The Household as a Source of Labor for Entrepreneurs:

Evidence from New York City during Industrialization *

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Abstract

Research Summary: This article conceptualizes households as a crucial pool of labor for small entrepreneurs. The household varied historically in its scope (depending on whether bonded workers were included) and work intensity (depending on the authority or coercion exercised by household heads). Drawing on data that enumerate over 100,000 households in New York City, I examine how the shift from institutions of unfree labor to wage labor affected business proprietorship between 1790 and 1850. Given the disproportionate importance of unfree household labor to small entrepreneurs, the contraction of this labor source may offer one general explanation for their decline.

Managerial Summary: How does household scope and composition affect the ability of an individual to run their own business? Historical archives can provide useful insights into this question. They track long-term declines in family size and the emancipation of non-family members – such as apprentices, indentured servants, and slaves – from the authority of household heads. Examining records from early New York City, this study shows that business ownership was strongly linked with the ownership of slaves and the presence of dependent males after the American Revolution. Large households and unfree laborers were especially important for entrepreneurship among individuals with limited wealth. For modern economies, the results suggest that policy-makers consider potential tensions between small business ownership and the development of free and equitable labor markets.

1. Introduction

The transformation of entrepreneurship during the Industrial Revolution has been actively studied by economic historians and entrepreneurship scholars, considering an array of economic and social changes between the mid-18th and mid-19th centuries. To name just a few examples, explanations for the changing character of entrepreneurship include the scholarship of McCloskey (2006, 2010) on the emergence of bourgeois virtue, Mokyr (2008, 2010) on intellectual property rights and cultural beliefs supporting early industrial entrepreneurs, and Sylla and his colleagues on the role of financial institutions (Rousseau and Sylla, 2005). While earlier accounts of industrialization in the West posited an exogenous source from a "sudden efflorescence of technological change" (De Vries, 2008: 77), recent perspectives have come to eschew this narrow view of technological determinism, either situating the effects of technological innovation – such as the steam-powered mechanization of industry -- in a broader context of institutions and management ideologies (Freeman and Louçã, 2001; Bodrožić and Adler, 2018; see also Bendix, 2001) or placing primary emphasis on institutional determinants of industrial development.

A recurring theme in institutional approaches has been the household as a historical source and locus of labor for small entrepreneurs (e.g., Kay, 2009; Scranton, 1983; Smelser, 2006; Tilly and Scott, 1987). In treatments of modern entrepreneurship, there is a robust and related literature on characteristics of family systems and entrepreneurship (Morck and Yeung, 2004; Mehrotra et al., 2011; Stamm, 2016), with households often appearing as synonymous with families (Aldrich and Cliff, 2003; Lumpkin et al., 2011). Some historical approaches likewise equate the household with the "family economy" of entrepreneurs (e.g., Smelser 2006). Yet an important lesson from history is that the household was a unit with malleable boundaries, one that varied considerably over the course of industrialization, both in the legal capacity of household heads to control non-kin and fictive kin under their aegis and in their ability to extract labor from household members (Steinfeld, 2002). The implications of such institutional variation in household labor remain to be drawn out

for entrepreneurship theory and, as I will argue, bear not only on historical cases, but also on the character of entrepreneurship in developing and developed countries today.

This article focuses on the likelihood that households were able to engage in business proprietorship as one measure of entrepreneurship.[1] Its primary thesis suggests that transformations in households and labor market institutions in the late eighteenth and nineteenth centuries were a major challenge to the small business owners who dominated the pre-industrial economy. The study begins with a theoretical approach that anchors the likelihood of business ownership in the size of a household's labor pool. Labor market institutions are crucial to entrepreneurs because they have historically allowed them to extend their household labor pool, through the incorporation of bonded workers (e.g., slaves, indentured servants, apprentices), and to intensify the utilization of family members in the pool, through their authority over spouses and working-age children. Over the course of industrialization, legal and normative changes regarding peonage and contractual relationships gradually eroded these institutional mechanisms of labor expropriation (Stanley, 1998; Steinfeld, 2002; Tomlins, 1993). As a result, the theory predicts, small business owners were at a growing disadvantage because they were least inclined and able to switch to wage labor.

To evaluate these claims empirically, the study considers the case of New York City, the center of early metropolitan industrialization in the United States (Rock, 1979; Wilentz, 2004). Drawing on a data set matching households and businesses in the city between 1790 and 1850, I analyze how the deinstitutionalization of slavery, indenture, and long apprenticeship affected the likelihood that residents would become entrepreneurs at multiple points during this sixty-year period. Findings suggest that slave ownership was a potent predictor of business proprietorship and the pursuit of entrepreneurial occupations before the 1820s, when the emancipation of bondsmen and women in the city was completed. By the middle of the nineteenth century, women and girls had come to

[1] A more exacting definition of entrepreneurship might differentiate between those individuals who start their own businesses and those who inherit or acquire businesses started by others (e.g., Stamm, 2016). While it is often not possible to draw this distinction with historical data, most businesses during industrialization were short-lived and were operated by the proprietors who founded them.

replace slaves, apprentices, and young male indentured servants as the most important source of household labor among the city's small business owners, even as these female workers were in increasing demand as wage workers. Meanwhile, relatively few of New York's small workshops and manufactories could rely on mechanization as a substitute for household labor.

As an explanation for the fate of the small entrepreneur, the theory and empirical results suggest that entrepreneurship scholars should supplement their emphasis on technological and market innovations with an account that considers the evolution of household labor pools. Moreover, if decreasing household size, accompanied by the removal of children and unfree workers from the labor pool, was a decisive factor affecting the character of entrepreneurship, then this relationship is not merely of historical interest but continues to have implications for modern entrepreneurial activity.

