docks and airports swiftly shifted the focus of international agreements towards pooled systems of registering and coding containers and cargoes. Changes here were designed to get rid of idiosyncratic or non-meshing information systems, help speed up processing at destination ports and improve information-sharing between different nations' customs services. International agreements now also contain undertakings on countries' inspection and approval times – for instance, to clear all containers through ports in 24 hours, unless there are serious grounds for investigation, in which case the time allowed increases to three days. Senior UK officials told us that signing up to such common standards also created a much stronger discipline on participating customs services. Mainstream exporters and importers often work closely with customs agencies to help curb problems, like pilfering, human trafficking and trade security. But they have also vigorously used their lobbying power to ensure that normal customs checks are as streamlined as possible.

3.2 THE 'AUTOMATION' OF CUSTOMS REGULATION IN THE UK

Until 2005 the responsible agency in the UK was Her Majesty's Customs and Excise (HMCE), a body that could trace its origins back in an unbroken line to the year 1203 (giving a real sense of how 'immortal' government agencies can be). Brigaded under the Treasury, HMCE was nonetheless set up as a non-ministerial department, partly to avoid any suspicion of

ministerial or political interference in the impartial implementation of customs processes. The department still reported to the Chancellor of the Exchequer annually, and needed ministerial approval for major policy changes, business process reforms and new investments. But its day-to-day operations were controlled only by a historically ancient board, composed of its top officials, all of whom were senior career civil servants. In addition to operating customs regulation and collecting excise duties (essentially special goods taxes on particular classes of goods, like alcohol and tobacco), from 1973 onwards HMCE also collected value-added tax (VAT) on almost goods and services – a function whose financial significance rapidly dwarfed its customs work. (We consider the tax-collecting activities of HMCE in the next chapter, and so here focus solely on the customs regulation function.)

From the late 1980s onwards HMCE remained a non-ministerial department, but it was run increasingly on 'Next Steps' lines (see Chapter 4), like the new executive agencies. This change meant that the organization had more operational independence, so long as targets and goals set by its controlling department (the Treasury) were being satisfactorily met. Most requirements here related to revenue collection at low cost, but also in a timely fashion. An audit report in 2001 said that time delays for importers were short but could be made more 'challenging' for HMCE (National Audit Office, 2001a, paragraph 3.4). In the 1990s the department also came under pressure from ministers, central Whitehall departments and industry stakeholders to contract out its IT operations in line with the Market Testing initiative. In 1999 most of its IT operations were transferred to ICL, a large UK company, once the UK's 'national champion' for ICT. ICL was later taken over by the Japanese multinational Fujitsu, which in 2002 also signed a large Private Finance Initiative (PFI) contract with HMCE.

In 2005 HMCE was merged with the larger Inland Revenue (discussed in Chapter 4) to form Her Majesty's Revenue & Customs (HMRC). One of the key ideas here was to pursue greater integration of taxation collection, especially between Customs and Excise's principally business-facing tax operations and those run by Inland Revenue (such as corporation tax). Customs became a much smaller function within a single, integrated tax agency. Three years later the detailed detection and small-scale prevention work of the customs function (such as anti-drugs smuggling measures against airline passengers) were moved out of HMRC and into the newly formed UK Border Agency, which also handled immigration at the border and illegal immigrants within the UK. However, the export/import functions and the regulation of trade movements remained with HMRC.

Government agencies dealing with businesses on a large scale were often

the first to invest heavily in electronic communication with their private sector 'customers', even in the pre-internet period. In particular, many business-facing agencies developed electronic data interchange (EDI) systems early on, well before the advent of the internet. EDI systems are dedicated private networks facilitating large-scale electronic transactions, with their biggest business partners. In the mid-1990s Customs and Excise achieved a rapid take-off for computerized transactions by following a philosophy where the information they required should wherever possible form part of businesses' standard processes and information needs for importing and exporting. For import/export, HMCE first developed a computerized system to process export trade statistics in 1963 and an import cargo system in 1971. The department's EDI-based customs-declaration processing system, the Customs Handling of Import and Export Freight (CHIEF) was implemented in 1994, and was internationally influential. Solutions of the same type subsequently became widely used throughout the world. Even in 2012 the UK government's main business website claimed that CHIEF 'is one of the world's largest and most sophisticated electronic services for managing revenue and customs processes for the international movement of goods' (HMRC, no date).

