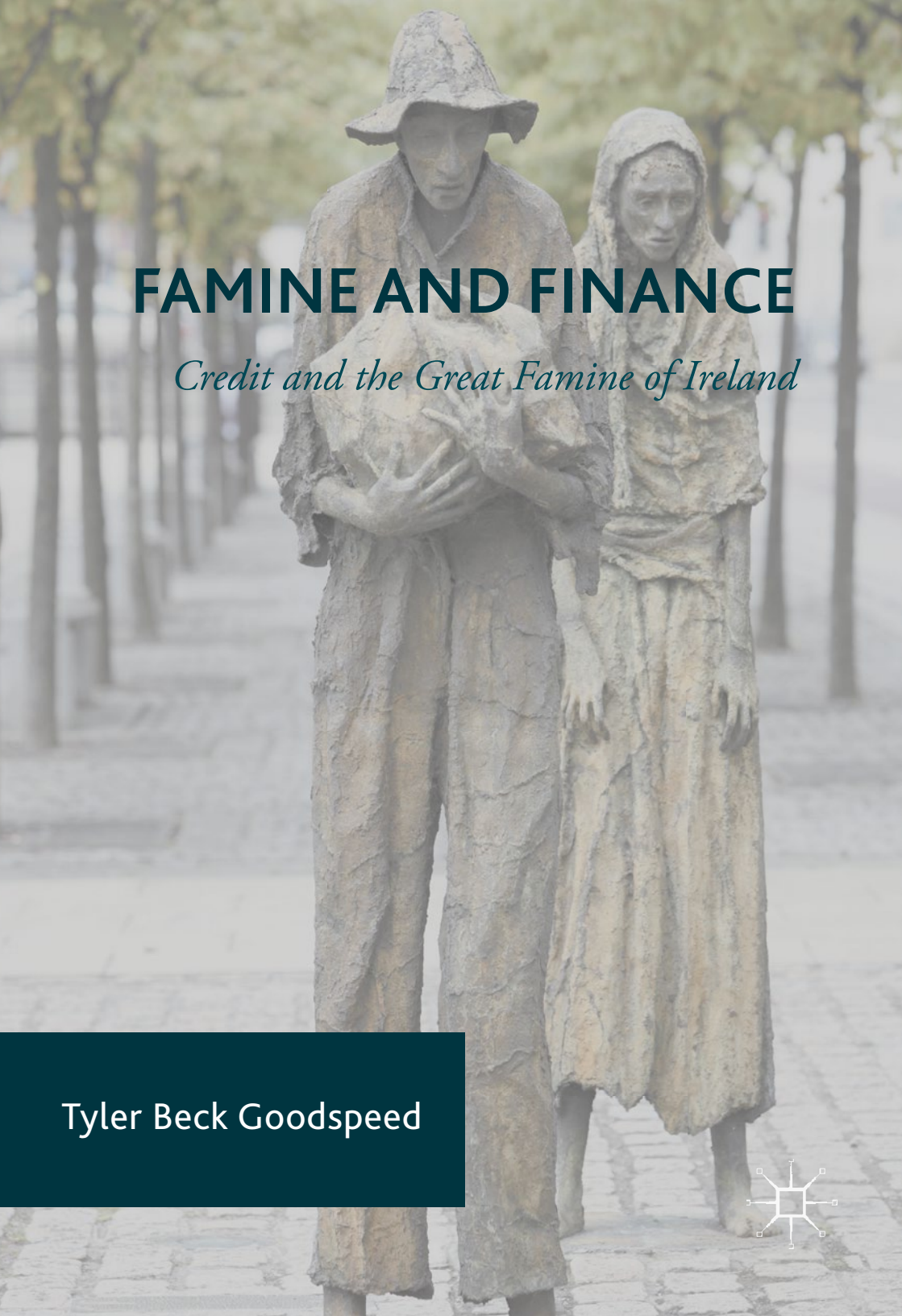

FAMINE AND FINANCE

Credit and the Great Famine of Ireland

Tyler Beck Goodspeed

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For the millions who went hungry

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Revisiting the Great Famine

> Ireland is now suffering under a circle of evils, producing and reproducing one another. *Want of capital* produces want of employment—want of employment, turbulence and misery—turbulence and misery, insecurity—insecurity prevents the introduction of capital—and so on. Until this circle is broken, the evils must continue, and probably augment. Report of George Nicholls on the Irish Poor Laws (1838)