2. Theoretical Framework

2.1 Entrepreneurship and the Industrial Revolution

Quantitative studies of occupational structure suggest that entrepreneurial activity was vigorous before the Industrial Revolution. In the urban centers of the American Northeast, for instance, occupational directories provide evidence of thriving entrepreneurship in the 18th century. Lubow (1997) estimates that Boston had an entrepreneurial class of artisans, manufacturers, shopkeepers, and service proprietors that comprised as much as 60% of adult males in 1790. Estimates for New York City during this period are comparable (see Figure 1). Based on city directory listings, about 64% of the city's heads of household were employed in occupations with a high probability of business proprietorship in 1790. Roughly 40% of those entrepreneurial households were involved in manufacturing and more than half owned brick-and-mortar enterprises – including small factories, workshops, stores, and other business establishments – that were reported in in the city's tax records. With the onset of the Industrial Revolution, such entrepreneurial activity tended to decline. By the middle of the 19th century, less than 48% of New York City's heads of household

were involved in entrepreneurial occupations and a mere 7% of those households owned real estate that could be deployed in manufacturing or retail activity.[2]

[Insert Figure 1 Here]

In his influential thesis on the industrious revolution, Jan De Vries (1994, 2008) argues that patterns of consumption had created a demand for marketable goods before the Industrial Revolution. During the 1980s and 1990s, a number of economic historians rediscovered the importance of entrepreneurs who tried to meet this demand by coordinating production among kinship groups or artisans prior to the age of the factory (e.g., Berg et al., 1983; Safley and Rosenband, 1993). Thomas Safley and Leonard Rosenband noted that, "the emphasis [in earlier treatments of industrialization] rests on concentrated capital and wage labor and, therefore, distorts the reality of manufacture in the Old Regime" (1993: 2). These perspectives suggest that an increase in consumption demand in Western European and American society (along with an agricultural surplus) led households to shift their efforts from agriculture, self-sufficient handicrafts, and leisure to the supply of marketed goods (De Vries, 2008).

In stylized form, the resulting form of entrepreneurship was a system of protoindustrial workshops (Table 1), largely reliant on household labor and inefficient yet industrious work routines that centered on craft technology and outwork (i.e., a division of labor achieved by subcontracting tasks to different households). Following this protoindustrial stage, the small producers were displaced by the factory system, which offered greater efficiency through mechanized and capital-intensive manufacture of goods and the collocation of larger numbers of workers in sites of production. Over the course of the Industrial Revolution, the growth of the market for mass-manufactured goods was furthered by entrepreneurs in retail and wholesale, who consolidated businesses in a tertiary sector that had previously been served by peddlers, stall keepers, and other "penny capitalists" (see Benson, 1983 for a critique).

[2] The sources of data and measures for assessing entrepreneurial activity in New York City are discussed at greater length in the section on *Methodology*.

[Insert Table 1 Here]

An alternative narrative emphasizes the implications of changing labor market institutions for entrepreneurs. Since the 1950s, economic sociologists have considered the social transformation of households and entrepreneurial ideology regarding labor to be major complements to "the widespread enthusiasm [among entrepreneurs] for technology and manufacture" (Bendix, 2001: 29; Smelser, 2006). Similarly, labor historians have sought to explain the Industrial Revolution from the ground up, through the perspective and experiences of entrepreneurial households and workers, rather than the impersonal force of technology and markets. With detailed analyses of the process of metropolitan industrialization, which predominated in urban centers such as New York City (Rock, 1979; Wilentz, 2004) and Philadelphia (Scranton, 1983), historians suggest that the social disruption of the artisanal and familial systems of labor may have been as important to industrialization as the mechanization of enterprise or development of consumer markets.

While offering a distinct image of entrepreneurship during the Industrial Revolution, this alternative perspective has left a number of important gaps. Early research incurred the risk of prioritizing structural forces affecting households over markets or technology as a matter of theoretical fiat, rather than empirical inquiry. Perhaps the most nuanced application of this approach could be found in Neil Smelser's *Social Change in the Industrial Revolution* (2006), which analyzed the reorganization of child, female, and male labor in the British cotton industry between 1770 and 1840. Smelser's point of departure was "to reject explicitly the notion that 'technology' explains the rise of the factory system" (ibid: 100), as reflected in the need for large fixed capital investments and requirement of central power sources, in favor of a historical sequence that highlights the differentiation of a household social system. This strong theoretical commitment made it difficult for him to assess the *relative* impact of changes in labor market institutions and technology to the creation of industrial enterprise.

Research in the field of new labor history has suffered the opposite critique, namely that it pushes institutions aside entirely in favor of the lived experiences of workers (e.g., Brody, 1993). This emphasis not only creates a risk of ignoring structural forces that affect labor markets over the course of industrialization, but also of ignoring those classes of workers – such as slaves, women, and children – whose voices are least likely to be preserved. A more general account of entrepreneurial behavior calls for attention to historical shifts in labor market institutions that affect the fate of these workers, while drawing out the implications of those shifts for the decline of small artisanal producers and retailers.

2.2 Institutions and Household Labor Pools

Whether viewed historically or in a present-day context, most business ventures tend to draw assistance from a close-knit circle of family members, friends, and other acquaintances. More so than financial assets or human capital, an entrepreneur's household size is a key determinant in the number of individuals they are able to recruit to work in their business (Ruef, 2010). Given a desire for workers or business partners who are easily accessible, low-cost, and familiar, the family or household labor pool becomes the fundamental unit of organization for many entrepreneurs (Aldrich and Cliff, 2003; Yang and Aldrich, 2014).

What remains to be added to this account, however, is the fact that household labor is deeply embedded in legal institutions and norms that affect both its scope and intensity. This is perhaps most obvious with historical hindsight. Well into the 19th century, unfree labor represented an essential means whereby entrepreneurs could expand their household labor pool. In Anglo-American law, the institutional basis for this labor source was the master-servant relationship. As Steinfeld (2002: 59) highlights, "a master's jurisdiction over his resident servants flowed in the first instance from his status as head of household, but it also flowed from a decision by the community that right order was served by giving heads of household jurisdiction over those among the laboring poor who were not settled … and might otherwise constitute a source of disruption".

