

Interactive comment on “The Irish famine of 1740–1741: causes and effects” by S. Engler et al.

S. Engler et al.

steven.engler@kwi-nrw.de

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Interactive comment on “The Irish famine of 1740–1741: causes and effects” by S. Engler et al. Anonymous Referee #1 Received and published: 3 March 2013

[General Comments] The paper studies a historical climate extreme that has received little scholarly attention, particularly in the chosen Irish context. The event is clearly relevant to the journal’s agenda. Additionally, the authors propose an integrated methodology that reflects current approaches in the field of historical climatology in line with the journal’s broader aims. However, the treatment of the underlying data (on prices, climate, and migration) is in serious need of clarification. The use of historical source material is below standard. As a result, the paper’s conclusions and the proposed model (FVAM and vulnerability indexes) remain vague and sometimes flawed. Its presentist drive is somewhat at odds with the journal’s orientation. The paper also need

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thorough English language editing.

Response: We have included a larger number of historical literature to assess single variables of our FVAM and strengthened our argumentation on almost every section of the paper. The paper did also undergo a professional English language editing.

[Specific comments] The paper makes extensive use of a) price b) climatological and c) migration quantitative data. The quality and reach of this material in the 18th century, poses serious challenges that need to be addressed more clearly: a) the author's state that oat and potatoes constitute the major dietary sources of the population in question. The paper, however, provides wheat prices only. The reader can only guess that oats prices were either missing or required more archival research. The substitution of readily available wheat price series for those of more widespread food is common practice, but has attracted major criticism (in the work of John D. Post for example). This discussion needs to be addressed in the paper. Particularly, as the authors use rising prices as an indicator for "food availability decline" that is central to their paper – a link (prices to harvests) that again has been questioned in more recent work on non-market economies, "economies of makeshift" (Hufton) or the "micro-politics of subsistence" (John Walter).

Response: Reliable price statistics for almost all goods are missing for Ireland for the first half of the eighteenth century. The same holds also for demographic data. The scope of our archival research did not change anything about this situation. Thus, we added some fragmented information about rising prices for potatoes, oats etc. from our source material and no longer take wheat to represent a general price trend. Thus, we have refrained from addressing the debate mentioned by reviewer No. 1, which would have led to lengthy theoretical remarks and summaries of the literature. In the case of 1740/41, we are sure about a general decline in food availability. However, we do not take prices to represent this decline. Instead we now emphasise the following: "While rising market prices do not directly reflect food availability in an economy in which many people depended on self-subsistence, they do reflect the hardship suffered by those

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segments of the Irish society participating in food markets. As Post (1995, p. 247) pointed out, 'food and drink accounted for some 60-75 percent of the household budgets of the labouring population when cereal prices stood at normal levels'. Increasing food prices thus severely affected the purchasing power of households."

b) the authors repeatedly claim that the climate data they provide is "for Ireland" (p. 1029) – a phrase that suggests data from Ireland is used. The referenced works, however, all focus on "Europe". My guess is, that the climate models presented, work by extrapolation based on modern climate reconstructions, without the use of any historical data from Irish proxies at all. Again, this substitution and the low- resolution (3-monthly averages) of the data needs to be addressed and its impact on the relevance of the data spelled out – particularly as an "integration" of climate and societal data is a central goal of the paper.

Response: The data is, as stated, "for Ireland". It is from multivariate climate field reconstructions that have proved to be robust even outside the region with high proxy availability, see the cited references. It does not rely on "climate model", the reconstructions are statistically based and include long instrumental data and different climate proxies (documentaries, tree rings, etc.) s Regarding the "low resolution" - Temporal: Seasonal climate field reconstructions are actually state of the art. While, of course, seasonal averages need to be interpreted with great care, the persistence of the observed weather situation over Europe, as also explicitly discussed by the cited newspapers, does warrant such an averaging. Regarding the spatial representation: 1) Temperature anomalies are highly correlated over more than 1000km, additionally showing long-range correlations. Thus, temperature reconstructions relying on these correlations are relatively robust, see cited literature. 2) Pressure anomalies are highly correlated in space. 3) Precipitation in the area of Ireland is (apart from convective activity on warm summer days) mostly driven by advection of warm and moisture rich air from the Mid Atlantic. This is linked to the overall synoptic situation over Europe and the North Atlantic, see comment on pressure. Additionally, the study of Pauling et

