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« Vive la différence » ?
Intergenerational Occupational Mobility in France and the U.S. in the 19th and 20th Centuries

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"'Vive la différence'? Intergenerational Occupational Mobility in France and the U.S. in the 19th and 20th Centuries"

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ABSTRACT

Though rates of intergenerational mobility differ little between the U.S. and Europe today, attitudes toward redistribution – that should reflect at least in part those rates – differ substantially. We examine the differences in intergenerational mobility between the U.S. and France since the middle of the nineteenth century to trace the path these economies have followed to the choice of their modern redistributive regimes. We use data for both countries that allows us to compare the occupations of fathers and sons across up to thirty years. The results demonstrate that, as a variety of commentators noted, the U.S. was a considerably more mobile economy in the past, though such differences are far from apparent today. The nineteenth century differences between France and the U.S., as well as the changes in each country over time, correspond to patterns of public investment in education.

INTRODUCTION

The U.S. and Europe followed strikingly different redistributive policies in the second half of the twentieth century: the U.S. remained a place of (comparatively) low taxes and transfers, while most of the European economies chose considerably higher levels of both. The last decade has seen a series of attempts to reconcile these vastly different outcomes with the apparent similarities between the U.S. and Europe in their technology, economic and political system, culture, and demography, among other characteristics (Piketty 1995; Bénabou and Ok 2001; Bénabou and Tirole 2006). The divergence in redistributive policy is all the more remarkable in light of the similarities in intergenerational mobility seen today across all these places (Erikson and Goldthorpe 1992). Despite

sharing a common mobility experience since at least the 1970s, the U.S. and Europe have adopted policies that seem to reflect fundamentally different beliefs about the need for redistribution.

Though the U.S. and Europe look alike in many ways today, there was a time when the experience of the U.S. was described by observers as an exception to patterns emerging in Europe. As he toured the U.S. in the early 1830s, a young French aristocrat contrasted the extensive social and economic mobility he witnessed in the new nation with that he knew from his homeland:

> Among aristocratic peoples, families remain for centuries in the same condition and often in the same place. . . . Among democratic peoples [e.g. in the U.S.], new families continually spring from no where while others disappear to nowhere and all the rest change their complexion. (de Tocqueville 1835).

Though recent research on occupational mobility across generations has found few differences among advanced, industrialized countries, nineteenth century observers such as de Tocqueville and Marx, however, saw vast differences in mobility between the U.S. and Europe, perceptions that seem to persist to the present day despite the similarity of modern mobility rates. Long and Ferrie (2005) have shown that substantial differences in intergenerational occupational mobility between Britain and the U.S. can be discerned in the middle of the nineteenth century, even after accounting for differences in these countries' occupational structures, but that those differences are no longer apparent by the second half of the twentieth century.

The comparison between the U.S. and Britain, though of great interest because of the long historical and economic ties between them, may reflect differences in economic development in the mid-nineteenth century: Britain had already seen substantial urbanization and exit from agriculture, and was well into the Second Industrial Revolution by 1850, while the U.S. remained a largely rural and agricultural economy at that date, though substantial industrial activity had begun by then, particularly in New England. We reduce the impact of some of these differences by adding France as a third point of comparison. In the mid-nineteenth century, France was more similar to the U.S.

than was Britain in its ruralness, the size of its farm sector, and how far its industrialization had advanced. If differences between the U.S. and France are nonetheless apparent, they must be attributed to something other than where these countries were located in these measures of economic development.

We ask specifically whether differences in intergenerational occupational mobility between France and the U.S. were actually as great as contemporary observers asserted, why such differences might have existed, and how any mobility differences between these two economies evolved from the 19th to the 20th century. To do this, we use: (1) data from French civil records that document the occupations of several thousand pairs of fathers and sons from throughout the 19th century and the Formation Qualification Professionnelle (FQP) survey of 4,700 father-son pairs from the late 20th century, and (2) data from the U.S. on 75,000 father-son pairs from 1850 to 1920 and the 1973 Occupational Changes in a Generation (OCG) survey of 10,000 father-son pairs.

We compare the occupations of sons to those of their fathers twenty to thirty years earlier using (1) a set of four broad occupational categories that we have defined consistently for both France and the U.S.; and (2) a measure of the association between fathers' and sons' occupational categories that abstracts from differences either across countries or within countries over time in the distribution of people across occupations.

Previous Research on Nineteenth Century Intergenerational Mobility

For both France and the U.S., much of the research on occupational mobility across generations in the nineteenth century has been conducted at the local level: following individuals who remained within a specific location across several life-events or census enumerations (Sewell, 1985; Tilly, 1979; Thernstrom 1964 and 1973). Though this provides valuable information in the form of detailed local context in assessing how the occupations of fathers and sons compare, it

misses a crucial part of the population: those who were geographically mobile, whose social and economic mobility may have differed from persisters just as their physical mobility differed.[1] The recent creation of nationally-representative, longitudinal data for both countries has now made it possible to examine intergenerational mobility more systematically, and to assess how it has changed over time by comparing historical data to modern data.

Ferrie (2005) summarizes recent research using samples of fathers and sons linked across successive U.S. federal population censuses. Mobility appears to have declined substantially since the 1850-1920 period, perhaps as a consequence of declining opportunities for improvement through migration. Bonneuil and Rosental (1999) find an increase in the openness of French society through the end of the nineteenth century, though they do not make explicit comparisons to mobility in the late twentieth century. There has been little work comparing mobility across countries in the nineteenth century until recently. Long and Ferrie (2005) compared intergenerational mobility in Britain and the U.S. in the three decades after 1850 and in the twenty years after 1950, finding that although mobility was substantially higher in the U.S. in the nineteenth century, the difference between the U.S. and Britain was erased by the twentieth century. The latter finding mirrors the work of Erikson and Goldthorpe (1992) who find few differences in mobility patterns across generations among modern advanced, industrialized countries.

The lack of adequate quantitative evidence for the comparison of mobility across countries in the past did not constrain contemporary observers. De Tocqueville (1835) was particularly firm in his belief that mobility (both social and geographic) was substantially greater in the U.S. than in

[1] Ferrie (2004) considers the role of migration to the western U.S. frontier in mid-nineteenth century economic mobility, finding that the performance of migrants was systematically different fro that of non-migrants. Bonneuil and Rosental (1999) compare the intergenerational mobility of movers and non-movers in nineteenth century France and reach a similar conclusion.