The pre-industrial entrepreneur could thus develop his household labor pool through several sources of bound labor, including apprentices, indentured servants, and, in some contexts, slaves.

During the early modern period, craftsmen and small manufacturers were especially likely to choose apprentice labor. When facing cash flow constraints, entrepreneurs could recruit apprentices, who would not have to be paid wages in regular intervals, in lieu of wage-earning journeymen. Apprentices were typically adolescent males who were contractually bound to a master, who lived in the master's household, and who worked in exchange for food, housing, and training. Although apprenticeship in Europe was closely associated with craft guilds, the master-apprentice system in America thrived in the absence of a guild organization. As Wilentz notes in his treatment of industrialization in New York City, "apprenticeship remained a standard arrangement in 1820, when employers estimated that between six and eight thousand apprentice boys served local producers" (2004: 28). The typical arrangement in question involved the indenture of a boy in his early teens who would work for a craft entrepreneur for a period of seven years.

In British North America, the institution of indentured servitude offered another pool of unfree labor within the entrepreneurial household. Among economic historians, it is now widely acknowledged that colonial entrepreneurs drew "on the continuing arrival of bound immigrant workers as one of their principal sources of employable labor", with an estimated half to two-thirds of white immigrants arriving under indenture before the American Revolution (Grubb, 2011: 197; Galenson, 1984). By the post-colonial period, the indenture system had evolved from supplying unskilled laborers who were suited to work in rural agriculture and husbandry to those who could offer skilled crafts and services in urban ventures. Statistics from the Philadelphia market, for instance, suggest that a third of indentured servants were acquired by merchants, shopkeepers, or service proprietors, while a fifth were acquired by manufacturing entrepreneurs. Most of the servants (83%) were single, with a majority comprised of young males or boys who lived with their masters (Grubb, 1985).

Slaves likewise constituted an important labor source for early entrepreneurs. Slavery in the United States is often uniquely associated with the plantation system of the American South, but a number of Northern states had substantial slave populations and only gradually abolished the institution of black bondage between the colonial era and early Republic (Ruef, 2014). In New York City, for instance, the 1790 Census identified over two-thousand slaves, representing two-thirds of the city's black population. Nearly one out of every five white households relied on black slave labor, with slave ownership being especially prevalent among merchants, shopkeepers, and manufacturing artisans (White, 1991). Like the contracts for apprentices and indentured servants, slaves were also assets on the balance sheets of entrepreneurs, to be sold, mortgaged, or hired out as business conditions might dictate (e.g., Kilbourne, 1995).

While these forms of bonded labor varied considerably in their degree of coercion, the property rights they accorded to employers, and their accompanying racial ideology, they shared a common institutional foundation in Anglo-American law: the master-servant relationship. This legal category could be traced to the seventeenth and early eighteenth century in England, when civil law began to recognize it as one of the fundamental relations in the household, along with "husband and wife" and "parent and child" (Tomlins, 1993; Steinfeld, 2002). In contrast to contemporary discourse regarding "hirelings", it implied a hierarchical relationship between superior and subordinate, such that a putative employer exercised legal authority over a subordinate, rather than simply exercising the economic power that could be wielded with wage payments (Steinberg, 2016). This source of control was essential to pre-industrial entrepreneurs – not only could they readily extend their labor pool beyond close family members in the household, but they were also able to intensify work effort beyond what would be expected from material incentives alone.

The legal category of master and servant encompassed marital and familial relations within the household. As Amy Dru Stanley (1998) has pointed out, husbands enjoyed property rights in the service of their wives and marriage itself was construed as a bond rather than a contract. This legal relationship drew on a long-standing conception of "the household as a hierarchically arranged polity", with wives, children, servants, and slaves all equally subject to the jurisdiction of the

(typically male) household head (Steinfeld, 2002: 56). Such authority was augmented in cases where the household head owned real estate or business property, since "proprietorship in the resources of land and houses incorporated rights over the persons and labor of household 'dependents'" (Blackmar 1991: 2).

Of course, pools of household labor could not be treated as interchangeable by entrepreneurs. In the late 18th century United States, for instance, a cult of domesticity increasingly proscribed the involvement of middle- and upper-class women and girls in commerce, yielding separate spheres of work and home life. Under this bourgeois ideal, the head of household enjoyed a right to the household labor of wives and daughters that was unsullied by market relationships (Stanley, 1998). The labor of slaves, male servants or apprentices, and sons, however, could readily be deployed in the service of business enterprise.

2.3 Institutional Change and the Decline of the Small Entrepreneur

Despite the importance of unfree household labor to small entrepreneurs, the political movements of the late 18th and early 19th centuries increasingly rendered it dissonant with the democratic ideals of Western societies. France abolished long apprenticeship in 1791. In 1814, England repealed the Statute of Artificers, which stipulated a seven-year term for apprenticeship, and curtailed indentured servitude by legislation in the late 18th century. Spurred by the American Revolution, all of the New England and mid-Atlantic states commenced the emancipation of slaves between 1777 and 1804 (though in some cases, the freedom of bondsmen and women would not be complete for decades to come). While indentured servitude remained formally legal in some parts of the Americas until 1917, it was seldom used for purposes of transatlantic migration after the 1820s. Meanwhile, challenges to the authority of master craftsmen, as well as poaching by opportunistic employers, contributed to the decline of apprenticeship in North America and its substitution by wage labor (Epstein, 1998; Galenson, 1984; Hamilton, 2000; Rorabaugh, 1986; Ruef, 2014).

