Gender and the 'Laws of Migration':
A reconsideration of nineteenth-century patterns

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Scholars across the social sciences have observed a long-term "feminization" of migration, where international migrant streams formerly dominated by men have gradually become gender balanced or even majority-female (e.g., Donato et al. 2006; Gabaccia 1996; Houston 1984; Simon and Brettell, 1986; United Nations 2006; Yinger 2006). The earliest works making this case were seen as revolutionary, reversing long-held beliefs about the role of men in undertaking long-distance, high-risk moves (New York Times 1985). Subsequent scholarship has shown the pattern to be significant and widespread. Current work on the topic is producing even better data on timing and has begun attempting to explain the consequences of the long-term shift (e.g., Donato et al. 2009). Scholarship on internal migration has generally been less concerned with global patterns in the sex-balance of migrants. This is unfortunate and in a sense ironic, since the earliest and boldest statements about gender and migration concerned internal migrants in England and Wales in the late-nineteenth century. Geographer E.G. Ravenstein's influential "Laws of Migration" stated in no uncertain terms that women were simply more migratory than men, particularly among short-distance, within-country movers.

This paper uses census microdata to take a fresh look at the relationship between gender and internal migration in late-nineteenth century Europe and North America. At the most basic level, we argue that there was a significant flaw in Ravenstein's key finding on gender and migration. Our analysis suggests that women were rarely more migratory than men in the countries we consider, not even in Great Britain in 1881. The data Ravenstein presented was technically correct, but his source materials did not allow him to probe beyond basic bivariate relationships. In short, we argue that the apparent over-representation of women among internal migrants was driven by an over-representation of women among the

adult and elderly population in general. Adult men experience higher rates of mortality and international migration; their absence created the illusion of a highly "feminized" internal migrant population.

The point of reconsidering these patterns now is three-fold. First, we are historians, and we do want to set the record straight on late nineteenth century patterns. While many researchers have challenged the applicability of Ravenstein's findings to other contexts, most have taken at face value that he accurately described 1881 England. Second, after 125 years, the source data behind the "Laws of Migration" have finally become available. Whereas Ravenstein's analyses were constrained by the contents of published tables from the 1881 British census, our analysis is able to go further by using individual-level data from the censuses of Great Britain, Norway, and the United States between 1865-1900. We see an opportunity to demonstrate the power of these newly available microdata, while revisiting one of the great works in migration studies.

Finally, we want to use Ravenstein's high-profile work to illustrate a basic but common problem in discussions of migrant sex differentials. Research on the feminization of migration has been the subject of much research and debate in recent years. Any consideration of migrant sex ratios must at least account for differences in age structures of male and female populations, which have been a near-universal fact of human demography throughout history. Ravenstein may have been among the first to miss this point, but he was not the last. Our reconsideration of the first study of this topic can hopefully serve as a cautionary tale for this new work, much of which has relied on descriptive summary statistics exactly like those used by Ravenstein in the 1880s (for a recent example, see, United Nations 2006: 22).

Why revisit an article from 1885?

E.G. Ravenstein's two papers on the "Laws of Migration" are probably the most-often cited works in migration studies. Using "Web of Science" to search for citations to Ravenstein's work, we found that his "Laws of Migration" articles have been cited more than 350 times since 1974.[1] And it is worth noting that the Web of Science excludes all books, as well as articles appearing in edited books, conference proceedings, working papers series, and many humanities journals. The complete number of citations to Ravenstein's work was surely much higher. According to the Web of Science citation index, journals containing the most citations to Ravenstein's work during this period were, in order, *International Migration Review*, *Demography*, *Social Forces*, *Social Science History*, *American Sociological Review*, *Annals of the Association of American Geographers*, *Geografiska Annaler*, *Population and Development Review*, *Social History*, and *Transactions of the Institute of British Geographers*. It is difficult to imagine any other single piece of work being regularly cited in such a broad range of venues. And this is just in the past 35 years. Various literature reviews from previous decades suggest that the Laws of Migration articles were recognized as path-breaking long before the 1970s.

This is not to suggest that every mention of Ravenstein over the years has been in-depth or even positive. Even in 1885, after Ravenstein's original presentation of his first paper, two members of the audience expressed serious concerns with his use of the term "laws." According to a written description of the proceedings, Ravenstein was gracious and

[1] We are grateful to Johanna Leinonen and Elizabeth Zanoni for allowing us to use results from an extensive literature review they conducted in Summer 2008. Their review searched for citations to Ravenstein's work in the "Cited Reference Search" available via the "Web of Science" tab at the ISI Web of Knowledge site (http://apps.isiknowledge.com/). They identified all works citing the "Laws of Migration" articles, covering all major journals from 1976-2008. They also produced summaries of many recent citations that considered Ravenstein in more than a superficial way. We hope to incorporate some of that work into the final draft of this paper.

conceded that his findings "lack the rigidity of physical laws" (Ravenstein 1885: 235). Even so, his use of that term and the more general clarity of his ideas probably go very far in explaining why his papers have stimulated many other researchers. Social scientists of all stripes have clearly seen value in Ravenstein's approach and findings.