Europe, while three decades later, Marx (1865) made much the same point. By the end of the early twentieth century, both Sombart (1906) and Turner (1921) were attributing the lack of a radical labor movement and attendant political party to the unusually high degree of social mobility in the U.S. In the late twentieth century, Thernstrom (1973) noted:

> American workers…failed to flock into labor and socialist parties to the same extent as their European counterparts in the late nineteenth and twentieth centuries because of the greater permeability of the class structure that governed their lives…The American class system…allowed substantial privilege for the privileged and extensive opportunity for the underprivileged to coexist simultaneously. It is tempting to argue that…[this] explains…the relative absence of acute class conflict in our political history.

The data we have constructed make it possible for us to assess whether Thernstrom's conjecture that there was something distinctive about mobility in the nineteenth century U.S. is correct, and why that distinctiveness is no longer apparent at the end of the twentieth century.

Occupational mobility is an essential feature of an economy and a reflection of its dynamism. A high level of mobility is generally associated with more vitality, a larger capacity to change and to innovate, and, on the whole, a greater ability to grow. It is also related to a more open society, offering a broader range of opportunities for individuals, and more freedom of choice. Societies where occupations and positions are fixed and set at birth, and are transmitted from father to child through rigid schemes, by contrast, have little room for innovation and fulfilment at either the individual or collective level.

Occupational mobility depends simultaneously on the structure of the economy ("forced" or "structural" mobility) and on the fluidity of the job market ("exchange" or "circulation" mobility). Therefore, changes in mobility patterns on the long run may result either from an evolution of the economic structure, due for example to industrialization, or from changes in the degree of "openness" of the society. For instance, the possibility of becoming a farmer declines as the

proportion of farmers in the economy declines, whereas the opportunity of becoming a lawyer may grow, without any changes in the proportion of lawyer in the society, as more and more people have access to education. In the analysis that follows, we take care to distinguish between these two sources of mobility.

As the observations of de Tocqueville and Marx, among other, demonstrate, the image of older European countries more socially rigid structures and consequently hindered in their economic development while the United States was a place of almost pure flexibility and dynamism has a long pedigree. However, little data is available to assess this contrast and to appreciate how over the long run social mobility evolved on the two sides of the Atlantic.

This paper offers a crude evaluation of occupational mobility during the nineteenth and twentieth centuries in France and U.S. To do so, we use two different datasets both built on individual-level data. For the U.S., data are drawn from samples of individuals followed across successive censuses which give occupation beginning in 1850. The data for France give occupation at marriage or death for a large range of individuals. For both countries, in each period, it is possible to observe both intra-generational mobility (that is the relationship between the occupations at age around 20 and the occupations at age around 50) and inter-generational mobility (comparing fathers' and sons' occupation at the same age either at the beginning or at the end of their active live). We will concentrate here on intergenerational mobility.

THE DATA

For the nineteenth century U.S., data were created by following individuals across census enumerations. The IPUMS sample for 1850 (Ruggels et al. 2004), a nationally-representative 1% sample from the U.S. population census, was linked forward to the 1880 complete census transcription; the IPUMS sample for 1910 (Ruggels et al. 2004), also a nationally-representative 1%

sample from the U.S. population census, was then linked backward to the same 1880 file. This yielded more than 30,000 linked observations. In each dataset, the father's occupation is observed in the initial year (1850 or 1880) and the son's occupation is observed thirty years later (1880 or 1910). The principal difficulty with these linked samples is that only about a third of those sought are successfully located, while the unlinked observation are systematically different from those that are linked.

The linkage rate is entirely accounted for by shortcomings at each stage of the linkage process: the census enumeration itself was probably no more than 85% complete in the nineteenth century, while individuals – even if they were successfully enumerated – often reported inexact information on name, age, or birthplace, all of which were used in the linkage process. In a small number of cases (3%), a single individual from the source sample was linked to two or more individuals in the target census who had the same name, year of birth, and birthplace. These cases were dropped. Table 1 shows the marginal effects from a probit regression in which the dependent variable distinguished between the base year population being sought and the sample of linked individuals, with 1850 (Column 1) or 1880 (Column 3) characteristics as regressors. Clearly, place of residence, father's occupation, and household wealth are useful in distinguishing linked individuals from the general population. In order to force the linked sample to mimic the observable characteristics of the general population, weights were generated through iterative proportional fitting. When the weights (based on 1850 characteristics in Column 2 and on 1880 characteristics in Column 4) are imposed on the individuals who were linked, there are no longer any characteristics that allow us to distinguish linked individuals from the general population – the substantive and statistical significance of all the partial effects in Columns 1 and 3 are eliminated. The results that follow are insensitive to whether 1850 weights, 1880 weights, or no weights are imposed.

Variable	1850, No Weights ∂P/∂X	1850, Weights ∂P/∂X	1880, No Weights (∂P/∂X)x100	1880, Weights (∂P/∂X)x100
Age 15-25 in 1850	0.0017	0.0013	0.0314	0.0000
	(0.41)	(0.31)	(14.38)***	(0.01)
Residence:				
Midwest	-0.0478	-0.0008	-0.0216	0.0001
	(11.26)***	(0.19)	(8.40)***	(0.02)
South[a]	-0.0519	-0.0011	-0.0235	0.0002
	(12.13)***	(0.25)	(9.17)***	(0.04)
West			-0.0398	0.0003
			(7.83)***	(0.02)
Population > 2,500	-0.0013	-0.0028		
	(0.25)	(0.52)		
Migration History:				
Interstate Mover	-0.0124	-0.0001	0.3214	-0.0001
	(1.34)	(0.01)	(43.35)***	(0.02)
Birthstate=Residence	0.0090	0.0001	0.3123	-0.0002
	(1.10)	(0.01)	(50.16)***	(0.03)
Family Size	-0.0003	-0.0003	-0.0004	-0.0004
	(0.44)	(0.35)	(1.22)	(0.50)
Occupation[b]:				
Farmer	0.0138	-0.0015	0.0126	-0.0003
	(2.07)**	(0.22)	(4.16)***	(0.04)
Skilled	0.0003	-0.0011	-0.0014	-0.0001
	(0.05)	(0.14)	(0.38)	(0.01)
Semi-Skilled	0.0086	-0.0008	-0.0012	-0.0000
	(0.93)	(0.08)	(0.28)	(0.00)
Laborer	0.0128	-0.0019	-0.0102	0.0001
	(1.52)	(0.22)	(2.85)***	(0.01)
Other	-0.0106	-0.0011	-0.0059	-0.0001
	(0.88)	(0.09)	(0.98)	(0.01)
Household Real Estate:				
0 < Real Estate < $1,500	0.0104	0.0024		
	(2.37)**	(0.54)		
Real Estate ≥$1,500	0.0255	-0.0025		
	(5.62)***	(0.56)		
Father Literate	-0.0067	-0.0058		
	(1.09)	(0.93)		
Attended School	0.0065	0.0006		
	(1.82)*	(0.17)		
Household Head			-0.0014	0.0024
			(0.35)	(0.26)
Married			0.0094	-0.0022
			(2.65)***	(0.25)
Observations	52,935	52,935	1,766,147	1,766,147
Pseudo-R^2	0.0071	0.0001	0.0356	0.0000
Predicted Probability	0.1794	0.1794	0.0014	0.0014