The Great Irish Famine of 1845–1851 was the last major famine in Western European history. Claiming more than one million lives—one-eighth of Ireland's pre-famine population—the catastrophe ranks as one of the worst instances of mass starvation in modern history. Including the more than one million who emigrated between 1845 and 1851, the island's total population is estimated to have fallen by between 20% and 25%, and has never since returned to its pre-famine level. Without doubt, the primary short- and possibly long-run margin of adjustment to this severe environmental shock was a mass exodus of humanity, despite the fact that Ireland's soil remained some of the most fertile in the UK, its populace unvisited by war, and its climate unvisited by drought or extreme weather.

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Foremost among the lingering unanswered questions regarding the Great Famine, therefore, is why adjustments in land use failed to avert demographic catastrophe. *Phytophthora infestans*, the blight that devastated Ireland's potato crop, left wheat, oats, barley, flax, hay, straw, cattle, swine, sheep, and poultry untouched. And yet, while the Irish agricultural economy did gradually, over the subsequent three decades, reorient itself away from potato cultivation toward other forms of tillage and animal husbandry, this substitution was clearly not sufficiently extensive or rapid to prevent the deaths and emigration of some two million souls.

Though there were many factors that impeded Ireland's ability to absorb and adjust to a shock of the magnitude of potato blight, the central argument of this book is that an additional, thus far largely overlooked factor was an acute lack of access to capital markets among the bulk of Ireland's rural poor. On the eve of the famine, not a single Irish bank was in the business of extending loans smaller than £10, at a time when per capita income was roughly £10, and per capita income at the 67th percentile was about £4.30. Consequently, one of the few formal sources of credit to lower-income agricultural households were the Irish Loan Funds—privately run for-profit microfinance institutions (MFIs). Initially conceived by the Anglo-Irish essayist and pamphleteer Jonathan Swift, the Loan Funds operated on the standard microfinance model of extending small loans for very short terms, with weekly repayments, and cosignatories in lieu of collateral. As of 1843, there were 300 of these funds, active in 240 of 323 Irish baronies, extending half a million loans a year. My project therefore asks two primary questions—first, how marginal adjustments differed where the environmental shock was marginally more severe; and, second, how relative marginal adjustments differed where, controlling for the severity of the environmental shock, one binding constraint—namely, access to small loan credit—was at least partially relaxed.

To answer these questions, I use original archival sources—constabulary reports from the Parliamentary Famine Relief Commission—to construct a database of the severity of potato blight infection at the local level. I find that in the short run, districts more severely infected by blight experienced larger population declines and accumulations of buffer livestock by small- and medium-sized farms, while in the medium and long runs, worse affected districts experienced greater substitutions toward other tillage crops and grazing livestock, particularly by medium-sized farms.

I further find that access to microfinance credit from the Loan Funds was an important factor in facilitating non-demographic adjustment to blight; worse affected districts with at least one microfinance fund during the famine experienced substantially smaller relative population declines and larger increases in buffer livestock during and immediately after the famine, and greater medium- and long-run relative substitutions toward other crops and grazing livestock, than worse affected districts without a fund. More specifically, I find that the presence of at least one Loan Fund in a severely infected district during the famine was associated with a 3660-person smaller relative population decline by 1851. By 1852, farms under 15 acres in severely infected districts with a Loan Fund had increased pig and poultry holdings by £673.23 more than farms under 15 acres in districts without a fund, relative to comparably sized farms in moderately affected districts, and had furthermore reduced the potato's share of total tillage acreage by an additional 29.3 percentage points.

Revisiting a salient question in the economic history literature on the Great Famine, results presented in Chap. 5, "Was Malthus Right," are generally inconsistent with a predominantly Malthusian account of the Irish Famine. That is, controlling for the severity of blight infection, access to microfinance credit, regional time fixed effects, and spatial fixed effects, while higher adult literacy was associated with smaller relative population declines in worse affected districts, other traditional proxy "Malthusian" variables do not appear to have been associated with differential demographic changes in worse affected districts, relative to less severely affected districts. Specifically, the cumulative population decline, relative to low-blight districts, was still statistically no different in high- and medium-blight districts with higher pre-famine population density, potato dependence, baronial valuations, and fourth-class housing stock versus high- and medium-blight baronies with lower pre-famine population density, potato dependence, baronial valuations, and fourth-class housing stock.

