SUMMARY

Small increases to checks at borders can result in very large and unpredictable delays to freight. Large and unpredictable delays have serious practical consequences for industrial practice. The second-order effects of these consequences – ‘cascade effects’ – may lead to devastating consequences for particular geographies and industries. The Government therefore needs to address port-related delays and congestion immediately, facing up to the reality that this will require very substantial public investment.

1. My submission is brief and makes four simple but important points. For readability, and to meet the deadline for the consultation, I have chosen to produce a brief document without the conventional academic apparatus of footnotes and sources. It draws on over twenty-five years of researching and teaching in the fields of Operations and Supply Chain Management. Nothing I say is particularly novel, but my hope is to draw attention to some key issues. One the UK’s greatest assets is its freight and logistics industry, and industrial practice has been transformed in the period in which we have been a member of the EU, and, indeed, since the arrival of the Single Market in 1992. However, those outside the industry may not fully appreciate the way in which our economic system now operates.

2. The issue I will focus on here is about the implications for delays to freight transport at ports. Many others will make important arguments about the large number of problems and issues that may arise from increased checks or hassle at the border that will come from leaving the Single Market and the Customs Union. Many have pointed out that increased delays will lead to queues and congestion, but I think there is a risk of underestimating the scale of the potential problem, and of misunderstanding the range of possible consequences.

3. My four points are:
   - Small increases to checks at borders can result in very large and unpredictable delays to freight.
   - Large and unpredictable delays have serious practical consequences for industrial practice.
   - The second-order effects of these consequences – ‘cascade effects’ – may lead to devastating consequences for particular geographies and industries.
   - The Government therefore needs to address port-related delays and congestion immediately, facing up to the reality that this will require very substantial public investment.

4. I should add that in the general discourse the question of queuing at ports is often discussed as a single thing, but we should be clear that queues are likely for both import and export directions, and may include exports getting into a port and imports being cleared to get out of a port.
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5. It's been widely discussed that extra checks (for various purposes associated with not being in the Customs Union and Single Market) could introduce delays to the free flow of goods at ports. Some have argued that this will cause serious congestion, and some have discussed moves to rectify this with investments in, for example, lorry parks. However, it is clear that much of the discussion doesn't quite capture the full scale of the situation that might unfold.

6. First, it is important to understand that thinking about the impact of 'average checking time'. It is undisputed that leaving the EU will lead to some increase in the amount of time taken per truck to pass through the border processes. However, the figures commonly cited seem superficially innocuous: a rise from a minute or so to a few minutes. This seems – to most people – not such a big deal. It is easy to think that this means a few minutes extra inconvenience for each vehicle.

7. But the nature of queuing dynamics means that this is not true when systems are operating under heavy pressure: then, even very small marginal increases in 'service time' (the time taken for the check itself) can lead to exponentially rising queuing time. This is because once we consider the elements of variation in both inter-arrival time (i.e. the time between one truck turning up and the next one) and service time, it is a mathematical certainty that queue lengths (measured in terms of numbers waiting and time spent waiting) increase drastically. The only case where this is not true is when there is a great deal of slack capacity. Therefore, even slight levels of extra faffing around at the port will lead to many hours of extra queuing. It is easy to underestimate the effect of this fundamental feature of the nature of queues. And once disruptions and variations generate queues, the queues persist.

8. An (imperfect, but easy to visualize) analogy can be made by thinking about our traffic flow on motorways. When all is well, high volumes whizz up and down the country unimpeded, and drivers can make reasonable guesses about how long a journey will take. If the traffic is light, a small obstruction (roadworks, say) has little effect – it may add a few minutes, but nothing more. But when traffic is heavy the small delay for each car at the road works itself rapidly translates into very long queues: imagine the very worst traffic on a bank holiday.

9. This analogy may help explain how queues develop, but how do they clear? In the bank holiday traffic example, two effects make the queue eventually disappear: by the end of the day, the stream of new cars joining the back of the queue peters out, and drivers peel off to find other routes. In time, the backlog clears. But for the ports, these solutions are not available. The pressure of the flow of goods is unrelenting, and it is impossible for trucks to make ad hoc routing decisions: you can’t take a side road to Calais.
Large and unpredictable delays have serious practical consequences for industrial practice.