Absolute value of z statistics in parentheses. * significant at * 10%; ** 5%; *** 1%. Omitted categories: "Age 0-14 in 1850," "Northeast,", "Population ≤ 2,500", "Foreign-Born," "White Collar," "Household Real Estate=0," "Father Illiterate," "Not Attending School," "Non-Head," and "Unmarried." 1880 uses a 25% sample of the unlinked.

Table **1**. Probit Marginal Effects on Linkage (1=linked sample, 0=Public Use Sample), U.S.

A final concern is that noise generated by the linkage process will generate spurious intergenerational mobility: if despite the cautious assumptions built into the linkage algorithm, a son whose father's occupation is observed in 1850 is linked to the wrong individual in 1880, and the probability of such mistaken linkage is random with respect to the son's occupation in the terminal year, the likelihood that in an observed father-son pair both will have the same occupation will be lower than if all matches were genuine. To overcome this last difficulty, the analyses that follow have been performed both with and without individuals whose characteristics did match up exactly in the two years (for example, the spelling of the surname differed slightly, or the age was off by a year or more). The difference between occupational mobility in France and in the U.S. is insensitive to this exercise. The results that follow include those inexactly-matched individuals.

For France, we employ data from "The 3,000 Families Survey" (Dupâquier and Kessler 1992) which follows individuals (1) who married between 1803 and 1832 and (2) whose surname begins with the letters "Tra" (e.g. "Travers"). These individuals were then subsequently located in French civil records of the births and the marriages of their children, and in the records of their own deaths. The next generation was then followed in a similar manner. The sample includes more than 45,000 marriages and successfully mimics patterns of wealth accumulation and demography in the broader French population. An important difference between the "TRA" sample and the linked samples from the U.S. census is that the latter is censored by life-events: an individual's circumstances (location, occupation, wealth) are recorded at the time of particular events in the life course (marriage, the birth of a child, a child's marriage, death). In a companion piece (Bourdieu, Ferrie, and Kesztenbaum 2006) we examine the potential and actual biases this induces in comparing mobility in France and in the U.S.

To compare these two samples, they must be as close as possible. We extract from the French database a sub-sample that mimics at best the characteristic of U.S. sample. On this basis, we are able to compute inter and intra generational occupational mobility for U.S. and France at the same time. We do this for four periods, in the nineteenth and beginning twentieth century. In each case, the sons are observed approximately at the same age as their father, which means around 30 years after their father (between 26 and 34 years later)[2]. The father is observed during the years:

1836-1874, for period 1
1875-1905, for period 2
1945-1960, for period 3

In both the French and American cases, we need to define a set of occupational categories. We have a wide variety description of occupational titles, too many to easily use in analyzing occupational change over time. We aim to build mobility matrices of reasonable size to be easily interpretable. As a result, we group occupations into four broad categories: unskilled, skilled/semi-skilled, farmer, and white collar. This breakdown corresponds roughly to at least three types of differences among occupations: level of wealth or income, level of education, and level of independence (wage and non-wage earners). The differences are not, however, always clear-cut: a weavers are consider semi-skilled although in some cases they can be very unskilled low wage workers, while in other cases they can be proprietors of large workshops and thus more akin to white collar group workers. Moreover, categories might not be completely stable as time passes: primary school teacher is no doubt an upper class white collar at the beginning of the nineteenth century, but this may be less the case by the middle of the twentieth. We believe, however, that the transition matrices we construct capture structural characteristics of occupation mobility for each period of time and for each country.

[2] It is exactly the same procedure for intra-generational mobility except that in this case, the same individual is observed twice in thirty years.

MEASURING OCCUPATIONAL MOBILITY

Comparing intergenerational mobility across two places or times requires comparison of two contingency tables. We will assume throughout that the occupational categories are not ordered. If fathers and sons in location P can be found in either of two jobs, their intergenerational mobility can be shown in matrix form as $P = \begin{bmatrix} p_{11} & p_{21} \\ p_{12} & p_{22} \end{bmatrix}$ where fathers' occupations (1 or 2) are columns and sons' occupations are rows. The upper left entry (p_{11}) is the number of sons of job 1 fathers who themselves obtained job 1. The simplest measure of the overall mobility in P is the fraction of sons in jobs different from those of their fathers: $M_P=(p_{12}+p_{21})/ (p_{11}+p_{21}+p_{12}+p_{22})$.

This measure, unfortunately, has a shortcoming when mobility is compared across two matrices P and Q: it conflates differences in mobility (1) due to differences across the matrices in the distributions of fathers' and sons' occupations (Hauser, 1980, labels this "prevalence") and (2) due to differences across the matrices in the association between father's and sons' jobs that may occur even if the distributions of fathers' and sons' occupations were identical in P and Q (Hauser, 1980, clabels this "interaction"). Consider $P=\begin{bmatrix} 10 & 5 \\ 5 & 10 \end{bmatrix}$ and $Q=\begin{bmatrix} 20 & 20 \\ 5 & 20 \end{bmatrix}$ for which $M_P=10/30$ and $M_Q=25/65$. As the marginal frequencies differ, it is unclear whether the difference in M results from this difference or from something more fundamental such as differences between P and Q in the amount of human capital necessary to achieve job 1.