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al. (2006) shows good RE for 18th century Ireland. The discussion of the robustness of reconstruction methods is not the aim of the paper. Studies are undertaken e.g. by Smerdon et al. (JCLim 2011, 2012) or Werner et al. (JCLim 2013) and several others. We thus do not expand the discussion of the underlying methods in this article. We included a sentence: "While these studies did not use predictors from Ireland, validation measures indicate decent skill for our area of interest."

c) migration is a central topic of the paper, the model proposed (FVAM) and the working group that inspired the authors. However, the data presented on migration is either varying widely (between 1.000 and 12.000 people p.a., p. 1037) or anecdotal. No independent verification or archival work seems to have been undertaken – the authors simply state that official records "are missing". Considering the central position of this field in the paper's argumentation, these lacunae need to be addressed and assessed frankly.

Response: Even though the numbers mentioned in the paper (1,000 and 12,000) represented emigrations from different parts of Ireland and are therefore both correct, we revised the section on adaptation and migration considerably – in fact: we reformulated it entirely. Section 4.4 now argues why we consider it justifiable to apply the term "climate (-induced) migration" to excess emigration and internal migration in Ireland during and immediately after the crisis of 1740/41. It is true that the demographic background of migration movements in the eighteenth century is somewhat obscure, as Cullen (1994) has pointed out. Our research could not change that situation, which would have required the discovery of new sources of demographic information or new methods that lead to better results than hearth counts did in the past. However, some studies on Irish immigration to North America provide numbers that are good indicators of the peak of Irish emigration that occurred during the crisis of 1740/41, about which none of the authors who have written about Irish migration in the eighteenth century leave any doubt. Thus, our contribution to the study of migration in "pre-famine" Ireland is mostly original in the sense that we discuss the evidence in the context of the recent

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debate about climate migration.

A second area of concern is the treatment of the historical material and argumentation of the paper. Considering the limitations of the quantitative data (above), it is surprising, that qualitative material is used reluctantly and inexpertly. As no archival material has been accessed, the authors focus on printed tracts and newspapers. These are often cited as objective validations of rather sweeping assumptions (absence of relief measures, shortcomings of the administration, general crisis). There are virtually no efforts to qualify the validity of historical authors or the text genres used. This is particularly awkward in the area of market regulation or relief, that were hotly debated by contemporaries and certainly reflect the personal background of the authors in question or their audience (Powell, Prior, Dublin Gazette).

Response: The scope of our source material is wider than stated in this criticism and includes newspaper articles, books, official records, diaries and letters. However, our assessments of the manifold indicators included in the FVAM is largely based on expertise other researchers have achieved through their study of Irish history from documentary sources. The use of, both, literature and source material in our argumentation has been refined considerably. We do not quote any newspaper articles, reflecting the opinions of contemporary observers, taking any of the statements for granted. We hope that the changes we have made will be sufficient to avoid this misunderstanding.

These deficiencies, however, seem to point to more general shortcoming in the historical placement of the event in question. The assertion of the authors that short lifespans and illiteracy limited the perception of disasters or climate runs contrary to the substantial research on historical disasters.

Response: We are not sure what the reviewer means with “substantial research on historical disasters”. We have revised the respective passage in our text hoping that our argument will now be clearer. We simply point to the fact that baseline memories of disaster tend to shift from one generation to another, even in highly literate cultural

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circumstances, in a way that the dangers of the occurrence of certain extreme events are generally underestimated after thirty or more years of non-occurrence. We consider our argument valid and plausible that illiteracy and relatively short life expectancy in Ireland enhanced the tendency to underestimate the dangers of an extreme winter frost.

The offhand remark that welfare was poor, because "only" the Church provided it, betrays a fundamentally ahistorical perspective. With regard to the journal's focus and the large amount of relevant literature (not least by co-author Mauelshagen), the historical passages need revising. The scientific reader will also manage without the information that flight was not available in the 18th century (p. 1024).