10. Second, it is crucial to understand that for freight transport, the consequences of substantial queuing are manifold, and difficult to predict. The issue of delays disrupting finely-tuned just-in-time and just-in-sequence manufacturing have been widely discussed, and it is important to recognize that lengthy delays mean that entire production systems become unworkable. This means that long and unpredictable delays mean more than a bit of inconvenience and cost; it makes whole systems of manufacturing (e.g. for the UK’s car assembly plants) unworkable.

11. But even for more conventionally organized supply chain systems, lengthy queues at ports have significant impacts. For example, many goods arrive at a distribution centre (which is a different thing to a warehouse) for the load to be speedily broken up and reconsolidated on an array of further trucks for onward distribution with other goods. Lengthy and unpredictable delays in arriving trucks make this coordination challenging if not impossible, with the consequence that supply chains must carry substantially more inventory. Holding inventory is very expensive, and requires different types of logistics facilities. Many foodstuffs are transported in refrigerated vehicles, and have very limited shelf lives: more queues means different sorts of trucks, or different sorts of products. Construction projects frequently require urgent supplies to overcome unforeseen problems, meaning that an additional day’s wait at a site incurs substantial costs that vastly exceed the value of the delayed item. Further, drivers’ working time is regulated for purposes of safety: if a journey becomes subject to substantial delays, it means that the process of scheduling and organizing logistics becomes hideously more complex: certain routes become simply unworkable.

The second-order effects of these consequences – ‘cascade effects’ – may lead to devastating consequences for particular geographies and industries.

12. It is important to note what happens when organizations and individuals are faced with queues and unpredictability: increased queues at ports will not just add a slab of uniform cost which industry and consumers will stoically bear. Instead, it will make some firms go out of business, and will make others limit their investments. Some business models will become non-viable. In certain industries and geographies, it is likely therefore that there will be significant cascade effects. The issue is that firms reach a tipping point, and their failure then brings down others.

13. In an economy where we appear to have a relatively large number of companies whose existence is already precarious, it is possible that these second order effects on the economy may be substantially greater than the (substantial) first order effects estimated in reports such as that by Oliver Wyman (“The Red Tape Costs of Brexit: What Price Will Businesses Pay for Freedom?”). This detailed piece of work makes some sombre reading; but it understates the threat: it does not attempt to estimate the knock-on effects of the increased costs.
The Government therefore needs to address port-related delays and congestion immediately, facing up to the reality that this will require very substantial public investment.

14. It seems likely that this will need to include very substantial state intervention, as the speed, scale and coordination of the investment required is unlikely to be possible using normal methods of procurement and public-private partnerships. This investment required will have to have at least three major elements: technology and administrative systems at the ports themselves; the background bureaucratic systems (for example, for systems of corporate- and consignment-level pre-registration); and, physical infrastructure. All of these elements will have substantial capital costs and recurrent running costs, and will have to be developed in coordination with the partner ports at Calais etc. The choice facing the Government is to spend heavily now, or risk potentially devastating economic consequences later.

Two final observations

15. I conclude with two observations. Firstly, there are those who have compared gloomy evaluations like this one to the concerns about the ‘Millennium Bug’, which turned out to be not as bad as people expected. But the comparison is false on two grounds. Firstly, no-one really understood exactly how computers would cope with the millennium issue, and a lot of the concern was based on precautionary guesswork. In contrast, the observations I make about queues and supply chains are based on well-founded and uncontroversial knowledge in my field. Secondly, the millennium bug issue was one that was addressed before the deadline with much effort by a large number of organizations that mostly sorted out their own risks independently; the issue here is a system-wide problem that requires coordinated action.

16. Finally, the amount of work needed to address these issues is very great. Even with a transition period – or even a year or two more – it will be a major challenge to deliver the changes required.

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