We can adjust one of the matrices so it has the same marginal frequencies as the other. Such a transformation, achieved by multiplication of rows and columns by appropriate constants, does not alter the underlying mobility embodied in the matrix. (Mosteller, 1968; Altham and Ferrie, 2005) If we multiply the first row of Q by ½ and then multiply the second column of the resulting matrix by ½, we produce a new matrix Q' with the same marginal frequencies as in matrix P and an associated total mobility measure $M_{Q'}$. We could then be confident that the difference in mobility

$M_P - M_{Q'}$ does not result from differences in the distributions of occupations between the two locations.

Even if $M_P - M_{Q'} = 0$, however, there may still may be differences in mobility between P and Q that transcend differences in their marginal frequencies. The cross-product ratio is the fundamental measure of association between rows and columns in a mobility table. For P, the cross-product ratio is $p_{11}p_{22}/p_{12}p_{21}$, which can be rearranged as $(p_{11}/p_{12})/(p_{21}/p_{22})$, the ratio of (1) the odds that sons of job 1 fathers get job 1 rather than job 2 to (2) the odds that sons of job 2 fathers get job 1 rather than job 2. In the case of perfect mobility, the cross-product ratio is unity: sons of job 1 fathers would have no advantage in getting job1 relative to sons of job 2 fathers. The more the cross-product ratio exceeds one, the greater the relative advantage of having a job 1 father in getting job 1. The cross-product ratio for both P and Q is 4, so these matrices have the same underlying mobility.

A table with more than two rows or columns has several cross-products ratios, and a useful summary measure of association should take account of all of them. Altham (1970) offers such a measure: the sum of the squares of the differences between the logs of the cross-product ratios in tables P and Q. For two tables, each with r rows and s columns, the Altham statistic measures how far the association between rows and columns in table P departs from the association between rows and columns in table Q:

$$d(P,Q)=\left[\sum_{i=1}^{r}\sum_{j=1}^{s}\sum_{l=1}^{r}\sum_{m=1}^{s}\left|\log\left(\frac{p_{ij}p_{lm}p_{im}p_{lj}}{p_{im}p_{lj}q_{ij}q_{lm}}\right)^{2}\right|\right]^{1/2}$$

The statistic d(P,Q) measures the distance between tables P and Q.[3] A simple likelihood-ratio χ^2 statistic G^2 (Agresti, 2002, p. 140) with (r-1)(s-1) degrees of freedom can then be used to test whether the matrix Θ with elements $\theta_{ij}=\log(p_{ij}/q_{ij})$ is independent; if we can reject the null hypothesis that Θ is independent, we essentially accept the hypothesis that $d(P,Q)\neq 0$ so the degree of association between rows and columns differs between table P and table Q. Though the statistic does not tell us which table has the stronger association, this can be determined by calculating d(P,I) and d(Q,I), which use the same formula as d(P,Q) but replace one table with a matrix of ones. If $d(P,Q)>0$ and $d(P,I)>d(Q,I)$, we can say that mobility is greater in table Q (i.e. mobility is closer in Q than in P to what we would observe under independence of rows and columns, in which the occupation of a father provides no information in predicting the occupation of his son).

Contingency tables are often dominated by elements along the main diagonal (which in the case of mobility captures immobility or occupational inheritance), so we will calculate an additional version of d(P,Q) that examines only the off-diagonal cells. This will show whether, conditional on occupational mobility occurring between fathers and sons, the patterns of mobility are similar in P and Q. This tests whether P and Q differ in their proximity to "quasi-independence." (Agresti, 2002, p. 426) For square contingency tables with r rows and columns, this additional statistic $d^i(P,Q)$ will have the same properties as d(P,Q), but the likelihood ratio χ^2 statistic G^2 will have $[(r-1)^2-r]$ degrees of freedom.

As a pure function of the odds ratios in tables P and Q, d(P,Q) is invariant to the multiplication of rows or columns in either table by arbitrary constants, so d(P,Q) measures the difference in row-column association between two tables apart from that induced by differences in marginal frequencies. As a simple sum of the squares of log odds ratio contrasts, $[d(P,Q)]^2$ can be

[3] Altham and Ferrie (2005) discuss the distance measure and test statistic, and provide algorithms for their computation.

easily decomposed into its constituent elements: for an r × s table, there will be [r(r-1)/2][s(s-1)/2] odds ratios in d(P,Q). It will be possible to calculate how much each odds ratio contributes to $[d(P,Q)]^2$, making it possible to locate where in P and Q the differences between them are greatest.

In analyzing how mobility differs between two tables, we will then proceed in three steps[4]:

1. calculate total mobility for each table as the ratio of the sum of the off-diagonal elements to the total number of observations in the table, and find the difference in total mobility between P and Q;

2. adjust one of the tables to have the same marginal frequencies as the other and re-calculate the difference in total mobility to eliminate the influence of differences in the distribution of occupations;

3. calculate d(P,Q), $d^i(P,Q)$, d(P,I), and d(Q,I) and the likelihood ratio χ^2 statistics G^2; if $d(P,Q) \neq 0$, calculate the full set of log odds ratio contrasts and identify those making the greatest contribution to $[d(P,Q)]^2$.

Mobility in France and the U.S. Since the Mid-Nineteenth Century

Changing patterns of intergenerational mobility over time are examined in Ferrie (2005), so we will concentrate here on change over time in the French patterns and on changes over time in French mobility compared to U.S. mobility at different points in time. The raw transition matrices are shown in Tables A-1 and A-3 in the Appendix; tables with all of the marginal frequencies standardized to 100 are shown in Tables A-2 and A-4. Table 2 presents a very rough summary measure of mobility (the fraction of sons who end up in occupations different from their fathers), derived from both the raw frequencies (M) or from the frequencies after the margins have been

[4]Common practice in sociology is instead to estimate log-linear models that decompose the influences on the log of each entry in a contingency table into a sum of effects for its row and column and an interaction between the row and column. Controlling for row and column effects eliminates the effect of the distribution of fathers' and sons' occupations on mobility. The remaining interaction between rows and columns captures the strength of the association between rows and columns which in turn measures mobility, though the coefficient on the interaction term has no meaning in itself as it is a component of a highly non-linear system. In comparing mobility in two tables, attention is generally focused on the statistical significance of the difference in the interaction effect rather than on its magnitude. In addition, a simple comparison of differences in the interaction term is seldom performed without the imposition of additional structure. For example, it might be supposed that all of the odds ratios in P differ in exactly the same degree from all of the odds ratios in Q, or that the odds ratios can be partitioned into sets that differ uniformly across the tables.

standardized to 100 (M^s). The raw measure in Column (1) suggests that this simple measure of mobility has declined in France since the min-nineteenth century. The measure that holds the occupational structure constant, however, reveals a different pattern for France: a sharp increase in mobility in the last quarter of the nineteenth century, followed by a sharp fall in the twentieth, by which time mobility is actually lower than it was at the outset. For the U.S., late nineteenth century mobility is greater than that in the twentieth if the raw frequencies are used, and both nineteenth century samples display more mobility than in the twentieth century if the standardized frequencies are used.