Results do, however, suggest that variation in pre-famine Malthusian pressures was associated with modest differential relative adjustments in land use and livestock acquisition and disposal, particularly over the medium to long runs. While greater pre-famine reliance on the potato crop and higher concentration of fourth-class housing were associated, in the short run, with greater acreage allocation toward the potato in worse affected districts, over the medium and long runs, worse affected districts

with higher pre-famine potato dependence and fourth-class housing substituted crop acreage away from potato cultivation. Specifically, after the first year of blight, high- and medium-blight districts with pre-famine crop acreage allocation to the potato greater by 1 percentage point relatively increased the fraction of tillage acreage allocated to the potato crop by 0.014 and 0.017 percentage points more, respectively, than high- and medium-blight districts with a 1-percentage point lower potato crop acreage allocation. By 1856, however, high- and medium-blight districts with pre-famine crop acreage allocation to the potato greater by 1 percentage point relatively reduced the fraction of tillage acreage allocated to the potato crop by 0.038 percentage points more than high- and medium-blight districts with a 1-percentage point lower potato crop acreage allocation.

Similarly, after the first year of blight, high- and medium-blight districts with houses rated "fourth class" accounting for a 1-percentage point greater share of total housing stock relatively increased the fraction of tillage acreage allocated to the potato crop by 0.007- and 0.006 percentage points more, respectively, than high- and medium-blight districts with a 1-percentage point lower fourth-class share of total housing. By 1856, however, high- and medium-blight districts with houses rated fourth class accounting for a 1-percentage point greater share of total housing stock relatively reduced the fraction of tillage acreage allocated to the potato crop by 0.011 and 0.014 percentage points more, respectively, than high- and medium-blight districts with a 1-percentage point lower fourth-class share of total housing.

Parallel to adjustments in crop acreage allocation, greater pre-famine reliance on the potato crop and higher concentration of fourth-class housing were also associated with differential changes in livestock assets among farms under 15 acres in worse affected districts. In the short through medium runs, farms under 15 acres in worse affected districts with higher pre-famine potato dependence and fourth-class housing stock, relative to equivalently sized farms in low-blight districts, increased stocks of buffer livestock holdings of chickens and pigs, compared to farms under 15 acres in worse affected districts with lower potato dependence and fourth-class housing stock. These relative accumulations, however, dissipated over the very long run. Greater pre-famine potato dependence and fourth-class housing stock were, moreover, associated with greater short-run liquidations of grazing livestock assets by farms

under 15 acres in worse affected districts. Higher pre-famine population density and valuations, meanwhile, were associated with greater long-run relative accumulations of buffer livestock by farms under 15 acres in worse affected districts, in tandem with no long-run relative reduction in acreage allocation to the potato in more demographically dense districts and, indeed, a long-run relative reallocation toward the potato crop in districts with higher pre-famine valuations.

Building on Hornbeck (2012), which focuses on margins of adjustment in a more developed economy context and does not explore the possible effects of constrained credit on the time-path of adjustment in great depth, the results of this book demonstrate that access to credit plays an important role in short- and medium-run adjustments to adverse environmental shocks in a subsistence economy. The long-run non-demographic adaptations to the arrival of blight in Ireland, specifically crop portfolio diversification and substitutions away from tillage toward pasture, were effected earlier and to a greater extent in worse affected districts with a microcredit lender versus in those without. Moreover, in the presence of incomplete capital markets, access to microcredit appears to have allowed farmers to acquire temporary stocks of relatively cheap, liquid buffer livestock assets with low, but also low volatility, yields. This is significant because while recent research has demonstrated that access to microfinance credit can mitigate the impact of environmental shocks on income and consumption (Dercon 2002), most microfinance studies have focused on welfare effects and optimal models of sustainability under relatively ordinary lending circumstances.