Response: We have revised the paper to avoid false impression concerning our assessment of welfare measures provided by the Church.

As a result, the paper's conclusions are of limited value. They centre on the known fact that the 1740s saw a crisis in Ireland and that climate played an important part, with little to no orientation given to its position and relevance in its own time. Indeed, the paper seems to be motivated almost exclusively by the contemporary debate on climate change. A fact that is irritatingly obvious to the reader in frequent anachronistic references, definitions, and comparisons.

Response: In the revised version, we have reduced the number of "anachronistic" definitions. However, we consider it entirely legitimate to see historical events in the context of recent debates about climate change and climate migration. Our findings are indeed not new with regard to the fact that the 1740s did see a crisis and that climatic extremes played an important part in it; what is new is that we apply a non-deterministic model of interpretation that integrates pre-famine vulnerability and up-to-date climate data to assess the complex interplay between climate and the Irish society in 1740-41. To make this point even clearer, we have reformulated our Abstract, introduction and conclusion.

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In order to strengthen the paper's historical perspective I would recommend a revision of the "index system" the authors use. At the moment its broad categories serve only to unfavourably compare pre-modern/developing and developed societies (reinforcing established pre-modern/modern dichotomies and teleologies). Its heuristic value for historical societies is limited. In its current form, it would produce the same results for almost any society of 18th century Europe! Once it is refined, the scores need to be discussed to make sense. What does a +7 in "policy" tell the reader? Before the case study is compared to modern societies, it should, however, be compared to and placed amongst contemporary examples. To what extent are "poor roads", the dominance of church based relief and "low" exchange entitlements an "Irish problem"? What sets the Irish case apart from other 18th century societies? Such an approach would strengthen the thesis of the authors that climate (not just policy) played a crucial role.

Response: Our aim is not to compare the processes of the Irish famine of 1740-41 to modern societies. The FVAM is the result of a careful review many studies of historical famines, some more recent, some more ancient. Thus, the model in itself includes no statement whatsoever about developing or developed societies. We are aware, though, that not all of the variables included can be thoroughly investigated in every historical context. Also, the revised version of our paper included some statements about those adaptations; we discussed some of the problems we encountered applying the FVAM, and we make our principles and solutions explicit in the introduction to part 4.1. One of our aims was to test the FVAM in various historic contexts. On the one hand this will enhance the model itself, and on the other hand it will allow comparisons between different societies in different periods. Coming along with a revised version of the FVAM, a shift to an analysis of modern societies is imaginable and achievable subsequently.

[technical corrections] The text needs substantial English language editing. Some of the phrases that need revising are: posed questions / further re-included (1015) combination of socio-environmental factors (1016) forth (=fourth) (1017) breadstuff (1018)

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portrayal (1019) even at low / was ... was / Therefore ... therefore (1020) constitute / real scarce times (1022) Thus did trade (1025) decent (=recent?) (1027) shrinking situation (1028) was claimed (1037) Discussion frosty (1038) as well as some phrasal verbs: the Horn of Africa is often understood as an example for political rather than pure climate impacts (1016) the term "vulnerable" needs a definition, when used on historical societies the reference for the claim that 1740 is the coldest year is inconclusive (1018) "good governance" is an ancient Greece rather than British concept (1021)

Response: With the exception of "posed question", which is an established phrase and "breadstuff", which is a term for "grain for the production of bread", all changes were made or explanations were given. Furthermore, the paper did undergo a professional English language editing

The acute cold (relevant for humans) and the drought (relevant for plants) need to be differentiated better (1030)

Response: From the text (p. 1029,1030): "and not three hours of continued rain since the beginning of November, which causes as great scarcity of water as in the midst of summer, so that there is no getting corn ground at our water mills" – "The dry winter and spring of 1739/1740 had a huge influence on crop yields for the following year as the saplings withered: the influence of detrimental weather on plant life, especially of plants growing only one year, is much higher during the beginning of the vegetation period than later in the same year."

p. 1031 line 21 needs a reference p. 1033 line 18 is missing a reference claim that recent famines support the findings needs a reference (1038)

Response: Changes were made and further references were included.