The CHIEF system has controlled and recorded UK international trade movements (by land, sea and air). It linked customs offices around the country to ports, airports and thousands of businesses and was integrated with commercial processes to facilitate the movement of goods across national frontiers. CHIEF was provided free to all traders, with a choice of three routes for EDI input, either via third party agents, or by attachment to internet e-mail or to older standard messaging systems. Virtually all traders (99.8 per cent) used this system for import declarations by 2002, when we completed an NAO report on HMCE's progress (Dunleavy et al., 2002). A fifth of traders also used CHIEF for export transactions at the same date. The system handled the vast bulk of revenues collected at ports and airports, amounting to £14 billion of revenue each year via 16 million transactions by 2002. The CHIEF system was also used by HMCE to help collect international trade and transport statistics and to control the import and export of restricted goods. Other important EDI services included an Intrastat return service for collecting economic statistics, which by 2002 dealt with 40 per cent of traders. From June 2000, this system included an internet service for which some 3000 of the largest traders (10 per cent of the total) had registered by 2002.

Customs and Excise had significant early success with EDI in the import/export area by replicating pre-internet private networks already used by the largest private companies at the same time as making the original move from paper-based to electronic systems. Take up of the CHIEF

import system was virtually universal because electronic declarations were standard for most imports at an early date. Smaller companies for whom it was not financially viable to purchase the necessary industry software used a registered agent, who submitted electronically on their behalf.

HMCE was also helped initially in doing business online by security of information considerations, which were of particular concern for its customers and for the agency itself. From the late 1990s onwards the UK government operated a version of an industry-led system for 'trust rating' material to be held electronically. It scored information on a scale that ran from 0 (the lowest security level) to 3 (the highest level). Most of Customs and Excise's information exchanges (such as the provision of trading statistics) were rated as level 1, which is why they could be easily computerized. As we will see in Chapter 4, information with significant financial implications such as the VAT return were rated as trust level 2, for which HMCE long held that the most appropriate method of authentication was digital certificates – a solution that most businesses were extremely reluctant to adopt. Hence VAT collection moving online was delayed by more than seven years after the import/export system was introduced.

Yet in government information technology, achieving early progress can also sometimes have a rather stifling effect upon making later changes, and so it turned out with customs. At first, as the internet took off, HMCE's clients were left largely unaffected. Larger export or import companies already had EDI accesses developed in many areas of their business processes and internal systems, which they were very reluctant to redo or change away from, producing a conservative lobby for getting by, rather than continuously upgrading systems. Small businesses and individuals were also always the most reluctant to adopt any electronic processes at all, and small firms in the UK have consistently been laggards in using internet-based systems for their dealings with government, creating major problems for HMCE in other areas. As late as 2007, for instance, the vast bulk (95 per cent) of VAT returns in the UK was made on paper forms, with payments by cheque. In import/export, however, the problems with small firms were less, because commercial agencies and the Community Systems Providers provided services (for a fee) to small firms and individuals in all the major ports and airports (Businesslink, 2011).

Second, having achieved administrative simplification and instant communication via EDI processes early on, top officials at Customs and Excise were for a long time reluctant to invest in new web-based technology, unless it could be done as part of normal business change processes. Customs first opened a website in 1998, but it was then left completely undeveloped until a new site launched in 2002, which still lagged far

behind other UK revenue agencies in terms of the information or services available online (Dunleavy et al., 2002, pp. 23–5). The New Export System rolled out in 2002 provided internal and frontier export clearance services. It included a web-based front end (using standard XML schemas), and pushed take up of this electronic service above 20 per cent. Some additional costs were entailed for electronic messaging, but the electronic service was successfully marketed as faster and more streamlined than the paper-based version, which the department subsequently restricted. The system allowed small firms importing or exporting to notify customs directly as well, by e-mail or via the customs website over the internet, as well as retaining Community Service Providers (CSPs).