Country and Period	M (1)	M^s (2)
1. France 1836-1874	48.4	48.6
2. France 1875-1905	47.4	52.3
3. France 1950-1977	53.0	44.5
4. U.S. 1850-1880	50.2	59.5
5. U.S. 1880-1910	59.1	60.6
6. U.S. 1950-1973	56.3	49.4

Notes: M is total mobility (percent off the main diagonal), M^s is total mobility using standardized marginal frequencies (Tables A-2 and A-4).

Table **2**. Percent Outside Father's Occupation in France and the U.S.

When we calculate the Altham statistics (Table 3), it is clear that within France mobility follows an inverted U-shaped pattern: it rises from the mid-nineteenth century to the late nineteenth century, and falls in the twentieth century. At each point in time, mobility is greater in the U.S. than in France, and these differences are always statistically significant. The decline in mobility from the

Comparison	M (1)	M′ (2)	d(P,I) (3)	G^2 (4)	d(Q,I) (5)	G^2 (6)	d(P,Q) (7)	G^2 (8)	d^i(P,Q) (9)	G^2 (10)
1. France 1836-74 (P)	48.4	42.4	19.46	1455.03***			9.42	140.79***	4.79	25.92***
vs. U.S. 1850-80 (Q)	50.2	55.6			11.46	1245.52***				
2. France 1874-1905 (P)	47.4	52.5	15.66	331.22***			5.36	23.92***	1.25	1.06
vs. U.S. 1880-1910 (Q)	59.1	53.1			11.71	2745.59***				
3. France 1950-77 (P)	56.0	53.0	26.16	2128.19***			9.60	47.56***	7.35	35.82***
vs. U.S. 1950-73 (Q)	56.3	56.4			21.30	723.21***				
4. France 1836-74 (P)	48.4	53.5	19.46	1455.02***			12.19	172.05***	5.44	23.23***
vs. France 1950-77 (Q)	42.3	53.0			26.16	218.19***				
5. U.S. 1850-80 (P)	50.2	59.4	11.46	1245.52***			11.74	114.67***	4.57	19.97***
vs. U.S. 1950-73 (Q)	56.3	40.6			21.30	732.21***				

Notes: M is total mobility (percent off the main diagonal), M′ is total mobility using the marginal frequencies from the other table, G^2 is the likelihood ratio χ^2 statistic with significance levels *** < 0.01 ** < 0.05 * < 0.10. Degrees of freedom: 9 for columns (4), (6), and (8); 5 for column (10).

Table **3**. Summary Measures of Mobility in France and the U.S.

mid-nineteenth century to the twentieth century is also large and statistically significant for both countries. Before we attempt to explain these patterns, we will consider in greater detail the changes that underlie these summary measures.

For France, when we abstract from change betwen the fathers' and sons' generations in the marginal frequencies, and from change over time in these frequencies, it is clear that the probability that a son had the same occupation as his father is much higher in the two upper groups (farmers and white collar) than in the two lower ones (unskilled and skilled/semi-skilled), particularly in period 1. This may be due at least inpart to the construction of the occupational group itself. Sons whose fathers are in the highest group have nowhere to move farther up, so they are much more likely to stay in the same group as their father. But it also shows the predominance of upward to downward social mobility.

We can also examine in more detail how some specific "mobility paths" evolved over time. Sons of unskilled fathers were more likely to become white collar or farmers in the second period

than in the first, while sons of craftsmen more often became white collar in successively later cohorts. Between period 1 and 2, white collar sons had increasing difficulty staying white collars and were almost equally distributed between the three other groups (16-18% in each). There is thus more downward mobility in the last period of the 19th century. In brief, there is a trend for intergenerational social mobility to increase from the middle to the end of the nineteenth century. Overall, sons have more chances to move into a different occupation than their father in the last period than in the first one.

For the twentieth century, the FQP survey for the year 1977 allows us to compare fathers' and sons' occupations. By using weights, we examine a representative sample of the whole of France. We control for the ages of fathers and son to keep the twentieth century sample consistent with that from the nineteenth. But in doing this, unfortunately, we cannot control the length of time between the first occupation (the father's) and the second (the son's). In all cases, France seems to be much less mobile in the twentieth than in the nineteenth century. Even when the occupational structure is held constant between the two centuries (with a very important decrease of farmers and land owners and an increase of employees and civil servants), mobility diminished substantially by the twentieth century.

Among occupations, farmers are generally the most stable group, but this stability decreases with time as the share of farmer in total population decreases. If we look at a constant occupational structure, the probability for a son of a farmer to stay in the same group does not vary across time and reaches 77% by the twentieth century. The same holds true for the unskilled. The occupational structure changes substantially between the beginning of the nineteenth and the end of the century, from century a mainly agricultural society to a society with more industrial and civil servants jobs.

A quick comparison between France and the U.S. shows that U.S. is always more mobile (socially speaking) than France although the difference is not as high as we would have thought. But the historical evolution of the two countries is rather opposite. While social mobility increases slightly in France from the beginning to the end of thenineteenth century, it rises only in the U.S. At the end of the century, U.S. was still more mobile than France but the two countries were closer than they were earlier. In the twentieth century, mobility falls in both countries, but the gap between them reaches its lowest level..

Figure 1 gives a short visual summary of mobility patterns in the two countries. We can see the U.S. is always more mobile and the gap seems to be rather constant. Mobility in late nineteenth century France is similar to that in the U.S. throughout the nineteenth century. By the twentieth century, both countries have moved far from independence, though a gap between them is still apparent.