Fig. 3 needs a better description. What do the black columns indicate (historical or modern data)? Why are the corresponding historical figures only represented by yearly rather than 3-monthly averages - are these figures missing, insignificant or uncertain?

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Why are the results relevant? The precipitation shows marked deviation only in winter, when it is less relevant to agriculture.

Response: The caption states: - "Seasonal climate diagrams for Ireland (averaged over land only grid cells 51°N-56°N, 11°W-5°W)" seasonal = 3-monthly averages, as stated by the referee in comment b) - "The histograms show temperatures (top) and seasonal precipitation (1710-1739)." Histograms = "the black columns" - The statement regarding precipitation in the reconstruction is true and discussed not in the caption. The remark is however already reflected in the text: p. 1030, 119 "While the spring of 1740 still remained slightly too dry, over the following seasons precipitation returned to normal levels." We changed "dashed blue lines denote values for seasons during the famine" to "dashed blue lines: seasonal values during the famine".

Interactive comment on "The Irish famine of 1740–1741: causes and effects" by S. Engler et al. Anonymous Referee #2 Received and published: 8 March 2013

General Comments: It is a huge strength of the paper that it combines social, economic, political as well as environmental factors in order to understand the Irish famine of 1740/41. For their analysis the authors draw on a wide range of empirical data (reaching from reconstructions of climatic conditions to archival material such as letters and newspapers) and apply interdisciplinary perspectives for analyzing this data. Furthermore, the authors reveal a comprehensive knowledge about current theories of famine and vulnerability concepts. By introducing the "Famine Vulnerability Analysis Model" (FVAM) the authors apply an innovative approach for the understanding of historical famines. However, the discussion of the "interaction of demographic, political, economic and environmental aspects is characteristic in this famine" remains sometimes superficial. It remains unclear why certain characteristics of the Irish society qualify as "indicators of vulnerability" (see Table 2). For instance, why does a specific "urbanization ratio" in- or decreases famine vulnerability? The same holds true for indicators such as "social classes", "social inequality" (which is misleadingly lumped together with marginalization) or "legal structure". These relationships need to be ex-

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plained. Additionally, the evaluation of most of the 34 indicators and the attribution of specific scores (Table 2) remains highly intransparent. The paper's ambitious aim to "lead to a rethinking of the role of climate/environmental aspects in current research" cannot be reached. Nevertheless, the paper represents a good contribution to the scientific understanding of historical famines and the role of climatic conditions for their causation.

Response: Much of what we have explained earlier in response to the first review also applies here. We simply add that we revised part 4.1 in a way that meets the queries mentioned in review No. 2. The revised version of the paper is now much more explicit about the historical relevance of single variables or indicators, and about our concrete assessments.

Specific Comments: Page 1014: "Taking all definitions of famine into account. . ." -> Which exactly?

Response: In the revised version of the paper we only rely on one definition and thus changed the mentioned paragraph.

Page 1014/15: The authors define famine "as an extreme scarcity of food or a drop in exchange entitlements in a certain region over a multi-year period that threatens the way of life of the already-vulnerable resident population and frequently leads to a higher mortality rate." According to their own definition the Irish event of 1740/41 hardly qualifies for a famine.

Response: It is difficult for the authors, without a specific reason indicated, to understand why the reviewer supposes that our definition disqualifies the Irish famine of 1740-41 as a famine. As our article shows, large segments of the Irish society suffered from a scarcity of food. Due to various reasons others experienced a sharp decline of their household's exchange entitlements. The focus of the FVAM is precisely to analyse the vulnerable of Ireland's pre-famine population. Maybe, the reviewer's criticism is based on an understanding of a 'multi-year period' which differs from that of the au-

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thors. In our own reading, however, two consecutive years of food scarcity are sufficient to qualify as a 'multi-year period'.

Page 1015: The Food Entitlement Decline (FED) theory by Amartya Sen is predominantly used for the explanation of contemporary famines (where local availability of food is of minor importance). Why is the FED from the 1980's used as a rivalling theory for the understanding of the Irish famine of 1740/41?