During the 1990s one of the benefits of the investments made was that the number of the agency's 22 000 staff working on information technology services stabilized at around 950 (many handling VAT systems, however). This number dropped significantly to 660 staff in 1999 following the PFI deal with ICL/Fujitsu to provide managed infrastructure services (excluding mainframes) to offices throughout the UK, involving the transfer of assets and over 300 staff under TUPE (the EU's 'transfer of public enterprises' provisions). The new infrastructure was to provide all HMCE staff with a desktop system. The contract was held up by financial and logistical issues. During our 2002 NAO study of the department we found that the agency's desktop system already appeared outdated. For instance, even at this late date a significant proportion of staff in the department were using PCs rolled out since the signing of the contract that did not have access to the internet (see Dunleavy et al., 2002, p. 70).

The much wider benefit of HMCE's success with early automation was that over two decades the department handled progressively greater workloads with falling overall personnel numbers. This was achieved primarily through the strong development of risk management approaches to customs regulation and duty collection, based around but going well beyond the development of more automated systems for processing data. Instead of trying to audit or inspect all transactions using volumetric checks, customs instead progressively concentrated their attention on traders and problems chosen on a risk assessment basis. This allowed increasing targeting of their administrative effort on risk management and assurance, rather than on 'unproductive' inspections of perfectly regular shipments.

Electronic delivery of services greatly extended this pattern of development, allowing faster and more complete acquisition of data in real time. The change helped in several ways. First, by providing much more accessible information online, traders wishing to be compliant could get accurate and more immediate help with their problems, reducing the incidence of

unintentional breaches of law or regulations or under-declaring of goods' values. So 'error' cases reduced and became somewhat easier to distinguish from fraud and intentional non-compliance. Second, electronic information (and later fully digital systems) made feasible the development of more sophisticated programmes for spotting anomalies amongst huge numbers of containers. Where problems were turned up, finding similar cases or identifying other shipments likely to be involved also became easier. The strong development of greater cooperation between customs services at both ends of international trade links, especially after the 9/11 attacks on the USA, also greatly facilitated electronic methods of working and improved intelligence functions.

There were some early hopes, strongly held in the US Customs Service around 2000 for instance, that it would be possible to condense out the wisdom of experienced freight inspectors into a customs 'expert system' that would routinize the detection of anomalous containers. Yet in practice the US service found that inspectors relied greatly on (different) hunches, intuitions and processing of multiple bits of information – about which ports or airports containers originated from, sent by which companies to which customers (interview, 2000). All this was interpreted in the light of a huge amount of informal knowledge about really current developments, very little of which could be systematized out into intelligence systems that genuinely worked in time-relevant ways. At the end of the day, in the UK, USA and Australia top officials stressed to us in interviews in the mid-noughties that detecting imports and export wrong-doing still came down largely to the skills and experience of the inspectors scanning interminable lists of electronic information about shipments.

Nonetheless, by greatly expanding the information base underpinning risk assessment, the growth of ICT systems made feasible efficiency savings for HMCE amongst its staff undertaking customs regulatory and informational work more generally, as well as supporting compliance and improved service quality. A key result was that by 2007 HMCE conducted far fewer volumetric controls than the customs service in any other EU country, checking only one in every 1000 shipments (or 0.01 percent) according to HMRC's returns to the EU (National Audit Office, 2008e, paragraph 2.18). This was the smallest proportion of shipments anywhere within the 27 EU countries, according to a study by the European Commission, as Table 3.1 shows. Almost half of EU countries still used volumetric checks on more than 10 per cent of their imports – the mean rate of checks was 9.6 per cent and the median was 7.6 per cent – all many times the check rate in the UK.