An important feature of agricultural economies with incomplete markets is that short-run adjustments to adverse production shocks are often impeded by binding constraints that may be relaxed only over the long run (Swinton 1988; de Janvry et al. 1991; Besley and Case 1993; Foster and Rosenzweig 1995; Conley and Udry 2010). In particular, uncertainty, as well as capital and land constraints, can result in demographic change constituting the primary short-run margin of adjustment (Rosenzweig and Stark 1989; Townsend 1994; Udry 1994; Dercon 1996; Fafchamps et al. 1998; Munshi 2004). Research has also demonstrated that production shocks in the form of adverse environmental change are especially harmful to developing economies and their poorest populations, with the threat likely to intensify (Jayachandran 2006; World Bank 2009;

Dell et al. 2012). Thus, while recent studies have analyzed economic adaptation to environmental change in more developed settings, it is increasingly important to understand such adjustment in developing contexts (Deschenes and Greenstone 2007; Hornbeck 2012). Historical episodes provide a unique opportunity to analyze both short- and (very) long-run adaptations to environmental shocks than is possible in more contemporary studies (Reardon et al. 1992; Gine and Klonner 2005; Kazianga and Udry 2006; Duflo et al. 2008). Moreover, as the distribution of adjustment to a large shock along different economic margins may vary considerably depending on the relevant time horizon, it is critical to examine such responses with a long historical perspective (Lange et al. 2009).

Second, this study contributes to the extant literature on the debated role of livestock in smoothing consumption in developing contexts. While Rosenzweig and Wolpin (1993) and Verpoorten (2009) provide evidence for the use of bullocks by credit-constrained households in rural India and Rwanda as buffer stocks for consumption, Fafchamps et al. (1998) find that livestock sales in Burkina Faso compensated for only 30% of income shortfalls due to adverse rainfall shocks, and Kazianga and Udry (2006) find little evidence of consumption smoothing. The results of this study, however, suggest that in analyzing the role of buffer livestock in consumption smoothing, it is important to distinguish between different types of livestock and their respective purposes for different types of farmers. Moreover, results indicate that the importance of buffer livestock may lie not so much in their liquidation value in the event of income shortfalls, as is typically reckoned, but rather in the hedging value of a low but relatively reliable supplemental income stream, for example, through the sale of eggs from poultry stocks.

In addition, because MFIs are often vulnerable to spatially correlated shocks such as adverse environmental change, I also analyze the effects of the Great Famine on the Irish Loan Funds themselves, exploring which management and lending practices allowed some Loan Funds to survive the famine while others failed. A major potential challenge confronting microfinance lenders, cooperatives, and credit-granting non-governmental organizations is that they may be ill-equipped to absorb the kinds of large covariate shocks typical of agricultural loan portfolios (Binswanger and Rosenzweig 1986; Braverman and Guasch 1986; Rosenzweig 1988; Shoji 2010; Kurosaki and Khan 2012). While the results of this book,

along with other recent research, demonstrate that access to microfinance credit can mitigate the impact of environmental shocks on income and consumption (Dercon 2002; Khandker 2007; Becchetti and Castriota 2008), the ability of microfinance lenders to cope with large-scale aggregate shocks involving high spatial correlation in income effects and default risk remains understudied.

This is a significant gap in the extensive microfinance literature—which has tended to focus on welfare effects and optimal models of sustainability under ordinary lending circumstances—because the concentration of borrowers and depositors in contiguous geographic locales and identical crop portfolios can generate considerable covariate risk for MFIs, for example, following adverse environmental change (Miamidian et al. 2005). MFIs may therefore be most vulnerable where and when they are most needed (Berg and Schrader 2012). History offers a unique opportunity to observe such rare events, and to analyze differential MFI outcomes and adjustment strategies, over both the short and long runs, in order to identify how sustainable lending models may vary depending on the macro context.

Following Hollis and Sweetman (2004) and utilizing the dataset constructed for this book, in Chap. 4, I thus analyze the effects of the Great Famine on Loan Fund failure rates and balance sheet changes. I find that compared to funds operating in less infected districts, funds in districts worse affected by blight in 1845 and 1846 not only had lower predicted probabilities of survival and experienced greater declines in lending, capital, and depositors, but also experienced larger declines in average interest rates, penalty fines on loans, and bad debts. Borrowing costs for qualifying borrowers therefore fell as funds in worse affected districts contracted lending and significantly raised credit standards.

I further find that pre-famine balance sheet metrics were important predictors of institutional survival during the famine, though certain metrics that were generally associated with higher (lower) survival probabilities were associated with lower (higher) survival probabilities where the severity of the environmental shock was greater. Specifically, while greater leverage, lower average staff salaries, and more depositors were generally associated with higher predicted probabilities of institutional survival, the reverse was true where blight infection was more severe. Conversely, though a higher average pre-famine unit cost of credit intermediation was generally associated with a lower predicted survival

probability, in the face of severe blight infection, funds with higher expenses as a percentage of total lending before the famine were more likely to survive the first two years of blight.