Underlying these diverse trends was a profound historical shift in the legal institutions governing the employment of labor, from ones of bondage to ones of voluntary contract (Stanley, 1998; Steinberg, 2016; Tomlins, 1993). By the middle of the nineteenth century, American and European observers had come to think of labor in contractarian terms, "as the simple product of a voluntary agreement between juridical equals" (Steinfeld, 2002: 16), though the law remained an important tool for employers to exercise discipline over their workers (e.g., Steinberg, 2016). So conceived, the new institutional basis of labor challenged the ability of entrepreneurs to constitute their workforce as dependent members of a household labor pool, particularly ones who could be held against their will. With the notable exception of the American South, entrepreneurs increasingly had to invoke the economic power of wages or threat of legal sanctions to persuade autonomous workers to do their bidding, rather than relying on corporal punishment or traditional authority to compel labor.

The institutional changes in labor markets had far-reaching consequences for the workforce that businesses could draw on. Throughout the American Northeast, apprentices and journeymen, who had previously been integrated in household production, were replaced by wage workers who lived away from manufactories and shops. In Philadelphia, the percentage of the workforce that was unfree (in large part due to indentured servitude) fell from nearly 40 percent around 1750 to negligible numbers in the early 19th century (Salinger, 1987; but see Grubb, 2011 for a critique). Freed blacks and waves of desperately-poor immigrants offered a growing source of wage labor. As Tilly and Scott (1987) have demonstrated in their study of industrializing England and France, the demand for wage labor also transformed the working lives of women, though not necessarily their social position. In American cities, such as New York, the first two decades of the 19th century still displayed a "dearth of women's wage work", instructed by a culture of domesticity where "the honorable artisan [was] expected to be the family bread-winner"; strikingly, by 1850, one-third of New York's manufacturing labor force was comprised of female wage earners (Wilentz, 2004: 51, 118).

The institutional change in labor markets over the course of industrialization suggests that small business ownership and success may have been strongly influenced by the demographics of household labor resources. In the early stages of industrialization, access to slaves or dependent male labor could substantially increase the probability that an individual was able to run a business. But in the later stages of industrialization, access to female and (adult) male labor would become important, particularly if such workers could be obtained within the household in lieu of a competitive market for wage labor.

As labor and financial historians have emphasized, the shift away from unfree labor was unlikely to affect all entrepreneurs or all sectors of the economy equally. The small entrepreneurs in the crafts and retail trades were especially ill-equipped to adapt to the new world of wage labor (Rock, 1979). Liquidity constraints meant that petit entrepreneurs, who once may have inherited slaves or indentured servants (or who were able to reimburse apprentices with training in skilled trades), often did not have the access to capital or credit to pay wages on an ongoing basis. As Bodenhorn (2003: 486) notes, "small-business finance in early America was bank-based", with bond, equity, and commercial paper markets limited to corporations and large mercantile houses. Even for bank loans, the loan terms remained heavily influenced by long-term relationships between banks and firms, favoring more established entrepreneurs. Looking at data for Philadelphia's Bank of North America, Wright (1999: 54) estimates that one in ten artisans received loans in 1790, but only one in fifteen received loans in 1800. The chartering of new banks aimed at artisans helped expand the customer base, but the Panic of 1819 again restricted the flow of loans and credit to small entrepreneurs. Given ongoing cash constraints in paying wage workers, it is little wonder that court cases involving new freedoms for bonded labor were bitterly fought by small entrepreneurs between 1810 and 1835 (Rorabaugh, 1986).

In the past, economies-of-scale had favored the business owner who could accommodate slaves, servants, and apprentices within an existing household. Urban slaves were placed in the cellars or attics of masters' homes and given left-over meals and cheap homespun apparel (White, 1991). Small entrepreneurs were especially likely to benefit from household economies-of-scale if the

stigma of co-occupancy with bound workers and slaves was greater among wealthy manufacturers or merchants, who were more inclined to build separate quarters and purchase separate rations and clothing for their workers. The difference in household economies-of-scale would disappear in the new marketplace for wage labor, in which all workers had to obtain subsistence wages that would support accommodations, food, and clothing independently from their employers.

These mechanisms involving liquidity constraints and household economies-of-scale suggest that entrepreneurs with limited wealth were historically more likely to choose unfree and other household labor than entrepreneurs with large amounts of capital. If so, the contraction of those sources of labor during the Industrial Revolution would have had a disproportionate and adverse impact on the ability of individuals with modest assets to start and run their own businesses. More generally, the theory predicts that any institutional change that reduces the extent of the household labor pool -- or the degree of patriarchal authority that the head of household exercises over it – will also diminish the ability of small entrepreneurs to stay in business.

3. Methodology

3.1 Setting

New York City offers a prominent example of metropolitan industrialization in the United States between the late 18th and mid-19th centuries (Rock, 1979; Wilentz, 2004). Symbolically, the city marked the beginning of the Industrial Revolution in 1789 with the arrival of Samuel Slater, a British industrial spy often heralded as the "Father of the U.S. Industrial Revolution" (Licht 1995). While Slater soon departed for Rhode Island to begin the Slater factory system, New York City – even more so than New England – became the heart of American industrialization. In 1810, the city already hosted many of the brewing, refining, and shipbuilding enterprises in New York State, second only to Pennsylvania in the value of its manufactures (U.S. Census Office, 1814). By 1850, New York was the most populous city in the United States and identified as "a largely manufacturing town", with 3,387 workshops and factories, $34 million in capital invested in

industry, and 83,620 manufacturing workers (Lossing, 1884: 606), employing more residents in manufacturing than any other U.S. city. Coupled with its diverse array of retail, wholesale, and hospitality businesses, New York provides an informative context in which to study the evolution of entrepreneurship before the Civil War.