The two of Ravenstein's laws relating to gender asserted that (1) short-distance migrants far outnumbered longer distance ones, and that (2) within-country moves were dominated by women. Ravenstein argued that, while men may have been more likely to move long distances, women were the ones making the majority of the short-distance moves that made up most of all migratory activity. The net of these two tendencies led Ravenstein to conclude that women were on the whole significantly more migratory than men. In his typically straightforward language, he stated that "Woman is the greater migrant than man...This may surprise those who associate women with domestic life, but the figures of the census clearly prove it" (Ravenstein 1885: 196).

Ravenstein's findings dealing with gender have fared particularly well over the years. There have been at least two systematic literature reviews of research dealing using Ravenstein's laws. In the early 1960s, two sociologists published a U.S.-focused literature review arguing that Ravenstein's laws on gender and distance "have a high degree of predictive validity" (Macisco and Pryor 1963: 221). Their conclusion argued that "the review of the literature undertaken here has shown that, with certain exceptions, the following tentative uniformities do exist: (1) For rural-urban streams, females are more migratory than males, and (2) Women predominate in short-distance moves." Geographer D.B. Grigg conducted a much broader-ranging literature review in 1977. Much like the sociologists before him, Grigg said of Ravenstein that "his laws on sex and age differentials have been

borne out" (Grigg 1977: 41). Textbooks in demography and world history presented Ravenstein's ideas on gender and distance as conventional wisdom for most of the twentieth century (for example, Peterson 1969: 264, United Nations 1979: 4).

Using new data to speak to an old issue

It may be hard to believe that there is anything new to say about relatively straightforward statements made 125 years ago. Indeed, our general approach is not new. We bring only slightly more sophisticated demographic techniques to bear on Ravenstein's laws relating to gender. Our main argument--that apparent sex differentials are explained by age-structure and out-migration rather than propensity to move--has been suggested by others before us (for example, Saville 1957: 90). What we bring to the table that neither Ravenstein nor his earlier critics could is a better version of the 1881 U.K. census data, as well as an increased awareness of the importance of his laws dealing with gender, given the twentieth-century feminization of international migration.

Ravenstein and others who have investigated this topic have relied on published tables from the 1871 and 1881 British censuses. These tables are highly detailed, especially by the standards of the late-nineteenth century census publications. The original source table behind Ravenstein's findings on gender showed, for every county in England and Wales, the number of men and women born in every other county in England and Wales. With 60 counties in 1881, the result was a 3,600 cell table spanning across 25 pages. Figure 1 shows a small slice of the table available to Ravenstein. Had there been data on migrants' ages, occupations, urban status, or any other characteristic enumerated in the census, Ravenstein surely would

have used it. With data only on county and sex, Ravenstein naturally focused on more strictly geographic questions.

Figure 1 A page from the published tables of the 1881 British census

Table 12.—DISTRIBUTION of the enumerated NATIVES of COUNTIES.

WHERE ENUMERATED.	WHERE BORN.							
	WEST MIDLAND COUNTIES.		GLOUCESTER-SHIRE.		HEREFORD-SHIRE.		SHROPSHIRE.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
TOTAL ENUMERATED NATIVES IN EACH COUNTY	1528676	1606350	292410	314231	71601	75343	153073	160458
LONDON	43317	51965	15292	18843	2643	4031	2878	3987
MIDDLESEX (*Intra-metropolitan*)	30079	36844	10564	13432	1798	2895	2019	2890
SURREY (*Intra-metropolitan*)	10688	12194	3899	4432	698	905	678	853
KENT (*Intra-metropolitan*)	2550	2927	829	979	147	231	181	244
SOUTH-EASTERN COUNTIES	18723	20586	6537	7663	1200	1695	1454	1621
SURREY (*Extra-metropolitan*)	3809	5155	1317	1753	297	466	298	495
KENT (*Extra-metropolitan*)	4440	4156	1325	1374	290	405	392	313
SUSSEX	2819	4116	969	1380	233	360	217	323
HAMPSHIRE	5064	4392	1721	1767	240	303	384	327
BERKSHIRE	2591	2767	1205	1389	140	161	163	163
SOUTH-MIDLAND COUNTIES	15610	19298	4495	5722	703	902	868	1200
MIDDLESEX (*Extra-metropolitan*)	4166	5225	1394	1816	278	426	289	459
HERTFORDSHIRE	1158	1431	300	419	64	78	93	163
BUCKINGHAMSHIRE	1426	1628	345	422	65	82	109	127
OXFORDSHIRE	3900	5335	1715	2227	97	147	101	138
NOTHAMPTONSHIRE	3548	4080	450	479	127	101	149	184
HUNTINGDONSHIRE	172	215	29	45	12	8	8	21
BEDFORDSHIRE	729	887	152	192	31	33	55	61
CAMBRIDGESHIRE	511	497	110	122	29	27	64	47

Source: Census Office, Census of England and Wales, 1881, Volume 3 (London: Eyre and Spottiswoode, 1883), 266.

We rely on a microdata file of 26 million individual records from the 1881 British census. Microdata is individual-level data, where each record represents a person and contains all of each persons characteristics as they were enumerated in the census. We obtained the 1881 census microdata from the North Atlantic Population Project (NAPP), a data dissemination project housed at the University of Minnesota and created in partnership with the U.K. Data Archive and several other national statistical agencies. Microdata usually

permit a great deal more analytical flexibility than the published books or tables released by national census offices. The downside of using microdata is that they usually provide only a sample of the population, since data entry is expensive and the benefits of increased sample size are small relative to what could be gained from entering a sample from another census. The NAPP microdata is extremely unusual in that it provides the complete population enumerated in the 1881 U.K. census. Compete data was entered by the Church of Jesus Christ of Latter Day Saints (LDS), for genealogical purposes. The NAPP project has optimized the files for academic researchers, mainly by coding alphabetic variables and providing good documentation. NAPP also provides the complete population from the U.S., Norway, Canada, and Sweden during approximately the same period.