After reviewing these imports numbers, the UK's National Audit Office (hereafter NAO) noted that:

Table 3.1 The proportion of import shipments checked by customs departments in the 27 EU countries, in 2007

Number of Import Shipments Checked, per 1000 Shipments	Number of EU Countries
100 to 400	12
80 to 99	1
60 to 79	4
40 to 59	1
20 to 39	2
10 to 19	5
2 to 9.9	1
1 (UK)	1
Total	27

Source: National Audit Office (2008e, Figure 9), drawing on the European Commission's unpublished EU Annual Measurement of Results Report for 2007.

> [W]e recognise that direct comparison of data between EU countries is problematic due to different volumes of traffic, differences in remit and practice, and variations in reporting numbers of examinations and rates of irregularities. The EU has no standard for the level of inspections required by each member country or for what an inspection should entail. The Department [HMRC] considers that its risk targeting justifies lower levels of examination, but the fragmented nature of its risk and intelligence information makes it difficult to assess. (NAO, 2008e, paragraph 2.18)

3.3 THE EVOLUTION OF UK CUSTOMS' PRODUCTIVITY

To estimate productivity for the customs function, we used the evidence detailed in Table 3.2. In output terms, the two main activities are the registering and inspection of exports and imports. The key output activities that we considered for customs are the total number of import and export declarations processed per year. This data is not publicly available but it was kindly provided by HMRC statistics teams from internal databases, and we thank them for their assistance. Declarations for both import and export declarations were then re-weighted by the relative unit costs in each year to create a total outputs data series.

We considered the need for making quality adjustments of outputs, but decided not to do so. A wide range of interviewees in the department across the period, together with limited surveys of stakeholder views and

Table 3.2 Data and adjustments used for the measurement of productivity in UK customs, 1998 to 2008

Variable	Evidence Used, and Adjustments Made
Outputs for processing of import and export declarations	Number of import and export declarations, obtained from internal data provided by HMRC for 1997–98 onwards
Cost-weighting of outputs	Unit costs for imports and exports, estimated from HMRC and HMCE annual reports
Inputs, for total factor productivity	Deflated total labour and other administration costs, obtained from annual reports
Inputs for staff productivity	Number of full-time equivalent (FTE) staff allocated to customs processing, obtained from annual reports

a systematic review of media commentary for our study period, showed substantial evidence of neither quality fluctuations, nor of major improvements in service quality over time. Quality declines might be hypothesized from the low level of shipments being checked by the end of the period, but no clear pattern could be identified in other data on seizures of illegal goods, the street prices of drugs or other customs key performance indicators (KPIs), which generally showed trendless fluctuations.

In 2001 the NAO noted that only 3 per cent of import cargos not otherwise 'profiled' would be checked (NAO, 2001a, p. 13). Seven years later NAO warned that checks on imports were very low by EU standards. In addition, the department had a ministerial target of finding problems in a quarter of its imports searches. Senior officials interpreted attaining this target as an unambiguous sign of increased efficiency in Customs' risk assessment. However, this apparently greater success was actually achieved through the department reducing the overall volume of its searches (thereby improving the ratio of problems found), and not by finding more problem shipments in absolute terms. NAO (2008e) did not recommend that search numbers should be increased – nor even that HMRC should conduct an annual random sample survey, to compare how the rate of discovery of problem shipments in that data moved over time.

A European Court of Auditors (2010b) special report on customs checks covered very small samples of checks in the UK (in common with ECA's standard audit methods). It found extensive problems with HMCE's pre-clearance checks, indicated by lots of red 'traffic lights' in its report, but a somewhat more reassuring standard of HMRC post-audit checks. However, the sample cases and transaction numbers involved

here were tiny, and ECA teams are seen by many EU states as being over-punctilious in marking cases as not meeting legal requirements. We therefore concluded that the quality-weighting of outputs data was not needed in this case, nor indeed were there data series available that could provide useful quality weights.

