Appendix 5. Aggregate price shocks

        While section 2 in the text provided detailed evidence about

movements in individual grain prices and tariffs, the CGE models used here

embody an aggregate cereal sector producing an aggregate commodity,

'grain'. In order to calculate the impact of both the grain invasion and

grain tariffs, two pieces of information are required. First, how far

would average cereal prices have fallen in the absence of protection? And

second, by how much did protection succeed in raising average cereal

prices?

        Appendix Table 5.1 gives the crop mix within the grain sector (taken

to be wheat, oats, barley and rye) for the five European countries in 1871.

The weights are derived as follows:

Britain

        Derived from the UK and Irish figures in Appendix 1.

France

        Production data in Mitchell (1981, p. 255), combined with the price

data in Appendix 1.

Germany

        Hoffmann (1965), Table 51, p. 292 and Table 135, p. 552.

Sweden

        Lindahl *et al*. (1937, p. 28).

Denmark

        Christensen (1985), Table IV.3a, p. 56 (figures are for 1875).

        Appendix Table 5.2 uses this information, together with the price

data of Appendix 1, to calculate aggregate cereal price shocks. The first

row gives the actual average cereal price declines observed in five

European countries over the period, while the next three columns give
alternative counterfactual free trade price declines (only relevant in the
cases of France, Germany and Sweden). The table confirms that average
grain prices fell most steeply in Britain, and least steeply in Denmark,
reflecting declining transport costs across the North Sea.

What about average cereal price movements in protected economies?
The fact that Germany, France and Sweden all registered larger price
declines than free-trading Denmark might make one think that the aggregate
impact of protection was minimal; but these average cereal prices mask the
fact that the cereal mix varied tremendously across economies (Appendix
Table 5.1). In particular, wheat, whose price was most affected by the
grain invasion, was not particularly important in Denmark. Alternative
counterfactual free trade price declines are thus presented in Appendix
Table 5.2 for all countries. The first and second experiments assume that
individual grain prices declined as in Britain and Denmark respectively;
while the third ('no tariff' experiment) assumes that the abolition of
tariffs would have lowered grain prices by exactly the amount of the tariff
(as would be true if markets were perfectly integrated and tariffs were
binding).

It is clear from Appendix Table 5.2 that protection increased average
cereal prices in all three protected economies substantially. The strong
links between French and British grain markets re-emerge: assuming zero
specific tariffs produces the same average price decline as assuming that
individual prices evolved as in Britain. Comparing these two
counterfactual price declines with the actual price decline produces
estimates of average cereal tariffs of 26.5% and 26.7%, compared with the
geometric average tariff of 26.6%.

What about German prices? I concentrate on Bavaria rather than

Prussia, as you would expect the former to be better integrated into Western European trade than the latter. While Bavarian average cereal prices actually fell by 11%, they would have fallen by 35% had individual grain prices moved as in Britain, and by 34% if they had been lower by the amount of the specific tariff. Comparing these counterfactual and actual price declines implies average tariffs of 36.3% and 34.7%, compared with a geometric average tariff of 34.8%

If individual Swedish grain prices had moved as in Denmark, average prices would have fallen by 16.7%, while if they had moved as in Britain, they would have fallen by 30.9%. If prices had equalled domestic prices minus the tariff, average prices would have fallen by 26.8%, implying an average cereal tariff of 22.4%.

In the paper I begin by exploring what the implications of cheap grain on its own would have been. I start by imposing the actual British cereal price decline -- 28.9% -- on all three models. I then impose counterfactual free trade price shocks on the Swedish and French models, on the assumption that tariffs were binding; that is, I explore the implications of a 33.7% cereal price decline in France, and a 26.8% price decline in Sweden. This will provide estimates of what would have happened to income distribution in these countries in the absence of protection. Finally, I explore the impact of protection in these countries, by imposing both the counterfactual free trade price shocks, and average tariffs of 26.5% in France, and 22.4% in Sweden. In Table 11, I impose a counterfactual price decline of 34.2% on the German economy, followed by the same price shock, combined with an average tariff of 34.7%.

Appendix Table 5.1. Grain production, 1871

(percentage shares of total grain production)

	Britain	France	Germany	Sweden	Denmark
Wheat	48.3	50.1	34.4	7.5	10.1
Barley	28.0	9.8	12.9	22.2	33.5
Oats	23.5	27.6	5.6	39.6	31.0
Rye	0.2	12.6	47.1	30.7	25.4

Note: Danish figures for 1875

Source: see text.

Appendix Table 5.2. Cereal prices and protection, 1870-1913

(percentage price declines, 1870-74 to 1909-13)

	Britain	France	Germany	Sweden	Denmark
Actual price decline	28.9	16.1	11.4	10.4	9.8
Counterfactual price decline (1)	28.9	33.8	35.0	30.9	26.2
Counterfactual price decline (2)	13.2	22.8	29.0	16.7	9.8
Counterfactual price decline (3)	28.9	33.7	34.2	26.8	9.8

Note: all cereals prices are geometric averages of individual grain prices, deflated by national GDP deflator.
Counterfactual price decline (1): assumes that individual nominal grain prices decline as in Britain.
Counterfactual price decline (2): assumes that individual nominal grain prices decline as in Denmark.
Counterfactual price decline (3): assumes that individual grain prices equal actual domestic price minus specific tariff.

Source: for grain prices, see Appendix 1; for GDP deflators, see Appendix 6.