Our analysis of these data proceeds in two steps. First, we verify that Ravenstein's findings can be replicated with microdata from the 1881 British census. Next, we investigate whether basic age-standardization can account for the apparent sex-differentials among internal migrants in England and Wales. In our conclusion we briefly consider whether similar patterns were apparent in Norway and the United States. This analysis uses data from six additional censuses from Norway and the United States. Table 1 lists the datasets that we use in our work.

Table 1 Datasets and units of geography to be used

Country	Percent of population in sample	Census year	Geographic unit of birth and residence
Great Britain	100%	1881	County
Norway	100%	1865, 1900	Municipality
Norway	2%	1875	Municipality
United States	100%	1880	State
United States	1%	1870, 1900	State

Sources: Integrated Public Use Microdata Series (IPUMS-USA) and the North Atlantic Population Project (NAPP), Minnesota Population Center

Reconsidering Ravenstein's laws

We viewed the replication of Ravenstein's basic findings as a critical first step in our work. This allows us to confirm the accuracy of our data in speaking to these questions, and it is also a way to make sure that there were no arithmetic errors at the heart of Ravenstein's analysis. Table 2 reproduces the most important table on gender and migration from Ravenstein's original 1885 article. Focusing on migrants who were born in England and Wales, this table shows that there were 104 women for every 100 men among non-migrants, those who still lived in their county of birth. Among those who had left their county of birth but still lived within England and Wales, there were 112 women for every 100 men. Among those who left England and Wales, there were only 81 women for every 100 men. This was Ravenstein's key data for his laws on gender and migration: women were over-represented among internal migrants, but under-represented among international migrants. Since internal migrants far outnumbered international migrants, this led Ravenstein to conclude that "women is the greater migrant than man."

Table 3 presents the same statistics as derived from the microdata, confirming that these data are indeed comparable to those used by Ravenstein in 1885. This table also uses the adjacency of counties to get a general sense of the relationship between gender and distance. Women were over-represented among all internal migrants, but they were particularly over-represented among those who left their county of birth for an adjacent county. Those who moved to a county that did not share a border with their county of birth were slightly more likely to be men than were the shortest-distance movers. These data thus suggest some support for Ravenstein's contention that women's predominance among migrants declined with distance moved. When NAPP provides identifiers on parish-of-birth, we expect to be able to work with much finer-grained measures of distance moved.

Table 2 Sex ratios among residents of the United Kingdom (produced from aggregate data)

	Number of Females to every 100 Males among Natives of			
	England and Wales.	Scotland.	Ireland.	United Kingdom.
Residing in county where born	104	108	104	105
Residing beyond county where born, but not beyond limits of kingdom	112	114	116	112
Residing in other parts of the United Kingdom	81	91	92	90

Source: E.G. Ravenstein, "The Laws of Migration," Journal of the Royal Statistical Society, 1885: 197.

Table 3 Sex ratios among residents of England and Wales (produced from microdata)

	Females per 100 males among natives of
	England and Wales
Residing in county where born	104
Migrants from an adjacent county	112
Migrants from a non-adjacent county	109
	Other countries
Migrants from Scotland or Ireland	92
Migrants from other countries	86
Total	108

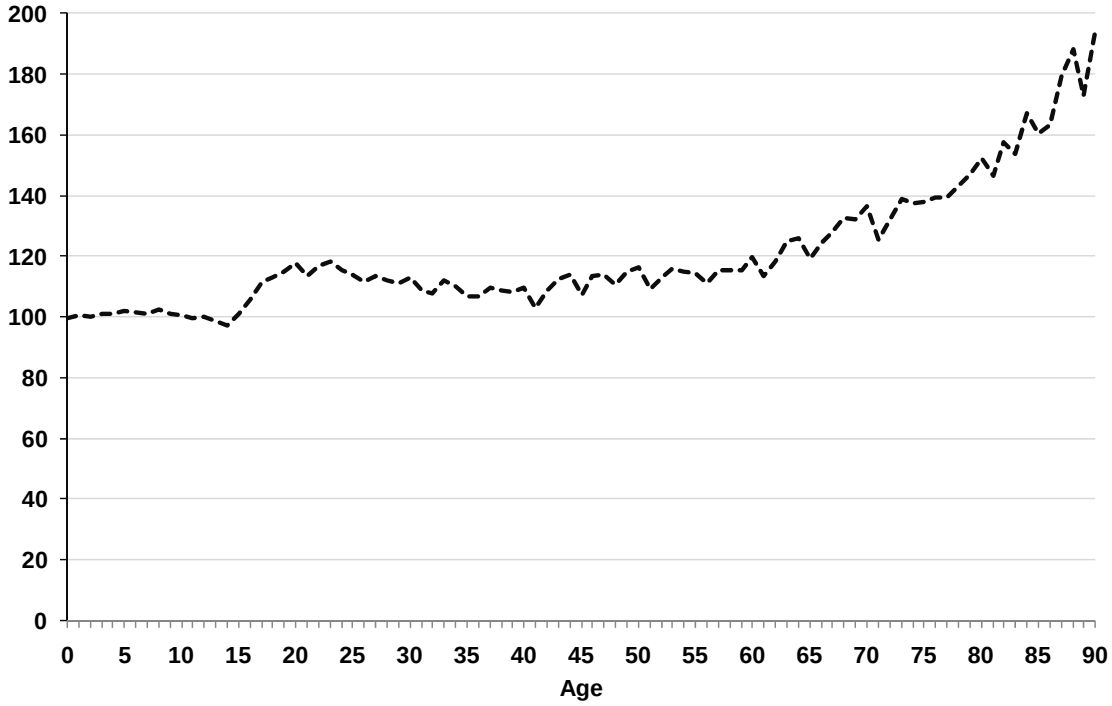
Source: North Atlantic Population Project (NAPP), Minnesota Population Center