Turning to inputs, for total factor productivity (TFP) we used a cost of staffing measure plus costs for direct materials and other costs, procurement, outsourcing of services provision and capital investment, to yield total administration costs. For staff productivity the inputs metric used was the number of FTE staff in HMCE (and later HMRC) working on the departments' customs processing effort. In all cases the outputs and inputs measures were set to 100 for a common base year, the financial year (April to March) 2000–01, which lies in the middle of our period.

The change from HMCE to HMRC running customs in 2005 posed some challenges in identifying the correct share of labour and other administration costs. Special care was taken to identify the share of labour and other administration costs allocated to the customs effort from 1997–98 to 2004–05 within the former HMCE department and from 2005–06 onwards within HMRC. The same focus was adopted to identify the share of labour and administration costs for the tax collection area, as explained in Chapter 4. (For more details see the Appendix at the end of the book.) We could not elaborate what we would regard as a fully reliable capital consumption estimate, because of irregular reporting by the department over years. But given that it represents a small share of total costs, we are certain at least that our numbers here do not unduly underestimate productivity in this area.

On this basis then, Figure 3.2 shows the levels of inputs and outputs over the decade for which we have data, and in the thickest line the total factor productivity trend. Productivity in this area shows an almost continuous upwards trend since 1997–98. This is mostly explained by a continuous increase in the volume of outputs (based on the total import and export declarations processed) and in the resulting productivity trend. Even in the last year shown here (the 'end of the boom' year 2007–08) there was still some growth of outputs, but because it coincided with increasing labour and other costs, this was enough to cause the customs TFP series to move downwards for the last two years shown in Figure 3.2. Our data do not cover the subsequent period, but customs productivity is likely to have declined significantly from late 2008 onwards into 2009 and 2010, because the credit crunch followed by the wider global financial crisis produced a big fall in the UK's overseas trade (shown in Figure 3.1 above).

Figure 3.3 shows our estimates of labour (staff) productivity in this area. The trend here closely follows our TFP estimate, but the range is much

Figure 3.2 Total factor productivity in the customs regulation of trade, 1997–2008

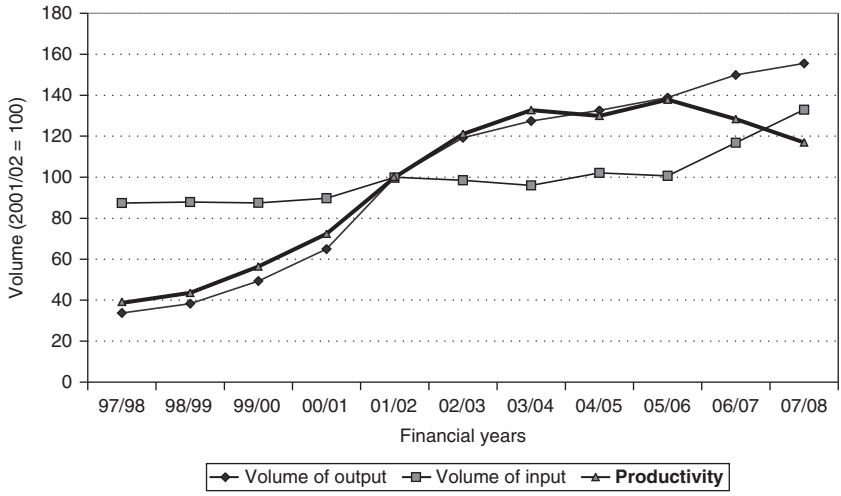
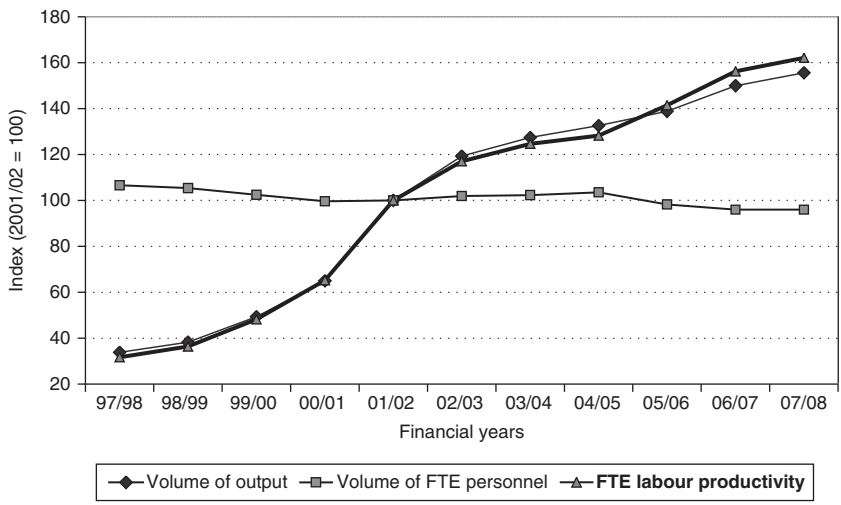