Although the periodization of the first industrial revolution in the United States is necessarily inexact, a fairly common focus among economic historians is the period between the American Revolution and mid-19th century (e.g., Cain, 2010). In the Northeast, the business historian Alfred Chandler located the rise of mechanization more precisely in the 1830s and early 1840s, when the opening of anthracite coal fields encouraged the diffusion of steam power in many locales that lacked harnessable water power. The transportation infrastructure for anthracite was enhanced considerably with the completion of several major canals between the coal fields and New York City. Soon thereafter, the supply of coal offered the possibility of urban industrialization in the city and other large eastern seaports, which could now rely on a domestic source of high-quality fuel that would service their industrial and household needs, rather than using charcoal and wood or imported bituminous coal (Chandler, 1972).

This setting and time period also allows us to consider the impact of changes in labor market institutions on the city's entrepreneurial households. In 1790, slave-holding, indenture, and apprenticeship were entrenched in New York (White, 1991; Wilentz, 2004). Prompted by abolitionist mobilization, the Gradual Manumission Act of July 4th, 1799 ordered that the children of slaves born after that date were free, provided that male children remained in service until the age of twenty-eight and female children until the age of twenty-five. In 1817, all slaves born before 1799 were freed and, in 1827, slavery in New York was fully abolished. For slave owners, a notable restriction during gradual emancipation was that they could continue to employ slaves as laborers in their businesses and households, but were prohibited from selling or exporting slaves to other states (White, 1991).

Indentured servitude and apprenticeship were also gradually phased out in the decades after the American Revolution, though they persisted to a remarkable extent for certain demographic groups.[3] While the institution of apprenticeship remained robust in New York during the early 19th century, legal challenges to the master-servant relationship increasingly substituted cash payments for the transfer of human capital between tradesmen and apprentices. In the 1820s, apprenticeship was dissolving into a "glorified form of juvenile wage labor" for youths taken from the city's impoverished families (Wilentz, 2004: 33). By the late 1840s, reports of widespread child vagrancy led the board of governors of the New York Almshouse to favor indenture or apprenticeship outside the state entirely.

3.2 Data

My historical data build on this periodization in order to consider the relationship between households and entrepreneurship before, during, and after these labor market transformations in New York. The data set encompasses household Census data and matched property valuations in three cross-sections: 1790 (before the institutional changes), 1810 (during), and 1850 (afterward). For purposes of sample definition, I focus on heads of household who resided in New York City. The sample thus excludes individuals who were not heads of household or who owned businesses (or other property) in the city, but did not live there.[4]

In 1790 and 1810, the data include a complete enumeration of the households featured in the Census of New York City (Willis, 2000), along with linked tax records. The heads of household were matched, by first name, surname, and location (i.e., ward), to the property tax assessment records for the city, identifying both residential and business properties. This procedure resulted in a sample of 5,968 resident heads of household in 1790 and 17,443 resident heads of household in 1810, along with linked lists of property. Complete household enumeration was also available

[3] A peculiar feature of the Gradual Manumission Act was that it "freed" the children of slaves only to redefine them as indentured servants for a specified period of service.

[4] Both exclusions are necessary due to data limitations. Aside from household heads, early American censuses did not identify household members by name, preventing linkage to other records. Information on household composition is missing for property owners who are non-residents.

for the third cross-section, using the 100% Census data in the Integrated Public Use Microdata Series (IPUMS) (Ruggles et al., 2015). These data include 93,840 resident heads of household in 1850, excluding individuals in group quarters aside from rooming houses and hotels. Since the 1850 census collected basic information on real estate ownership, no further linkage to tax assessments was conducted for this cross-section of data.

To obtain additional insight into the use of technology among artisans and manufacturers, I also drew a sample (~5%) of establishments from the Census of Manufacturing in 1850, using the data collected by Bateman and his colleagues (2004). The sample encompasses 195 workshops and manufactories in the city. While the IPUMS data enumerates a sample of households – including those individuals who were and were not small business owners and who were and were not in manufacturing – the sample from the Census of Manufacturing focuses on New York City's industrial enterprises in particular.

Table 2 summarizes the data used for each of the three cross-sections, along with the 1850 Census of Manufacturing.

[Insert Table 2 About Here]

3.3 Measures of Small Business Ownership

The key outcome of interest is whether a given head of household runs his or her own business. On this basis, one definition of entrepreneurship relies on tax assessments to enumerate properties that are identified as manufactories, shops, or other real estate devoted to urban business activity, as well as the proprietors who operate them. I located 1,617 businesses owned by individuals in New York City in 1790 and 1810, including 253 manufacturing enterprises and 1,364 retail, service, or hospitality businesses.[5] Consideration of historical trends led to the exclusion of two

[5] Given my emphasis on linking properties to households, I excluded properties owned by business partnerships or corporations (207 in 1790 and 1810 combined).

types of businesses: farms and boarding houses/tenements. While New York featured a small number of farms within city boundaries during the early Republic, the city's population boom soon displaced these agricultural enterprises. By the early 19th century, surging demand for housing prompted many residents to become landlords (Blackmar, 1991). To avoid period-specific effects of population expansion on estimates of entrepreneurial activity, I remove both of these forms of business activity in favor of a focus on urban manufacturing, retail, and services. Aggregating from business properties to individuals as the unit of analysis, this led to the identification of 1,455 business owners total in New York City in 1790 and 1810, including some who operated more than one business. 628 of those business owners were resident heads of household in 1790 or 1810. For 1850, I classified business owners similarly based on those who (a) owned real property; and (b) were involved in entrepreneurial activity, aside from farming and property rentals. This led to the identification of another 2,376 entrepreneurs in the 100% household census.