The second step of our analysis is to consider the extent to which these apparent sex differentials among internal migrants could be driven by demographic processes other than internal migration itself. Our basic hypothesis is that the over-representation of women among internal migrants was not be due to their higher propensity to move, but rather to the much higher rate at which male migrants left the population, through either death or emigration. In this way, men were probably just as likely to make internal moves as women were; the difference was that men did not remain in the population to be counted when the decennial census was conducted.

We observed very marked pattern of this type in earlier work investigating the feminization of international migration to the United States. Over the course of the twentieth century, the U.S. foreign-born population became significantly "feminized," undergoing a major shift from majority-male to majority-female. We found that much of this shift had nothing to do sex differentials in migration. After all, the middle decades of this period there was virtually no international migration to the United States. Mortality was the main engine of population change among the foreign-born in the mid-twentieth century U.S. Between the 1920s and the early 1960s, the U.S. foreign born population was static, with a mean age that was getting higher every year. As is typically the case, men were on average dying at earlier ages than the women, causing a slow shift in the population's sex balance. The resulting feminization of the foreign-born in the United States was not due to the increasing numbers of women entering the population, but rather to the increased number of men exiting the population, mainly through mortality (Donato et al. 2009).

In the same way, our investigation of migration patterns in England and Wales hinges on issues regarding the age-structure of the migrant and non-migrant populations. Figure 2 shows the number of migrant women per 100 migrant men, by single years of age. These statistics were generated in the same way as those in Tables 2 and 3, except they were generated for each year of age. Figure 2 suggests there were no sex differentials before age 16, but that there were significant differentials for at every age from 16 up. At all ages 16 and above, internal migrant women outnumbered internal migrant men.

Figure 2 Number of women per 100 men, internal migrants in England/Wales



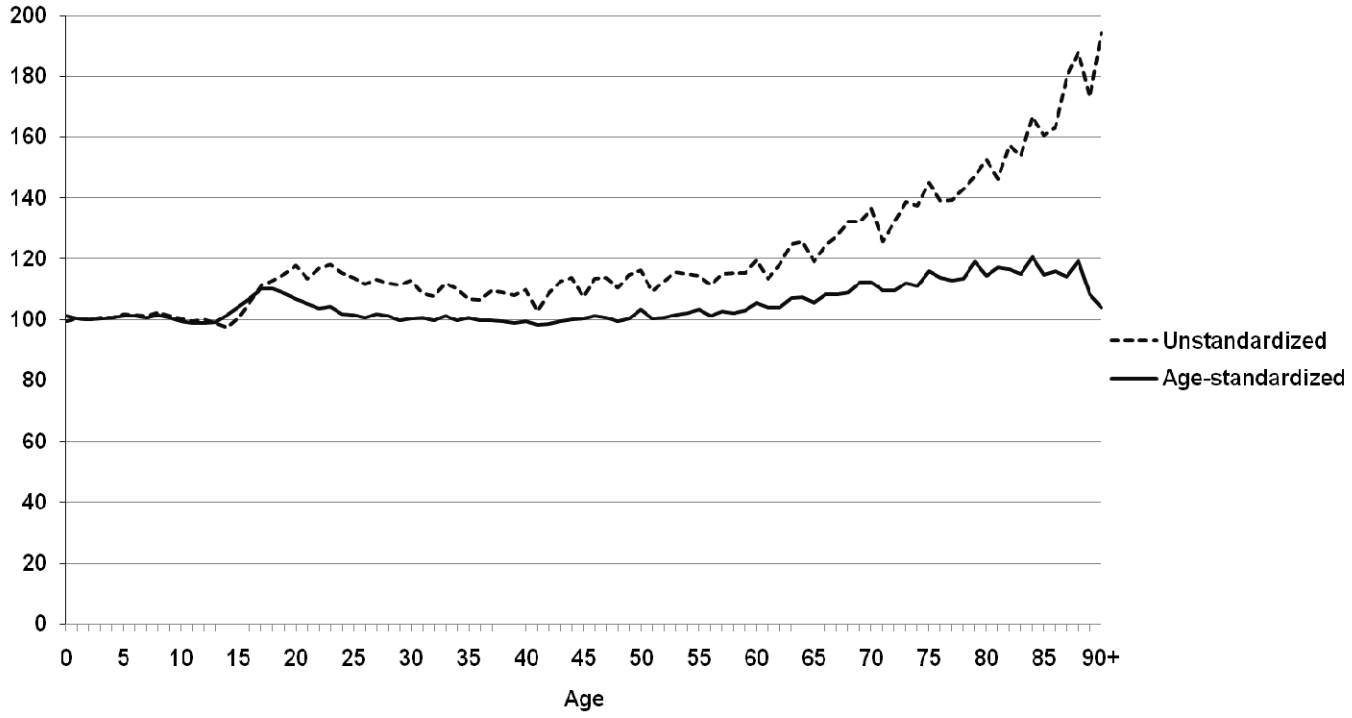
Source: North Atlantic Population Project (NAPP), Minnesota Population Center

Figure 2 by itself does not demonstrate that women were more likely than men to move at any particular age. For instance, if sex ratios for the non-migrant population followed the same curve, that would suggest that women and men had the same rate of migration at all ages. In order to determine the ages (and magnitude) of true migrant sex differentials, we applied men's and women's age-specific migration rates to a standard population. In this case, we chose to standardize on the population of native-born women in England and Wales.