In both countries, occupational mobility (as expressed by the raw frequencies) is effected by the evolution of the structure of occupations. This evolution is however not straightforward. For example, while the share of white collar jobs increases continuously and more than doubles (from below 5% to above 10%), farmers do not decline steadily as we could have expected, mainly because this group contains only independent farmers (owners). For both sons and fathers, the share of in farming increases in the second period and drops in the final period to a very low level. Finally, we may note that skilled/semi-skilled and unskilled represent two groups of equal share except for the last period, when unskilled become a larger group.

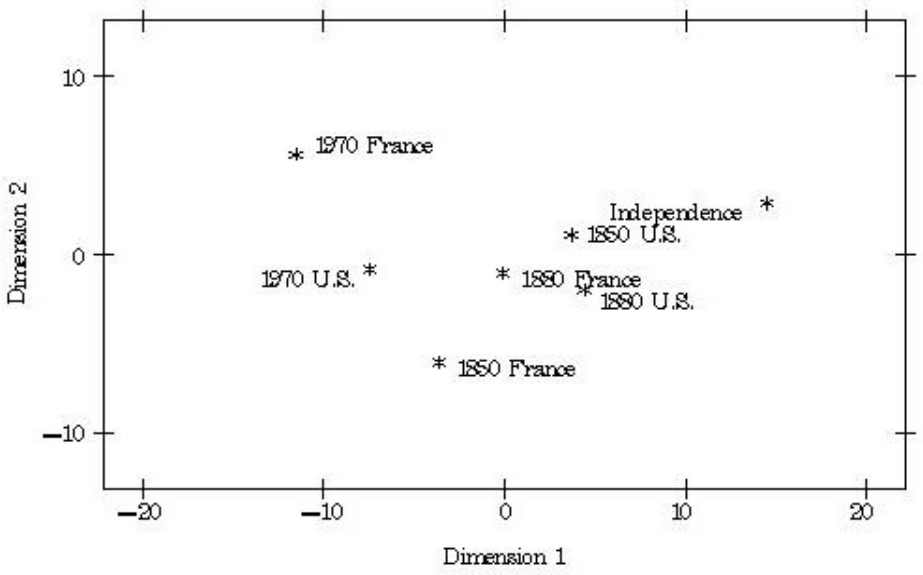

Figure **1.** Two-Dimensional Representation of Mobility Measures (Altham Statistics) for France and the U.S., Mid-Nineteenth Century to 1970s.

Until the last period, sons of farmer feed all three other groups to a quite large extent as there remain a large number of farmers. In the last period however, farming attracts very few from

any of the other groups and is even too small to accommodate all farm sons (a large part of them ending up in the unskilled group). The influx into farming from the other groups is very low except for period 2: the farming seems much more attractive then and no less than one out of five white collar sons join the group of the farmers. This is a surprising result. Usually, the main outside contribution to farmers is from skilled/semi-skilled. This could be explained by unequal access to land: while white collars are well educated and often work in the service sector (and so do need to buy land in the countryside), unskilled workers do not have the economic capital to become owners. At the opposite extreme, the white collar group is no less self-centred even if it tends to become more open between the first and second periods (60% of the white collar became white collar in the first period for the standardized matrix and 56% in period 3, but 49% do so in period 2).

Using standardized matrices we can ignore composition effects: diagonal frequencies measure the level of auto-reproduction for each group. This level is generally larger for the two extreme groups, unskilled and white collar. This is unexpected: one would have believed that the enlargement of schooling and liberalization of the labor market would have increase mobility for the least skilled. As we shall see, however, levels of schooling may be less important in promoting mobility than the distribution of access to schooling across social classes. Skilled/semi-skilled show less immobility.

If two standardized matrices are significantly different, which implies significant changes in the structure of mobility, it is not trivial to say whether mobility has increased and through which paths. The major change that appears once structural effects are discarded is the place of farmers. We may think that, as time goes, farming is less and less attractive. For instance, in the last period, only 8% of the sons of a non-farmer father becomes farmer.. When looking further, however, we

see that this effect is mostly due to the very low proportion of farmer in son's occupation in this period, only 7%. So non farmers sons do not become farmers simply because there are not enough farmer positions.

A second important feature linked with dropping the effect of composition is the degree of openness of unskilled and semi-skilled groups. It reveals that unskilled is even more closed and semi-skilled much more open with the actual composition of the population. And this result seems to increase with time. The unskilled group closes up more and more, reproduction reaching nearly 60%. On the other hand, semi-skilled sons almost randomly distribute in the white collar, farmer and skilled/semi-skilled groups (with a larger effect for this last one). This is not the case with the U.S. Mobility appears to result less from the skilled/semi-skilled and morefrom the white collar. A crude appreciation of the difference of mobility in France and the U.S. therefore is that, leaving aside difference of composition by occupational groups, mobility is larger in the United State due to a higher level of mobility towards and from the white collar group. On the contrary, mobility in France occurs mainly among the skilled/semi-skilled.

EXPLAINING THE NINETEENTH CENTURY DIFFERENCES AND TRENDS OVER TIME

In attempting to understand how mobility differs across places and over time, ideally, we seek explanations that are consistent with four facts we have established:

1. $\text{Mobility}^{\text{U.S., 19th century}} > \text{Mobility}^{\text{France, 19 thcentury}}$

2. $\text{Mobility}^{\text{19th c. U.S.}} > \text{Mobility}^{\text{late 20th c. U.S.}}$

3. $\text{Mobility}^{\text{19th c. France}} > \text{Mobility}^{\text{late 20th c. France}}$

4. $\text{Mobility}^{\text{late 19th c. France}} > \text{Mobility}^{\text{early 19th c. France}}$

Economic theory provides some guidance in our search for causes. In a simple economic model of intergenerational mobility (Becker and Tomes, 1979, 1986), parents maximize an altruistic utility function subject to:

their own income

the heritability of endowed characteristics

the technology transforming investment in their child into the child's human capital

the relationship between human capital & income for the child

public investment (schooling) in the child

Solon (2004) shows that the elasticity of child's income with respect to parent's income is

$$\beta = \frac{(1-\gamma)\theta\rho + \lambda}{1+(1-\lambda)\theta\rho\lambda}$$

where

γ is progressivity of public spending
θ is ∂(Human Capital)/∂(Investment)
ρ is the earnings return to human capital
λ is the heritability of characteristics

Mobility is lower (β is higher) when

- heritability of characteristics is greater
- human capital investment is more productive
- the earnings return to human capital is greater
- public investment in children is less progressive

Grawe and Mulligan (*JEP* 2002) and Han and Mulligan (*EJ* 2001) also show that

- mobility is lower where capital markets function poorly
- mobility is lower with more variance in ability

Two of these stand out as plausible sources of differences across places and over time:

1. the progressivity of public investment (public education in the 19th c. U.S., though rudimentary, was more equally distributed than in 19th c. France or the 20th c. U.S.; though it became more widely available within France in the last quarter of the nineteenth century)
2. the productivity of investment by parents in their children (in 19th c. France and the 20th c. U.S., it's schooling; but the 19th c. U.S. has another investment: geographic mobility)

These explanations also seem to fit the British pattern, in which mobility in the nineteenth century was substantially below that in the U.S., while the gap between them declined dramatically in the twentieth century as mobility in both places diminished (Log and Ferrie, 2006).