Historically, a considerable amount of manufacturing and other business activity occurred in residential properties, rather than buildings or structures that were visibly designated for commercial use. As Blumin (1989) has documented in his analysis of turn-of-the-century (1800) Philadelphia, less prosperous manufacturers and shopkeepers tended to have workshops, retail displays, and living space in close quarters. In many cases, moreover, such space was rented rather than owned by small entrepreneurs. As a result, enumeration of businesses via property tax assessments may miss much of the entrepreneurial activity during early industrialization. An alternative definition focuses on occupations that were especially likely to lead to brick-and-mortar business proprietorship, including the artisanal trades, shopkeeping, high-end service trades, and independent professions (Ruef and Reinecke, 2011). The number of household heads with these entrepreneurial occupations are shown in Table 2.

3.4 Explanatory Variables

The explanatory variables of theoretical interest involve the household pool of labor that an individual has access to and the extent to which they have access to wealth, particularly capital

that can be invested in a business. The *labor pool* is assessed as the composition of each sampled household in New York in terms of four categories drawn from the Federal census: (a) number of slaves; (b) number of young white males under the age of sixteen (including apprentices); (c) number of adult white males and free blacks; and (d) number of white girls and women (of any age). In this historical setting, categories (a) and (b) were the primary sources of unfree or dependent labor, while categories (c) and (d) emerged as important sources of wage labor. For my analysis of New York City's manufacturing establishments, I also construct a generic measure of the workforce, which combines male hands, female hands, and children or youth who were employed by an artisan or manufacturing entrepreneur.

Capital is assessed in terms of the value of real estate and personal property held by each head of household. A 1788 act of the State of New York required that "assessors of each respective ward in the city of New York … proceed to inquire into the value of the real and personal estate, of every freeholder, inhabitant and resident" (State of New York, 1788). Real property involved the valuation of buildings and land. Because such property was often used as the physical site of a residence or business, I treat it as capital that is not liquid. Personal property included items such as money, equipment, livestock, vehicles (e.g., carts, coaches, and river vessels), household furniture, and jewelry (ibid, 1799). Because such property could be readily sold or converted into the working capital of a business, I treat its value as liquid. The federal Census of 1850 employed a parallel distinction, tabulating the value of real estate separately from the value of personal property. To ensure comparability in the multivariate analyses, the valuation of property was converted to standardized (z) scores within each cross-section.[6]

The *mechanization* of manufacturing businesses was assessed through the source of power that entrepreneurs relied on, distinguishing between steam (mechanized production) and hand or

[6] To ensure that the multivariate analyses were not unduly influenced by outliers, I removed household heads with very large real estate holdings (z-scores over 25). The assessment of personal property included the value of slaves and other bonded workers. Consequently, this measure permits us to separate the use of bonded workers as capital (e.g., as a source of credit for businesses) from the use of bonded workers as labor.

animal power (pre-industrial production). In each enterprise, the source of power was identified directly in the Manufacturing Census for New York City.

3.5 Additional Variables

The multivariate analyses include dichotomous controls for the gender and race of each head of household, since visible instances of entrepreneurial activity were often discouraged for women and free blacks in antebellum New York. The analyses also consider whether a head of household was listed as a resident in a previous Census and, if so, whether they appeared as a business owner in that year's tax assessment. These controls account for the possibility that residential stability and prior business ownership could affect subsequent entrepreneurial activity, whether through the individual accumulation of social and financial capital or the participation of these residents in self-aware "entrepreneurial generations" within the city (Lippmann and Aldrich 2016).[7]

Selected models control for the ethnicity of household heads. While early Censuses did not collect data on nativity or ethnicity, name-based methods of ethnic classification can be effective when such data are not available (Mateos, 2007). I linked first names and surnames in New York to ancestral groups of origin based on their ethnic predictability in the 1850 Census. A multinomial logit model accounts for the nativity of foreign-born residents in six categories: (a) English; (b) French; (c) German; (d) Irish; (e) Scottish; and (f) Other. The names explained roughly 32% of the variance in nativity and correctly classified about two-thirds (64%) of foreign-born residents across these categories. The same model was then used to predict the ethnicity of household heads in the 1790 and 1810 Censuses. Examples of names with a high degree of ethnic predictability include "Patrick Fagen" (Irish) and "Christian Schultz" (German). For all household heads, this procedure yielded six ethnicity variables, with a degree of membership in each ethnic category that varied from 0 to 1.

[7] These variables are necessarily coded as zero in the first cross section (1790) of the study. This is not especially problematic given the substantial impact of the Revolutionary War. Fires burned much of New York City in the late 1770s and the remaining buildings frequently changed hands between military troops and residents. After British soldiers finally departed in 1783 (along with 8,000 loyalists), most of the businesses in the city were de novo.

The analyses of business ownership incorporate controls for the primary industrial sector in which each household head is employed, including (a) manufacturing; (b) sales or service; (c) professional or white-collar; and (d) other (including land owners and farmers). Given the centrality of manufacturing in the Industrial Revolution, this sector is of particular interest and receives separate treatment in some analyses.

3.6 Model

The outcome of theoretical interest is dichotomous and is modeled using logistic regression. The odds that a household head is a business owner are specified as:

$$\frac{p(E)}{1-p(E)} = \exp(a_t + b_{1t}L_U + b_{2t}L_W + b_{3t}C_R + b_{4t}C_P + b_5 C_R \times L_U + b_6 C_R \times L_w + b_7 I \ldots b_n X_n) \quad (1)$$

Where *t* indexes the time period of the cross-section, L_U is the count of dependent or unfree laborers in the household (e.g, slaves), L_W is the count of wage workers (or potential wage workers) in the household, C_R is the capital that the head of household owns in real property, C_P is the capital that the head of household owns in personal property, I is the industrial sector that the head of household is employed in, and X_n indexes control variables (e.g., gender, race, ethnicity of household head). In order to address the heterogeneous effect of different labor pools, analyses generally differentiate L_U and L_W into more precise demographic groups.