Response: The FED theory by Sen is not seen as a "rivalling" concept in the context of the Irish famine of 1740-41. The FED has impacted historical famine research in many ways; for example, it has discouraged studies by historical climatologists since the early 1980s, when famine was one of the favourite contexts to look at impacts of reconstructed climatic extremes in the societal context. Even though many aspects of the FED theory are sufficient to describe the processes of famines, it is incomplete. For example, one missing or at least underrepresented element is the climate variable. The authors want to stress that famines are extremely complex and only explicable by a consideration of social and environmental factors.

Page 1021-23: In political science, the term "Policy" does not refer to "political systems corresponding institutions and structures" which are in the center of the indicator group labeled "Policy". "Political System" or "Governance structure" would be more appropriate for this indicator group. However, these are two indicators of this group. What do the authors mean by "Political System" and "Governance Structure"? And what is the difference? In short, this section lacks conceptual clarity.

Response: The indicator group we labelled "politics" integrates all structural pre-conditions affecting political management and its efficiency. The inclusion of categories such as "political systems" or "legal systems" in the FVAM has been explained in the theory paper by Engler (2012), which explains the model. It is impossible to define all indicators extensively in the limited framework of a paper that is focused on historical examination. However, in the revised version of our paper we have sought to be as

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explicit as possible about the indicators, their relevance and our assessments.

Page 1023: Concerning "education" and "literacy" the argumentation appears to be ahistorical: For contemporary (knowledge) societies, the FAO considers education as a crucial factor to reach food security. However, it needs to be explained how high illiteracy rates increased famine vulnerability of the Irish population in 1740/41! Famine memory and knowledge cannot only be passed on by literary language (in fact, for most time of human history it was not).

Response: We have revised the relevant passage explaining why we consider education and illiteracy an element of famine vulnerability even for 1740-41. Approaching the middle of the 18th century, enlightenment movements had already left their trademarks in reforming educational systems in many countries in Europe. Their reforms were particularly important in the longer-term transition from pre-industrial to industrial agriculture, enhancing the productivity of the rural population. Ireland was clearly behind in those developments.

Page 1024: The same (a-historical perspective) holds true for "labour market" as part of the vulnerability indicator set: Fully established labour markets are, again, a feature of modern societies and their development is closely connected to the rise of capitalism. According to Karl Polanyi (The Great Transformation, 1944), in Britain a working (competitive) labour market was not established before the 1830s.

Response: Here we disagree with the comment. Why is it a-historic, or anachronistic, to emphasise the vulnerability of not fully integrated labour markets in a comparison between modern and pre-modern societies? Rather on the contrary, we consider this type of comparison historical almost by definition. There is a point to the argument of anachronism only if our assessment of an indicator does not reflect time and space, i.e. Ireland in the wider European context. In the revised version of our paper we seek to make this context more visible and explicit to avoid any misunderstanding.

Page 1027: While the paper aims at making a complicated argument for the Irish

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famine of 1740/41 (with multiple factors), the authors simply state concerning previous famines: "Ireland was often hit by famines, which were primarily caused by extreme climates." This evaluation needs to be supported by sources.

Response: We changed the sentence to: "In years diverging from these "average" conditions of Irish climate, extreme events and anomalies often led to food scarcity affecting various segments of society (Crawford, 1993)".

Page 1027: "socio-environmental system" -> The term needs to be explained.

Response: To avoid misunderstandings, the paragraph was changed to: "Looking at the state of the primary sector of economy reveals some of the social and environmental problems in Ireland."

Page 1031: "The prices for other agricultural products increased by similar percentages." -> Source! Response: The paragraph was revised and further references were added.

Technical corrections: Though, the paper's level of English is very high, it requires corrections & editing. Page 1034: For non-German readers of the paper it should be explained that the acronym BMBF stands for "Bundesministerium für Bildung und Forschung", the German Federal Ministry of Education and Research".

Response: Necessary changes were made and the paper did undergo a professional English language editing.

Interactive comment on Clim. Past Discuss., 9, 1013, 2013.

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