The scale of public investment in education can be seen in Table 4. In the middle of the nineteenth century, the U.S. was already enrolling nearly half of its school-age children in schools,

	1850	1870	1890	1910
England	n.a.	16.8	38.5	54.2
France	35.1	46.7	56.7	58.8
U.S.	47.2	48.4	54.3	59.2

Note: "School-Age" is 5-19 for France and England, and 5-20 for the U.S.
Sources: England and France: Crafts (1984, Tables 2 and 3); U.S.: *Historical Statistics of the U.S.* (Series Bc438).

Table **4**. Public School Enrollment as a Percentage of School-Age Population (Percent).

compared to just over a third in France and a sixth in England. Over the last quarter of the nineteenth century, France closed this gap and was educating a slightly larger fraction of its children at public expense in the 1890s than the U.S.; Britain still lagged behind both through 1910.

Another noteworthy difference between the U.S. and France (and also between the U.S. and Britain) is impact of internal migration. Geographic mobility was much higher in the U.S. than in

	France	U.S.
Changed		
Region		19.4%
State (71,000 mi^2)		28.2
Departement (2,000 mi^2)	29.9%	
County (1,800 mi^2)		57.7
Commune (6 mi^2)	45.2	
Distance Moved (miles)		
Under 50 (incl. 0)	86.6%	57.6%
50-100	2.8	9.5
100-250	6.1	13.1
Over 250	4.6	19.8

Source: Military service records for France, males linked from the 1880 population census to the 1900 population census for the U.S.

Table **5**. Geographic Mobility in France and the U.S., 1880-1900 (Males Age 18-22 in Initial Year).

Britain, and also higher in the U.S. than in France. Though direct comparisons of U.S. and French mobility rates are difficult because of the different sizes of the administrative units over which migration can be observed, it is clear that young males in the U.S. crossed the boundaries of even very large administrative units more often than young French males crossed the boundaries of much smaller administrative units. For example, over the two decades after 1880, 58% of U.S. males

crossed a county boundary, while over the same time period, fewer than half of French males crossed a *commune* boundary, even though *communes* were several hundred times smaller than counties. The average distances moved provide additional evidence that migration, and particularly long-distance migration, was much more common in the late nineteenth and early twentieth century U.S. than it was in France at this time.

There was also something quite different about the character of internal movement in the U.S. that may have had some bearing on intergenerational mobility. Throughout the 1850-1920 period, cities are appearing and growing rapidly across the U.S. as settlement moves westward. For example, Chicago grows four-fold over the 1850s, and then does so again over the 1860s. This provided parents with an investment not available on scale in other countries in the nineteenth century or even in the U.S. by the late twentieth century: migration to new cities and towns that were rapidly growing and in which occupational mobility across generations could be achieved even if parents lacked the financial resources that would otherwise allow them to afford direct investment in the careers of their children (by purchasing schooling or land or tools or connections).

As Bonneuil and Rosental (1999), geographic mobility and intergenerational occupational mobility were also related in late nineteenth century France; what was perhaps different about the nineteenth century U.S. was the magnitude of this opportunity. Many of the urban places that were prominent destinations on Third Republic France had been prominent trade and administrative centers for centuries; new cities in the U.S. really did spring up from a virgin landscape, promoting opportunity similar in kind to that seen in France, but altogether different in scale.

Conclusions

Over the third quarter of the nineteenth century, intergenerational mobility was greater in the U.S. than in France. At the same time, mobility in both countries was greater than it was in. By the third quarter of the twentieth century, intergenerational mobility had fallen in both France and the U.S., though mobility remained virtually unchanged in Britain. Though the overall amount of mobility was similar in all three countries by the third quarter of the twentieth century, there remained some differences in the specific patterns of association between fathers' and sons' occupations. We cannot reject the null hypothesis at any conventional significance level that the patterns of association were the same in Britain and the U.S. in the decades after World War Two, nor can we reject this null hypothesis at the 5% level for Britain and France. For France and the U.S., however, we can conclude that some differences in these patterns of association remained even as the gap in overall mobility between them narrowed from the nineteenth century to the twentieth.

As de Tocqueville and Marx noted at the time, then, the U.S. was indeed more occupationally mobile than France in the middle of the nineteenth century. After accounting for differences between the two countries in the distribution of occupations, intergenerational occupational mobility was greater in the U.S. than in France, though the U.S. advantage was less than that over Britain at the same time. By the last quarter of the twentieth century, the differences among all three countries had narrowed considerably. The differences in mobility between the U.S. and France in the nineteenth century and why they narrowed in the twentieth century, are less likely the result of differences between the U.S. and France in urbanization, the size of the farm sector, or the extent of industrialization, as these were roughly similar in the middle of the nineteenth century. Instead, the observed differences in mobility appear to correspond to differences in (1) access to education; (2) opportunities for occupational advancement through migration to rapidly growing

and newly developing regions; and (3) the extent to which political and social upheavals removed institutional impediments to mobility, the influence of landed wealth and the growth of state employment.

