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The Economic Impact of the Famine in the Short and Long Run

By Kevin O'Rourke*

The Irish famine of 1845–1849 stands out as one of the great disasters of the 19th century: the last major famine in Western European history, occurring in the backyard of the then dominant world power. Excess mortality amounted to roughly one million, or over one-ninth of the population: on these scales, the disaster ranked with the Bengali famine of 1943–1944. Irish emigration was greatly increased, leaving its mark on the economies and societies of the New World.

Moreover, this famine had permanent effects. The role of the potato was radically diminished. A half century of rising population prior to 1841 was followed by a fall in population which persisted up to the 1960's. The structure of agriculture changed dramatically, with the share of crops falling from 55.5 percent before the famine, to 36.4 percent a decade later, to only 12.5 percent at the start of this century. Ireland had been a net exporter of grain until the Famine, when it became a large net importer, another permanent change.

Joel Mokyr (1981) found that the potato had an important influence on pre-Famine population trends, "revisionist" claims to the contrary notwithstanding. Similarly, in an earlier paper (O'Rourke, 1991a) I argued that the Famine had a lasting impact on post-Famine Ireland, again contrary to some revisionists. The claim that even if the Famine had not occurred, international commodity price shocks would have led farmers to switch from labor-intensive tillage to land-intensive pasture, significantly reducing Irish agricultural employment, is not supported by the evidence.

Surely the Famine influenced the long-run evolution of the economy; the question is how?

I. The Short-Run Impact of the Famine

Potatoes were the linchpin of the pre-Famine economy. Their function as a wage good is well known; but potatoes were also fed to animals and played a crucial role in crop rotations. A major form of saving consisted of feeding potatoes to pigs, which were sold in the summer months when the potato crop of the previous autumn had been exhausted. Blight hit Ireland in 1845, partially destroying the potato crop. The crop was completely destroyed in 1846. In consequence very few potatoes were planted in 1847, a year when the blight was absent. This encouraged more potato-growing in 1848, when, however, the blight struck again. The result was that Ireland was largely without potatoes for four years. How did the economy respond?

Available agricultural statistics show the collapse in potato cultivation during the famine, as well as its gradual recovery afterwards. The potato acreage never got close to its pre-Famine level, however (Austin Bourke, 1993 Ch. 11). Pig and poultry numbers also collapsed, and the numbers of sheep declined, as peasants consumed their capital. Initially the area under grains increased, as farmers substituted away from the potato; the wheat acreage soon started to fall back, however.

The statistics also show a continual rise in the numbers of cattle, both during the Famine and afterwards. The Famine clearly had dramatic short-run effects on the Irish economy. More interesting, maybe, is the fact that once the Famine had run its course,
and the economy had settled into a new equilibrium, the structure of the economy had changed significantly. The potato never recovered its pre-Famine position. By the mid-1850's, wheat production was significantly down from pre-Famine levels, and cattle numbers were significantly up. Relative to their pre-Famine levels, tillage output was down 21.3 percent, potato output was down 75 percent, and the volume of animal products was up 30.8 percent.

An obvious explanation for this would be that relative price changes caused the shifts in production. However, output movements had already largely taken place by 1854, as Cormac Ó Gráda (1993) has shown; but relative prices did not start to move strongly against tillage until 1856. If the Famine was at least partly responsible, what were the mechanisms at work?

One obvious possibility, raised by Ó Gráda (1989), is that the Irish potato, which has already (mistakenly) given textbooks their example of a Giffen good, may also have provoked a classic example of the Rybczynski theorem in action. Did the fall in Ireland’s labor endowment, caused by the Famine, lead to the contraction of labor-intensive tillage and the expansion of land-intensive pasture? The problem, as Ó Gráda notes, is that the ceteris paribus conditions of theory were no more present on this occasion than they ever were. Declining potato yields, and (by the late 1850’s) changing relative prices, might also have led to the output movements observed.

It is therefore necessary to ask the counterfactual question, “What would have been the impact of a declining population on the Irish economy, in the absence of other exogenous shocks?” Computable general equilibrium (CGE) models are of course ideally suited to ask such questions. In O’Rourke (1991a), I constructed such a model, calibrated to pre-Famine data. There are three sectors in the model: tillage, pasture, and potatoes. The outputs of the first two sectors (cereals and animal products) are traded, and their prices are exogenous. Potatoes are nontraded. In addition the model incorporates other largely intermediate products produced by the three sectors: straw, hay, and manure. There are four factors of production: labor, capital, land, and “expertise,” the returns to which represent the income received by tenants in excess of their wage income. Standard competitive assumptions are made, with two exceptions (designed to capture the peculiar flavor of the pre-Famine Irish economy). Workers and farmers consume a fixed amount of potatoes per capita; and in most runs, wages are exogenous and linked to potato prices, with employment then being endogenous.