Figure 3 reproduces the information in Figure 2, but also includes an additional curve showing the age-standardized sex ratio for migrants, by single years of age. To make the ratios for the solid line in Figure 3, we first determined the number of male migrants that would be expected if men had the same population structure as women. We obtained this

"age-standardized" number of male migrants by multiplying native-born men's migration rate at each year of age by the absolute number of native-born women at each year of age. These "expected" numbers of male migrants at each year of age, along with the known number of female migrants at each year of age, were then used to calculate a new set of age-specific migrant gender ratios. This direct age-standardization effectively controlled for the different age-structures of men and women in 1881 England and Wales.

Figure 3 Number of women per 100 men, internal migrants and the entire population, England and Wales



Source: North Atlantic Population Project (NAPP), Minnesota Population Center

The difference between the dashed and solid lines in Figure 3 shows the extent to which apparent migrant sex differentials were due to differences in the men's and women's

age structure. Most of the migrant sex differentials were actually reflecting differences in the male and female populations more generally. The exceptional age groups--those where women really were more migratory--were those ages 16-21 and those ages 65 and up. We hypothesize that women's advantage in the younger of these groups was related to temporary moves into domestic service or agricultural labor[2]. This is potentially testable with the microdata, but we have not yet delved any further into this question.

The significant migration differentials for women ages 65 and up is more puzzling, but ultimately do not lend much support to Ravenstein's original findings. For one thing, the bulk of the unstandardized differential for this age group disappears when migrant populations are age-standardized. Furthermore, only four percent of the native-born population was aged 65 and up in 1881. Only one percent of the population was above age 75, where the migrant sex differentials were largest. This is not to suggest that the real differential among the very old is meaningless. We need to understand this differential. Still, the fact is that the net of the difference in these two age intervals (16-21 and 65+), amounts to a miniscule overall difference in the sex ratios of migrants and non-migrants in 1881 England. Overall, when differences in male and female age-structures are accounted for, women's predominance among internal migrants is reduced to almost nothing.

There is still the question of why age-standardization made such a large difference in migrant sex ratios. The most straightforward explanations are that many potential male migrants had already left the population, through either out-migration or death. Both of these processes were mostly concerns for adults. In 1881 England and Wales, men suffered higher

[2] For more information on women's temporary work in agriculture in England, see Ann Kussmaul, A general view of the rural economy of England, 1538-1840 (Cambridge, 1990). For more details on domestic service, see Antoinette Fauve-Chamoux (ed.), Domestic service and the formation of European identity, 16th-21st centuries (Bern, 2005).

rates of mortality than women beginning at about age 35 (Lancaster 1990: 376). Adult men also seem to have been over-represented among out-migrants.[3] The British population below age 16--free from sex differentials in mortality and out-migration--was sex-balanced. Probably because of sex-differentials in both mortality and out-migration, there were more women than men at every single year of age from 16 up. Many adult men were "missing" from the migrant population not because they had failed to move, but rather because they had left the country or died.