APPENDIX

	Father's Occupation				
Son's Occupation	White Collar	Farmer	Skilled/ Semiskilled	Unskilled	Row Sum
France (1836-1874):					
White Collar	106.0	105.0	155.0	84.0	450.0
	(43.8)	(5.1)	(10.6)	(6.5)	
Farmer	32.0	1156.0	158.0	222.0	1568.0
	(13.2)	(56.1)	(10.8)	(17.1)	
Skilled/Semi-Skilled	74.0	331.0	736.0	379.0	1520.0
	(30.6)	(16.1)	(50.4)	(29.2)	
Unskilled	30.0	467.0	412.0	611.0	1520.0
	(12.4)	(22.7)	(28.2)	(47.1)	
Col Sum	242.0	2059.0	1461.0	1296.0	
France (1875-1905):					
White Collar	35.0	56.0	44.0	24.0	159.0
	(38.9)	(8.2)	(16.9)	(10.3)	
Farmer	19.0	405.0	38.0	42.0	504.0
	(21.1)	(59.4)	(14.6)	(18.0)	
Skilled/Semi-Skilled	21.0	94.0	126.0	68.0	309.0
	(23.3)	(13.8)	(48.5)	(29.2)	
Unskilled	15.0	127.0	52.0	99.0	293.0
	(16.7)	(18.6)	(20.0)	(42.5)	
Col Sum	90.0	682.0	260.0	233.0	
France (1950-1977):					
White Collar	342.0	156.0	337.0	285.0	1120.0
	(44.9)	(8.7)	(18.6)	(9.1)	
Farmer	7.0	503.0	26.0	21.0	557.0
	(0.9)	(28.1)	(1.4)	(0.7)	
Skilled/Semi-Skilled	293.0	391.0	856.0	1005.0	2545.0
	(38.5)	(21.9)	(47.2)	(32.0)	
Unskilled	119.0	739.0	595.0	1825.0	3278.0
	(15.6)	(41.3)	(32.8)	(58.2)	
Col Sum	761.0	1789.0	1814.0	3136.0	

Table A-**1**. Intergenerational Occupational Mobility in France (Column Percent).

Son's Occupation	White Collar	Farmer	Skilled/ Semiskilled	Unskilled	Row Sum
		Father's Occupation			
France (1836-1874):					
White Collar	60.4	8.7	19.2	11.8	100.0
Farmer	11.0	58.2	11.8	18.9	100.0
Skilled/Semi-Skilled	19.7	12.9	42.6	24.9	100.0
Unskilled	8.9	20.2	26.5	44.5	100.0
Col Sum	100.0	100.0	100.0	100.0	
France (1875-1905):					
White Collar	49.4	12.2	23.9	14.6	100.0
Farmer	16.6	54.8	12.8	15.8	100.0
Skilled/Semi-Skilled	18.6	12.8	42.8	25.8	100.0
Unskilled	15.4	20.2	20.6	43.8	100.0
Col Sum	100.0	100.0	100.0	100.0	
France (1950-1977):					
White Collar	55.6	4.4	25.8	14.2	100.0
Farmer	6.2	77.3	10.8	5.7	99.9
Skilled/Semi-Skilled	27.3	6.4	37.6	28.7	100.0
Unskilled	10.9	11.9	25.8	51.4	100.0
Col Sum	100.0	100.1	100.0	100.0	

Table A-**2**. Intergenerational Occupational Mobility in France, Standardized Marginal Distributions (Column Percent and Row Percent).

	Father's Occupation				
Son's Occupation	White Collar	Farmer	Skilled/ Semiskilled	Unskilled	Row Sum
U.S. (1850-80):					
White Collar	260.0	715.0	424.0	142.0	1541.0
	(38.1)	(13.0)	(22.6)	(15.0)	
Farmer	194.0	3245.0	454.0	247.0	4140.0
	(28.4)	(59.0)	(24.2)	(26.2)	
Skilled/Semi-Skilled	158.0	874.0	751.0	327.0	2110.0
	(23.2)	(15.9)	(40.1)	(34.6)	
Unskilled	70.0	664.0	246.0	228.0	1208.0
	(10.3)	(12.1)	(13.1)	(24.2)	
Col Sum	682.0	5498.0	1875.0	944.0	
U.S. (1880-1910):					
White Collar	1538.0	1622.0	1203.0	529.0	4892.0
	(44.0)	(20.5)	(30.7)	(22.0)	
Farmer	550.0	3371.0	363.0	409.0	4693.0
	(15.7)	(42.6)	(9.3)	(17.0)	
Skilled/Semi-Skilled	907.0	1486.0	1736.0	858.0	4987.0
	(26.0)	(18.8)	(44.2)	(35.6)	
Unskilled	500.0	1428.0	622.0	611.0	3161.0
	(14.3)	(18.1)	(15.9)	(25.4)	
Col Sum	3495.0	7907.0	3924.0	2407.0	
U.S. (1950-1973):					
White Collar	751.0	195.0	592.0	196.0	1734.0
	(70.6)	(26.0)	(39.2)	(30.2)	
Farmer	7.0	108.0	7.0	7.0	129.0
	(0.7)	(14.4)	(0.5)	(1.1)	
Skiled/Semi-Skilled	244.0	327.0	742.0	314.0	1627.0
	(23.0)	(43.7)	(49.1)	(48.3)	
Unskilled	61.0	119.0	169.0	133.0	482.0
	(5.7)	(15.9)	(11.2)	(20.5)	
Col Sum	1063.0	749.0	1510.0	650.0	

Table A-**3**. Intergenerational Occupational Mobility in the U.S. (Column Percent).

	Father's Occupation				
Son's Occupation	White Collar	Farmer	Skilled/ Semiskilled	Unskilled	Row Sum
U.S. (1850-1880):					
White Collar	42.6	16.1	25.4	15.9	100.0
Farmer	19.9	45.8	17.0	17.3	100.0
Skilled/Semi-Skilled	20.3	15.5	35.4	28.7	100.0
Unskilled	17.2	22.5	22.1	38.2	100.0
Col Sum	100.0	100.0	100.0	100.0	
U.S. (1880-1910):					
White Collar	38.5	15.9	27.5	18.1	100.0
Farmer	19.9	47.8	12.0	20.3	100.0
Skilled/Semi-Skilled	21.3	13.7	37.4	27.6	100.0
Unskilled	20.3	22.7	23.1	34.0	100.0
Col Sum	100.0	100.0	100.0	100.0	
U.S. (1950-1973):					
White Collar	52.5	5.7	26.0	15.9	100.0
Farmer	10.9	69.7	6.8	12.6	100.0
Skilled/Semi-Skilled	20.2	11.2	38.5	30.0	100.0
Unskilled	16.5	13.4	28.6	41.5	100.0
Col Sum	100.0	100.0	100.0	100.0	

Table A-**4**. Intergenerational Occupational Mobility in the U.S., Standardized Marginal Distributions (Column Percent and Row Percent).

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