Funds with higher pre-famine gross profit margins per loan were generally no more likely to survive over the long term than less profitable funds, but higher pre-famine margins were positive predictors of institutional survival where blight infection was worse. While ministers were generally less competent fund managers—funds managed by ministers had a significantly lower predicted probability of survival—ministers were statistically no more or less competent than non-clergy managers where the magnitude of the environmental shock was greater. Differences in average pre-famine loan size, bad debts, fines ratio, number of loans, and cost of capital do not appear to have had differential effects on predicted survival probabilities during and immediately after the famine, either generally or particularly where blight infection was more severe.

To explore potential channels through which differences in pre-famine balance sheet metrics influenced survival probabilities, I also examine whether certain balance sheet metrics were associated with differential institutional responses to the adverse shock. I find that balance sheet contraction and flight to quality were the primary mechanisms by which some Loan Funds managed to successfully navigate the famine, which suggests that one cost of credit market resilience to a major aggregate shock like adverse environmental change is reduced outreach to borrowers of lower credit quality. This result is consistent with my additional findings that while Loan Fund lending had significant effects on agricultural adaptation by small- to medium-sized Irish farms, it does not appear to have affected the very smallest and most vulnerable farms of under 1 acre.

Specifically, relative to funds with lower average gross profit margins per loan before the famine, funds in worse affected districts with higher pre-famine margins relatively reduced average loan size, interest rates, fines ratios, and bad debts during the famine, implying a relative increase in average credit quality among approved borrowers. Similarly, funds in worse affected districts with higher staff salaries before the famine relatively reduced their average annual number of loans and fines ratios during the famine.

Moreover, while funds with higher pre-famine profit margins experienced relative declines in average margin per loan, there was no

difference in their average, non-differenced level of profit margin per loan during the famine. In contrast, funds in worse affected districts with more depositors before the famine experienced relative increases in average loan size, fines ratios, and bad debts during the famine, while funds in worse affected districts that had been more highly levered before the famine experienced a relative rise in the unit cost of credit intermediation and relative decline in profitability, resulting in lower average margins per loan during the famine. In robustness checks, I find that differences in pre-famine balance sheet metrics cannot be explained by pre-famine differences in available micro-level social and economic variables.

These findings suggest that Loan Funds that had been earning higher rents before the famine had more scope to contract credit and raise lending standards in response to an adverse spatially correlated shock, while still remaining profitable. Better compensated staffs seem to have been more effective at restricting credit to higher-quality borrowers. By contrast, funds that had been relying more heavily on leverage appear to have been more severely affected by balance sheet contraction during the famine, with more levered funds experiencing relative increases in the unit cost of credit intermediation and relative decreases in average profit margin per loan, resulting in lower average margins during the famine. Funds with more depositors, meanwhile, seem to have been less able to contract their lending portfolios and raise average credit standards. These results imply that MFI sustainability in the face of a major covariate shock such as a natural disaster may depend critically on an ability to rapidly scale down lending, reduce average loan size, and significantly raise lending standards, and therefore that though microfinance may help to mitigate the effects of such shocks on borrowers of higher credit quality, it is not a viable mitigant for more vulnerable borrowers.

1.1 Historical Background

1.1.1 The Irish Loan Funds

On the eve of the Great Famine, Ireland's was an undercapitalized subsistence economy heavily dependent upon a single staple crop. By 1845, median farm size in many Irish districts had declined to such levels

that the potato was the only crop with sufficient yield and nutritional and caloric content to support an average-sized family for 12 months (Mokyr 1985; Bourke 1993; Ó Gráda 1995, 1999).[1] On the eve of the famine, the potato thus accounted for approximately 60% of the Irish food supply, with nearly 40% of Irish depending almost exclusively on the potato for subsistence (Bourke 1993). While average annual per capita income was an estimated £10, with those at the 67th percentile earning £4.30 or less, no conventional bank in Ireland was in the business of extending loans in amounts smaller than £10.[2] Indeed, before 1845, just two Irish joint-stock savings banks—the Agricultural and Commercial Bank and the Provident Bank—had ventured into the business of extending loans below £10; both had failed by 1845.