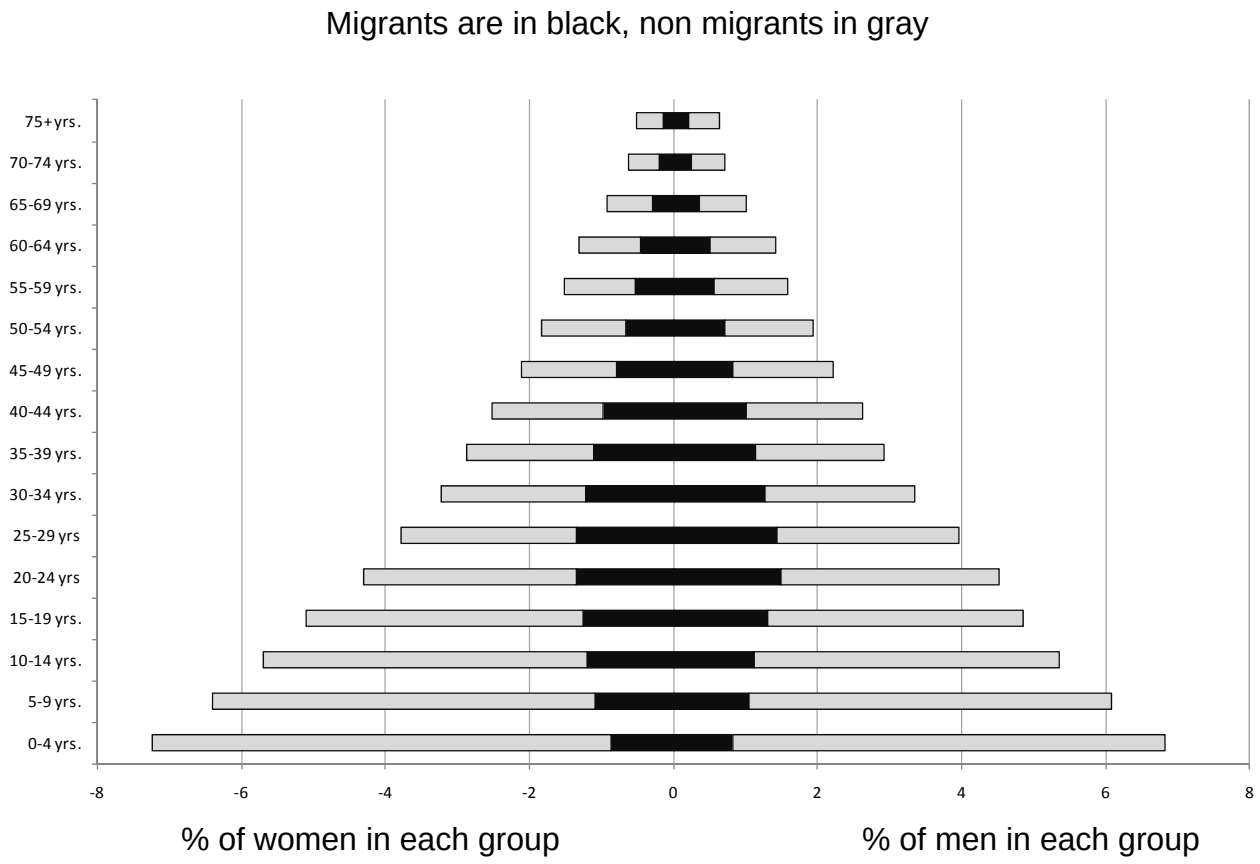
The effect of these differences between adult men and women were even further exaggerated by several unique attributes of the younger British population. First, the 1881 British youth were a very large group. As the population pyramid in Figure 4 suggests, forty percent of the native-born population was under the age of 16 in 1881. Second, the young population was sex-balanced. The two main components of population change--mortality and out-migration--did not much effect people below the age of 16 (except for infants). Finally, British children had very low rates of internal migration. Taken together, these patterns meant that there was a massive amount of overlap between the youth population and the non-migrant population. In 1881 England and Wales, statistics on youth and statistics on non-migrants were hopelessly entangled; this was the root of Ravenstein's problem .

Stated in the most baldest terms, any statistics Ravenstein generated on "the non-migrant population" were in fact statistics mostly about children. Statistics about "the migrant population," on the other hand, were mostly about adults. Statements Ravenstein made

[3] We have compiled data on the British-born population living in Canada, the United States, Scotland, New Zealand, the six Australian colonies, India, and in the armed services. In all cases, men outnumber women. On the whole, of about 1.5 million British-born persons living in one of these areas, 950,000 were men. As was true for internal migrants, the age-structure of the international migrant population was skewed upwards, with children under-represented. Data on English/Welsh-born in Canada, the United States, and Scotland were generated from the North Atlantic Population Project. Data on the England/Welsh-born in New Zealand, Australia, and India come from published census reports from those countries.

comparing non-migrants to migrants were at risk of instead simply comparing children and adults. This is exactly what we think happened when Ravenstein was formulating his laws on migration and gender. The core of his finding was not that women were more migratory than men; it was that adults were more migratory than children.

Figure 4 Population pyramid of the native-born, England and Wales, 1881



Source: North Atlantic Population Project (NAPP), Minnesota Population Center

Conclusion

We believe there was a fundamental flaw in Ravenstein's laws relating to gender, and that this flaw has implications for more recent scholarship on gender and migration. Data limitations prevented Ravenstein and subsequent researchers from understanding the true causes of the apparent over-representation of women among county-to-county movers. Instead of reflecting differences in the propensity to move, the migrant gender ratios he identified reflected adult men's increased likelihood of experiencing out-migration or mortality. Ravenstein's work has been very influential over the years, and it is critical to understand the limitations in his findings, even as they apply to 1881 England and Wales. More importantly, however, we believe that our admittedly basic demonstration of the importance of age-structures has additional relevance for recent studies of the feminization of international migration. To take just one example, the United Nations "State of the World Population" report from 2006 established the predominance of women in contemporary migrations by looking at the migrant sex balance of foreign-born populations, by continent and decade, from 1960 to the present (United Nations 2006: 22). Given the massive population transformations taking place in some parts of the world over this period, it seems likely that some of the variations presented and analyzed in this report were due to other demographic processes unconnected to migration. We hope that our work encourages researchers to pay additional attention to these sorts of issues as research on the feminization of migration moves forward.