3.7 Missing Data

Due to the pervasiveness of missing data in historical research, two aspects of the data received special consideration. First, it has been well documented that descriptions of occupational structure in early American cities tend to undercount certain occupations, especially among unskilled and manual laborers (Oestreicher, 1994). To analyze the extent of the bias, I assigned each household head in the New York City census to their ward of residence (which serves as a proxy of economic status) and further segmented this population into white males and other heads of household. I then compared the distribution of the census population to the corresponding entries in *Longworth's City Directory*. In 59% of the ward segments, the occupational directory entries reasonably approximated the distribution of cases in the federal census. However, in the remaining ward segments, undercounting of household heads was more severe, especially in the poorer wards of the city. I weighted the data in 1790 and 1810 to account for this bias and recalculated estimates of occupational prevalence. As shown in Figure 1, the aggregate estimates of the proportion of individuals employed in entrepreneurial occupations are only slightly lower with the weighted than the unweighted data.

A second missing data issue affects the assessment of capital among New York City households. Due to the importance of real estate in early tax assessments, social historians have found real property valuations in New York to be fairly complete and reliable (Klein and Willis, 1985). For a number of reasons, assessments of personal property appear less complete. Combining tax assessments from 1790 and 1810, around 20% of New York City's properties did not have any valuation of the personal capital on the premises. Despite this limitation, the value of personal estates inventoried within specific properties was fairly predictable, varying as a function of real estate value, the ward within which the property was located, the type and utilization of the structures on the property, the gender of the owner, and whether the property was owner-occupied. The following analyses draw on these regularities to impute the value of personal estates in properties where no assessment was reported. The personal capital of each head of household is

then defined as the total valuation of personal estate found in all of their New York City properties, excluding the personal items of any tenants.

4. Results

Several features of entrepreneurship can be observed in the descriptive statistics on New York City businesses and residences, along with linked data on household demographics (Table 3).[8] Comparing businesses and residential properties, the table shows that households with businesses tended to be larger across several demographic categories, with more slaves, more adult white males and free blacks, and more white females. The business properties also tended to be valued more highly than residential properties, in terms of both their physical plant (buildings and land) and the other capital that owners invested in them. From this tabulation, it is unclear whether business owners tended to have larger pools of household labor net of wealth, or whether their greater wealth simply allowed them to support larger households.

[Insert Table 3 Here]

The table also suggests two salient trends that affected New York's business owners between 1790 and 1810. One was the declining availability of slave labor during the period of gradual emancipation. On average, each household head with a business had one fewer slave worker in 1810 than in 1790. This contraction was not compensated by the expansion of any other category of household labor: the total household size of New York's business owners averaged 8.76 individuals in 1790 and only 7.40 in 1810. Those entrepreneurs seeking to run equivalent businesses in the midst of gradual emancipation would either have needed to do so more efficiently, or turn to non-household (wage) workers as a source of labor.

[8] Since these statistics are tabulated with properties as their units of analysis, they can only be observed in 1790 and 1810. Subsequent analyses aggregate to the level of heads of household and, thus, also include information from the 1850 census.

The other trend was the increasing capital cost for the physical site of businesses. While all real estate was subject to inflation (owing to population growth in New York), scale and location drove up the price of business properties to a greater extent than residential properties. In 1790, the average business property was valued at 33% more than the average residential property; in 1810, the average business was valued at 53% more than the average dwelling. In terms of other capital assets, there was no corresponding increase. The valuation of capital aside from real estate averaged 80% more in business properties than residences in 1790. By 1810, the premium assigned to equipment and personal property in businesses averaged merely 58% over those in residential properties.

4.1 Entrepreneurship and Household Labor Pools

The implications of trends in household labor composition can be drawn out more fully by aggregating the data from properties to heads of household in New York City and controlling for individual attributes. Table 4 summarizes the results from models that analyze the odds of brick-and-mortar business ownership. Pooling all of the data across years, a baseline specification (Model 1) shows that business ownership was far more likely among household heads who were male, white, wealthy, or residents in a previous census. The next model (2) reflects the association between household composition and the likelihood of business proprietorship, net of the real wealth and demographic characteristics of the household head. The estimates suggest that the odds of proprietorship increased significantly with the expansion of the household labor pool, by 5% for every additional adult white male or free black in the household and roughly 9% for every additional young white male. On average, the largest effects can be found among households with slaves, who increased the odds of business proprietorship in New York City by 12% on a per capita basis, and white women, who increased the odds of business proprietorship by 21% per capita.

[Insert Table 4 and Figure 2 Here]

Model 3 and Figure 2 show how the effects of different labor pools in the household varied by time period, after obtaining the estimates for the same pooled sample but with time interactions. Slave ownership was an important correlate of business proprietorship before the period of gradual emancipation, increasing the odds of proprietorship by nearly 20% in 1790. Notably, this does not appear to be due to the function of slaves as a source of credit or collateral, since the estimate is almost identical in models that control for the valuation of slaves and other personal property.

The relevance of white boys or youths in the household varies with institutional changes in the labor market for apprentices and indentured servants. In 1790, each additional white male under the age of 16 increased the odds of business proprietorship for the household head by 13%. By 1810, with declining rates of indenture, the effect of each additional male youth was negligible, before rising by the middle of the 19th century, when immigrant children again constituted a robust source of household labor (Schuman, 2017). These results support the thesis that the probability of business ownership was strongly tied to an individual's access to unfree or dependent labor during industrialization.

The results plotted in Figure 2 also indicate the growing importance of female workers over the course of industrialization in New York City. In 1790 and 1810, the presence of white women in the household only had a modest impact on the odds of business proprietorship on the part of the household head. By the middle of the 19th century, each additional female increased the odds of proprietorship by more than 25%.