Registered pawnbrokers were legally entitled to grant loans at interest. Interest charged could not exceed one halfpenny per 2 shillings per month, corresponding to 5 shillings in the pound per annum, or 25%, though penalties on late payments could often raise effective annual rates to 40%. An 1849 registry counted just 477 of such entities for the entire island, however. Before 1850, moreover, there was just one Irish building society, established in Dublin in 1846. Unregistered moneylenders, so-called gombeen men (from the Irish Gaelic *gaimbín*, for money interest, from the Latin *cambium*, for exchange), meanwhile, extended loans at significantly higher rates, not uncommonly a shilling in the pound per week, corresponding to 520% simple interest, or 1200% compound interest, per annum (Keenan 2001).

Important providers of credit to Ireland's rural poor, therefore, were the Irish Loan Funds—privately-run microfinance funds operating throughout Ireland from the mid-eighteenth century into the early twentieth century. Originally conceived by Irish essayist and satirist Jonathan Swift in the early 1700s, the first Loan Fund was established as a quasi-charitable enterprise by the Musical Society of Dublin, which

[1] Despite high potato dependency, however, revisionist quantitative work by Mokyr (1985) and Ó Gráda (1995, 1999) challenges conventional claims that the pre-famine Irish economy was balanced on a Malthusian knife-edge. Mokyr and Ó Gráda find that, owing partly to the high caloric and nutritional content of the potato, mean height and estimated daily caloric intake were in fact higher in pre-famine Ireland than in most other Western European countries.

[2] Mokyr (1985) estimates annual per capita income was between £9.50 and £10.50, and per capita income at the 67th percentile between £4.30 and £4.60.

for a brief time thereafter operated a branch system of musical loan societies. By the early 1840s, however, the Loan Funds were a diverse set, including private pawnbrokers and Mont-de-Piétés that had reorganized and registered as Loan Funds, and with no operating connection to the original Dublin society (McLaughlin 2009).[3] On the eve of the famine, there were thus 300 independent Loan Funds active in more than half of Ireland's 323 baronies, extending almost 500,000 loans a year to approximately 300,000 borrowers.[4]

Like more contemporary microfinance models, the Irish Loan Fund model was predicated on extending small, short-term loans with frequent payments, secured by two cosignatories in lieu of collateral. The average fund made 1750 loans a year, with a mean loan size of approximately £3 and a fixed maximum of £10.[5] Standard term was 20 weeks, with mandatory weekly payments, enforced by penalty fines. Cosignatories, who were not allowed to borrow themselves or cosign another loan so long as they were bound by cosignature to an outstanding loan, could be pursued in the event of default, with fund managers instructed to deduct 2 shillings from the pay of staff members who failed to initiate legal proceedings against delinquent cosignatories to a defaulted loan (Piesse 1841).[6,7] Interest was standardized to 4 pence in the pound per week, or 8% per annum, though additional fees for filing application

[3] Traditional pawnbrokers and Mont-de-Piétés had different lending structures than Loan Funds, and, unlike Loan Funds, required collateral, which meant that potential borrowers had to possess durable assets to pledge.

[4] Assuming an average family size of five, this implies Loan Funds were annually extending loans to roughly 20% of Irish households, though in some counties, the figure was closer to 30–40% (Hollis and Sweetman 1998, 2004).

[5] To put these figures in perspective, *Thom's Statistics of Ireland* for 1853 quotes the following official enumerated values: cattle at £6.50 per head, pigs at £1.25 per head, sheep at £1.10 per head, goats at £0.375 per head, and chickens at £0.025 per head. Market quotes from 1845, however, report £2.25 per head for pigs (£1.00 for a young feeder pig), £0.09 per head for chickens, £9.00 per head for an adult cow, and £1.00 to £2.10 for an adult sheep, depending on gender. Alternatively, seed to sow one acre of oats cost £0.90 (*Thom's* 1850).

[6] There were 12 pence (d.) in a shilling, and 20 shillings (s.) in a pound (£). Legally, Loan Funds enjoyed priority over other creditors (McLaughlin 2009).

[7] Charles A.J. Piesse was a British civil servant at Dublin House and Secretary of the Loan Fund Board of Ireland. His publication, *Sketch of the Loan Fund System in Ireland and Instructions for the Formation of a New Society*, was intended not just as a guide for the establishment of Loan Fund societies, but also to encourage establishment. The publication therefore likely overstates the degree of uniformity and regulatory consistency within the Loan Fund system.