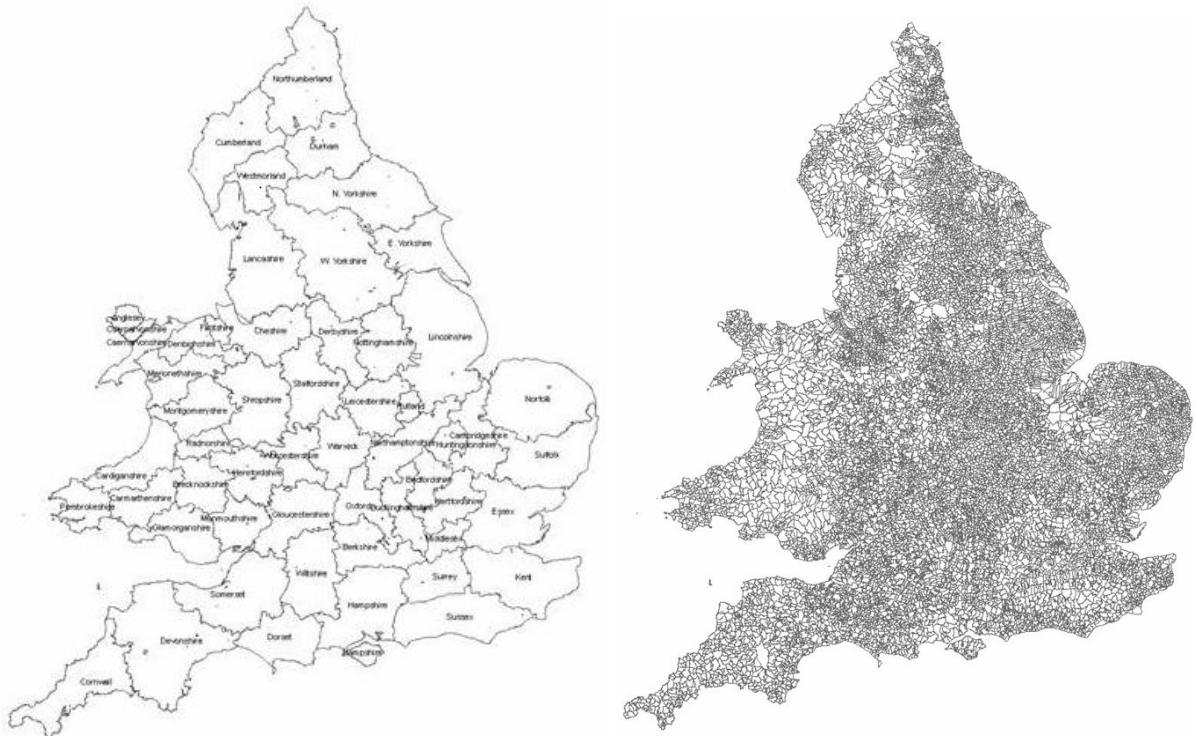
Future research plans

As for next steps, we can imagine taking this analysis in a couple of directions. First, we have only scratched the surface of Ravenstein's second law, which states that longer-distance

moves are male dominated. With county-to-county migration data, we did not feel that our measures of distance were fine-grained enough to confidently address this topic. It is our understanding that the U.K. Data Archive plans to release additional variables that will allow us to identify parish-to-parish moves. There are only 60 counties in England and Wales, but there are more than 15,000 parishes (see Figure 5). Good data on parish-to-parish migration will allow us to assess the applicability of the laws on distance to 1881 England and Wales.

We have also begun to collect similar data from more countries, and compare and interpret differences over time and place. This work is only preliminary so far. Figure 6 presents the ratio of women to men for inter-municipality migrants in Norway for 1865, 1875, and 1900. All figures are age-standardized, following the same procedures we used to construct Figure 3. Our preliminary findings suggests that, controlling for age, migration within Norway shifted from being majority female to majority male over the 1865-1900 period. Figure 7 shows the same data for the United States. In the U.S., internal migrants were majority-male for the entire 1870-1900 period. The differentials show no change over time, and virtually no variation by age. This work is obviously still very preliminary, and we welcome any advice about whether either of these approaches (or another approach that we haven't thought of) would be most useful.

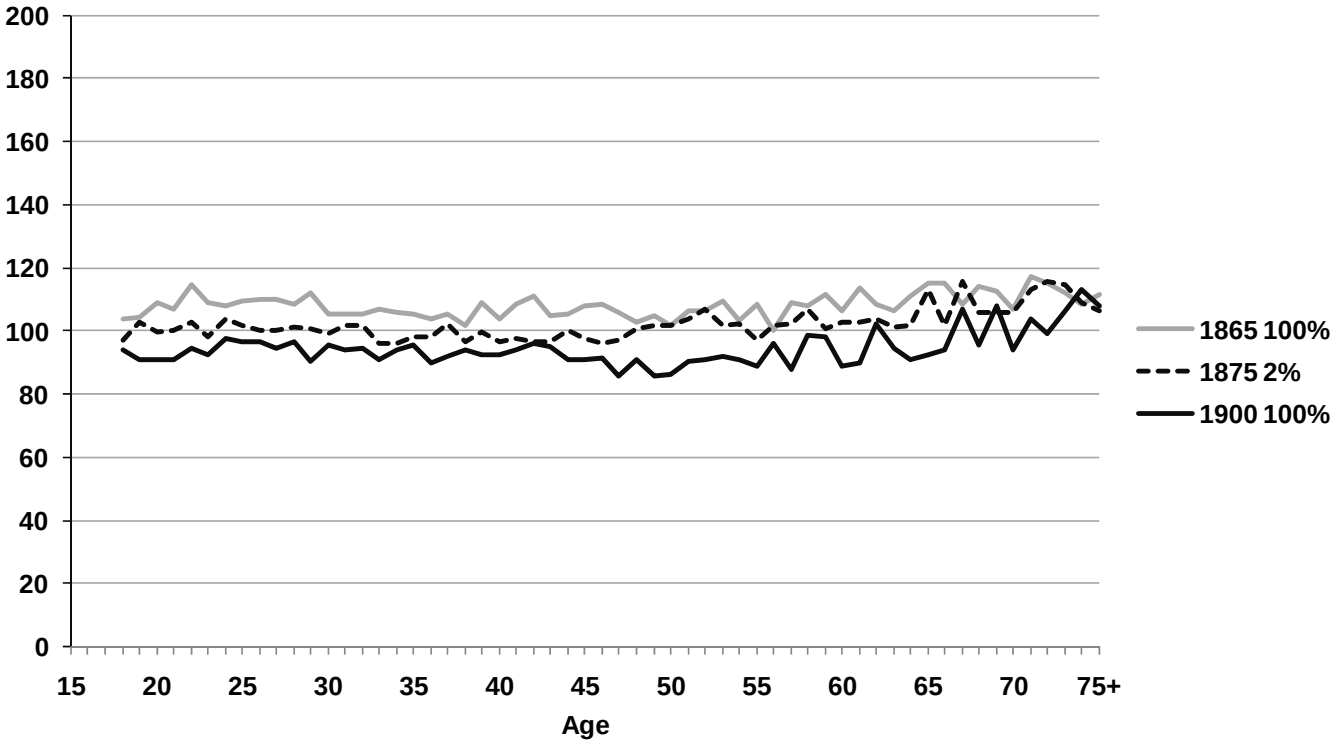
Figure 5 Counties and parishes in England and Wales, 1881