The model attempts to incorporate as many features of the real world as possible and is thus more general than the 2×2 model of the Rybczynski theory. For example, the model incorporates a third, nontraded, sector. Whether a reduction in the endowment of labor in such a model leads to the output responses predicted by Rybczynski in the context of the 2×2 model is a purely empirical issue. Agricultural employment fell by 29 percent between 1841 and 1856. If one imposes this shock on the pre-Famine model (letting wages adjust endogenously, of course), the result is that tillage output contracts by 17 percent, and potato production by 15 percent, in line with the predictions of the theorem (see Table 1). However, pastoral-products production also contracts, although only by 3 percent. It thus appears that the decline in population caused by the Famine can explain a lot of the decline in tillage, as well as some of the increase in the share of animal products in agricultural output. It

<table>
<thead>
<tr>
<th>Shock</th>
<th>P</th>
<th>T</th>
<th>S</th>
<th>w</th>
<th>d</th>
<th>L</th>
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<td>−17</td>
<td>−15</td>
<td>+22</td>
<td>−13</td>
<td>−29</td>
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<td>−10</td>
<td>0</td>
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<td>+9</td>
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<tr>
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<td>−20</td>
<td>−26</td>
<td>+20</td>
<td>−15</td>
<td>−22</td>
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<tr>
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<td>+6</td>
<td>−42</td>
<td>+2</td>
<td>−11</td>
<td>−12</td>
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<td>−45</td>
<td>0</td>
<td>+23</td>
<td>−32</td>
</tr>
<tr>
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<td>−21</td>
<td>−75</td>
<td>+45</td>
<td>—</td>
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</tr>
</tbody>
</table>

Notes: P = pasture-sector output; T = tillage-sector output; S = potatoes; w = wage; d = return to land; L = agricultural employment.
cannot, however, on its own explain the increase in animal husbandry, nor the dramatic fall in potato production.

II. The Long-Run Impact of the Famine

In any event, the Rybczynski theorem would be incapable of answering a further question: why did the Irish population, and therefore the structure of Irish agriculture, not revert eventually to pre-Famine modes? Did the Famine in some way permanently alter the structure of the Irish economy?

As indicated earlier, potatoes were at the heart of the pre-Famine rural economy. Blight became a semi-permanent fixture until the end of the century, when effective treatments were found. Peter Solar (1989) estimates that net potato yields per acre after the Famine were 38-percent lower than before 1845. It is difficult to separate empirically the exogenous fall in yields from declining labor intensity, especially since the former, by raising the price of the wage good, would have induced the latter. Nevertheless, that potato yields did permanently fall in the wake of the Famine is not in dispute.

Patrick McGregor (1984) argues that in the short run this would have led to higher wages, less employment, and a switch from tillage to pasture. This wage effect might have applied in the very short run (a few months, say), but it is more likely that farmers were constrained by a shortage of labor as the Famine progressed (as in the previous section), rather than by an increase in the subsistence wage. Eventually workers would have shifted to cereals consumption, which would have cut the link between potatoes and wages. In the longer run, dearer potatoes would presumably also have led to less intensive agriculture, with animals eating fewer potatoes.

CGE models are of course unsuited to examining structural change. However, they are good at disentangling the separate effects of different but closely related shocks through counterfactual analysis. For example, one could ask: “What would have been the effects on the Irish economy if potato yields had declined, and nothing else changed?” The “yield” run in Table 1 reduces pre-Famine potato productivity by 25 percent, a reasonable estimate. Nominal wages are held constant, to abstract from the wage-good effect mentioned above. The results are surprising but easily explained. Pre-Famine diets were overwhelmingly potato-based, and the model thus incorporates no substitution between potatoes and other goods. If farmers and their workers had continued to eat potatoes in the same amounts, potato output would only have declined a little. More resources would have had to be devoted to potato cultivation than before, outputs of other sectors would have had to contract, and overall employment would have risen. (Since potatoes were non-traded, this would have involved a multiplier effect of sorts.)

The effects on production of course would have been even more negative if wages had risen in line with increased potato prices, as McGregor suggests. The “wage-good” run in Table 1 shows that employment would have fallen, and production in all agricultural sectors would have dropped. With the potato as wage good, reduced potato yields reduced the productivity of Irish agriculture as a whole. In the absence of other change, there would have been across-the-board decline.

Clearly such an outcome would have been unsustainable: something had to give. Diets certainly did: per capita consumption of potatoes fell by two-fifths between the early 1840’s and late 1850’s. Allowing consumption per capita to fall as it actually did and correspondingly reducing the role of potato prices in determining wages, I get the “diet” results in Table 1. Potato production now contracts by substantially more than the decline in productivity, as expected, releasing enough resources so that tillage can expand a little. Notice that declining potato yields on their own do not seem to be able to explain the post-Famine switch from tillage to pasture. This is reasonable; so far, I am keeping pre-Famine agricultural structures intact and merely changing potato productivity, diets, and wages. The main result of this should indeed be a contraction of potato production; an expansion of tillage, similar
in terms of factor proportions, would be reasonable under the circumstances.