Figure 3.3 Staff productivity in customs regulation of trade, 1997–2008



greater and the slope steeper. Unlike in the TFP curve, the line showing staff productivity does not seem to decline with the onset of the economic downturn. There is a continuous upwards trend in Figure 3.3, especially in the late to early 2000s, which somewhat flattens off in the last years

shown. However, again the economic downturn since 2008 is likely to have dented staff productivity, since fall offs in international trade were very fast and deep, while HMRC cannot usually gear down its staff in customs regulation this quickly or extensively. (Traditionally HMCE had a lot of full-time staff and low proportions of fringe staff – no casual workers, for instance.) This is an interesting example of how some public services are very sensitive to demand changes (such as with customs and the issuing of passports), particularly if the government organization involved is not capable of quickly changing how it provides for and plans staff needs.

Conclusions

Over a long period Customs and Excise made a general shift in its administrative operations. It moved away from a reliance on staff-intensive volumetric processes and passive or uninformed checks. Instead the department shifted towards assessing risks proactively, a movement that affected the ways in which all its staff were deployed. The targeting of inspections and checks based on intelligence and expert judgement information then became feasible. The department was able to greatly reduce the time and resources spent on the routine checking of consignments that probably did not present any threat to revenue or security. Customs' early investment in proven (EDI) technologies for electronically interacting with importers and exporters allowed it to extensively replace paper-based administration systems. So far this commitment has largely paid off over more than a decade in use. The CHIEF system provided a critical underpinning of the reorientation to risk-based administration, greatly increasing the volume, systematization and 'real-time' qualities of all the department's regulatory information.

These twin shifts, in how work processes were organized and in how information flowed into the department, both meant that HMCE responded effectively to the post-containerization age. It met the demand for speedier clearances of shipments in and out of the country, and it was able to cope successfully with the strong growth of international trade volumes, especially from non-EU ports of origin and 'riskier' areas of the world. The increased workload was accommodated and quality of service maintained, while keeping Customs staff numbers relatively constant over a long period, and with relatively constrained increases in ICT outsourcing and other procurement costs.

As a result, staff productivity in the customs function of HMCE and later HMRC improved fivefold across the decade. However, a number of offsetting factors need to be considered. The increased outsourcing of IT functions and the transfer of some detection staff to the UK Border

Agency at the end of the period, both mean that this rate of change is somewhat deceptive. We also need to recognize that the general growth of international trade across the period provided a generally benign environment for Customs until 2008. Many organizations in the private and public sectors with constantly growing demands on them will tend to increase productivity, as existing assets are 'sweated' more, workflows are not disrupted by periods of slack demand and more consistent IT investments can be sustained.

Hence the increase in Customs' total factor productivity index is a better overall indicator of progress than staff productivity across the decade. It shows somewhat more than a threefold increase, after allowing for the effects of the 2008 trade downturn. This is still impressive and much of it can clearly be attributed directly to the department's own efforts – in changing management and administrative practices, making relatively forward-looking ICT investments, and encouraging importers and exporters to shift away from paper-based to electronic forms of information provision.