Counties (N=60) Parishes (N=15,021)

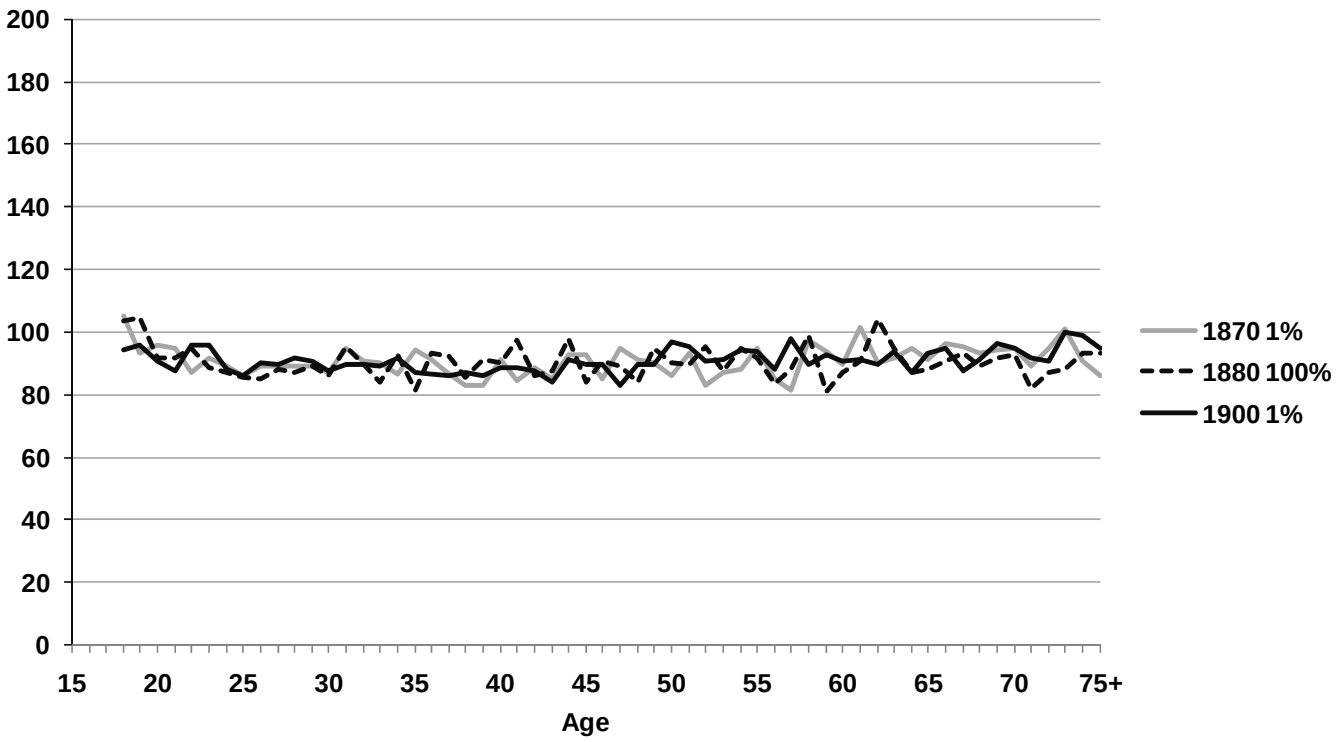
Source: U.K. Data Archive.
Note: We are grateful to Kevin Schurer of the U.K. Data Archive for providing us with GIS-ready maps of counties and parishes in 1881 England and Wales.

Figure 6 Women per 100 men, inter-municipality migrants in Norway, age-standardized



Sources: North Atlantic Population Project (NAPP), Minnesota Population Center

Figure 7 Women per 100 men, inter-state migrants in the United States, age-standardized



Sources: Integrated Public Use Microdata Series (IPUMS-USA) and the North Atlantic Population Project (NAPP), Minnesota Population Center

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