Something more radical had to happen to produce the dramatic output shifts documented earlier, in particular the move to extensive farming mentioned above. Given information on what cattle and pigs were stall-fed before and after the Famine, one can ask: "How would the pre-Famine economy have responded if potato yields and potato consumption had fallen as they actually did, animals had been fed at their post-Famine rates, and nothing else had changed?" The results are given as "all shocks" in Table 1. Pasture now expands dramatically, while tillage contracts. The reason is obvious enough: less intensive animal husbandry involved fewer inputs and was more profitable for landowners. (Compare the returns to land in the all-shocks run with those in other runs.)

Surprisingly, these three shocks (to potato yields, consumption, and animal feeding) combine to produce movements in outputs and total employment reasonably close to those actually observed (given in the last row of Table 1). The model's assumption of subsistence wages does not, however, square with the observed wage increase of 45 percent (see the next section). (The all-shocks run does link wages to potato prices; however, the net effect of the yield, diet, and animal-feeding shocks on potato prices is negligible.) Moreover, while I do not have accurate data on other factor prices, rents probably fell over the period, presumably due to the increase in wages. To repeat, CGE models cannot by their nature be used to investigate structural change; it is the similarities between the last two rows of the table, not the differences, which are remarkable.

Extensive farming favored landowners but led to diminished employment opportunities. The permanent nature of the blight necessitated a switch away from old farming styles. The possibility that the Famine also provided farms with the opportunity for such a switch cannot be discounted, for of course if extensive farming was their most profitable option, one must ask why they did not switch sooner. From the perspectives of landlords and farmers, the Famine cleared large tracts of land of the smallholdings which made large-scale grazing difficult. Viewed in this light, the Famine served as a sort of speeded-up enclosure movement. While the data for the 1840's are poor, and a lot more econometric work has to be done on the post-Famine data, the degree of correlation across counties (during the 1850's) among increases in cattle numbers, declines in population, and increases in the percentage of farm holdings over 30 acres, is sufficiently strong to keep this hypothesis firmly on the agendas of Irish economic historians.

III. The Famine and Irish Labor Markets

The contrast in Table 1 between the actual wage increase after the Famine and the static nominal wages predicted by the pre-Famine model has already been noted. The pre-Famine economy was characterized by subsistence wages, linked to potato prices, and the model assumes this. The Famine completely altered the structure of the Irish labor market, however. By forcibly displacing so many Irish men and women, it severed the ties between subsistence costs and wages, generating links between Ireland and the rest of the world which ensured that foreign labor-market conditions would have a far greater impact on Irish labor costs than the Irish potato.

All the available evidence (George R. Boyer et al., 1994; Jeffrey G. Williamson, 1994) show Irish real wages catching up with U.S. and British real wages after the Famine. Moreover, those wage data which span the pre-Famine and post-Famine periods show a clear break: no catching up, or even falling behind, before the Famine, and strong catching up afterwards. This makes sense. Before the Famine, potential emigrants might have been constrained by a lack of money, contacts, or information; after the Famine, relatives and friends in the United States or elsewhere could make all of these available. One substantial shock was enough to send Ireland down a road leading to complete integration with world labor markets. Given hysteresis, history matters: the Famine is crucial to an understanding of subsequent Irish demographic development.
In turn, the integration of international labor markets had a substantial impact on the post-Famine Irish economy. Using a CGE model calibrated to post-Famine data, I have argued (O’Rourke, 1991b) that post-Famine emigration is best understood as a “pull” phenomenon, with emigrants being lured abroad by higher wages. This contrasts with Marx’s view of destitute workers being pushed off the land as a result of a switch from tillage to pasture. In a similar vein, Timothy J. Hatton and Williamson (1993) found that post-Famine Irish emigration was well explained by relative wages in Ireland and overseas.

What was the long-run impact of emigration on Irish living standards? In the context of a standard, constant-returns CGE model, Boyer et al. (1994) find, not surprisingly, that the answer depends crucially on the extent to which capital was internationally mobile. If capital was completely immobile, and there had been no post-Famine emigration, Irish per capita income would have been 13–25-percent lower in 1908 than it actually was. If capital was perfectly mobile internationally, no emigration would have meant substantial capital inflows, and per capita income would only have been 5–9-percent lower than it actually was. Increasing the range of uncertainty is the possibility that brain drains, or other malign forces, might have led to emigration actually hurting the Irish economy.

REFERENCES