To what extent did these institutional shifts in labor markets have a differential effect on poor and wealthy business owners? Model 5 groups the pools of household labor into two categories – unfree (slave) labor and all other household labor – and estimates the interaction effect of both variables with the real wealth of heads of household. Since these interaction effects cannot be tested or interpreted readily as regression coefficients (Ai and Norton, 2003), I examine them using predicted probability plots, holding all other covariates at their means. Figure 3 shows how the probability of being a business owner in New York varied with real property assets and the number

of slaves in the household. Among households with no slaves, the probability of business proprietorship rose predictably with wealth, from 2% for a head of household at the mean of the real property distribution (z-score = 0) to 11% for a head of household who was two standard deviations above the mean. The addition of one slave increased the probability of business proprietorship across the wealth distribution, but the addition of two or more slaves had a disproportionate effect for household heads with limited real wealth. For example, a New York City resident at the mean of the real property distribution is estimated to have nearly tripled his or her probability of business proprietorship with the increase from zero to two or more slaves, while a resident located two standard deviations above the mean is estimated to have merely multiplied his or her probability of proprietorship by a factor of 1¼. Since Census records in 1790 and 1810 reveal that households of below-average wealth represented more than half of the city's large-scale slave-holders (with two or more slaves), the aggregate effects on entrepreneurship in New York were substantial.[9]

[Insert Figures 3 and 4 Here]

Figure 4 shows the probability plot for the interaction between real wealth and the size of the household labor pool. Among the less wealthy New York City residents, we again observe a disproportionate increase in the likelihood of business ownership when there is a large pool of household labor. At the mean of the real property distribution, the probability of business proprietorship almost quintuples as a household expands from less than three members (excluding slaves and the head of household) to six or more members. For a household with real property assets at two standard deviations above the mean, the corresponding increase in the probability of business proprietorship is just over 80%. As in the case of slave ownership, this points to the value of dependent household labor among small business owners, particularly those who had few options to hire wage labor in an external market. The disproportionate boost to proprietorship was especially apparent in large households, but even among mid-sized households (with three to five

[9] The prevalence of slave-holding in households with limited real property may be accounted for by a number of factors. Less wealthy residents may have inherited slaves from family members, they may have saved money to buy slaves as one-time purchases, or they may have invested in slaves in lieu of real estate.

members, aside from the household head), the labor pool served as a greater catalyst to entrepreneurship for the poor than wealthy New York City residents.

To consider the robustness of these results, I also estimated the same models with a household head's membership in an entrepreneurial occupation as the outcome. With respect to the household labor pool, slave ownership remained a potent predictor of entrepreneurship, increasing the odds of activity in an independent trade by 29 to 43 percent (per slave) before the completion of emancipation in New York. Dependence on slave labor also continued to differentiate poorer residents of the city from their wealthier counterparts, who were more likely to enter entrepreneurial trades without slaves in their households. Such distinctions appeared less important for other categories of household labor (white male youth, white females, white adult males and free blacks) when entrepreneurial activity is assessed on an occupational basis.

4.2 Entrepreneurship, Capital, and Technology

Despite the decreasing size of entrepreneurial households in New York City, as well as institutional changes restricting the use of coerced or dependent labor, there is little evidence of capital-labor substitution. Indeed, multivariate analyses point to an opposing trend in the salience of liquid capital assets. In 1790, a city resident who increased the value of his or her personal property by one standard deviation in the wealth distribution is predicted to have experienced an 81% increase in the probability of business proprietorship. By 1810, that estimate had dropped to a 17% increase in the probability of business proprietorship and, by the mid-19th century, access to liquid capital did not help residents in New York City become business owners at all. By contrast, capital held in the form of buildings and land did become more essential for business proprietorship in the 19th century, primarily as the city entered a population boom and business owners competed with other residents for space (Blackmar, 1991). Controlling for these trends leaves the effects of household labor pool composition largely unchanged.[10]

[10] Detailed results available on request from the author.

Trends in capital investment, labor, and technology can be tracked more precisely by focusing on the entrepreneurs who ran New York City's workshops and manufactories. A descriptive comparison of the data on manufacturing establishments with data on other business establishments indicates a number of notable differences (Table 5). While manufacturing and other businesses were linked to households of almost identical size and composition in 1790, they diverged in the two decades afterwards. The average household size for manufacturing enterprises declined by nearly three members (from 8.9 to 6.0), while the average household for other businesses only declined by one member (from 8.7 to 7.6). Manufacturing households were particularly bereft of women, who would emerge as an important new source of labor in 19th century urban production. Meanwhile, the scale of manufacturing enterprise – as proxied by the value of buildings and land devoted to manufacturing pursuits – was growing. In 1790, the average manufactory in New York City had a real property value that was 25% below that of the average business devoted to retail, wholesale, or services; by 1810, the mean property value of the two types of businesses was statistically indistinguishable. Over the same period, the capital invested in personal property and equipment in New York's manufacturing businesses failed to keep pace, and actually declined in nominal terms.

[Insert Tables 5 and 6 Here]

With the shift toward wage labor, several mechanisms suggest why investment in technology may have become *less* – rather than more – important for small entrepreneurs over time. One is that improvements in output could be achieved as a result of workers having greater skill using the same machines, rather than more or better machines (see, e.g, Bessen, 2012 on textile manufacturing). This may have been true, in particular, if the ranks of wage laborers were joined by former masters who could no longer maintain their own shops and manufactories. Second, entrepreneurs who employed slaves, indentured servants, or teenage apprentices in their businesses had to provide their workforce with the requisite tools of the trade. Wage-earning journeymen, however, often brought their own tools into the workplace, thereby reducing the capital outlays of entrepreneurs and dampening enthusiasm for the acquisition of expensive machinery.

The long-term impact of such disinvestment can be seen in the technological profile of New York City's manufactories that emerges in the 1850 Census (Table 6). Even at the end of the first Industrial Revolution, the great majority of manufacturing occurred by hand (or, in a few cases, animal power), with 87% of enterprises in the city operating without a central source of power. Many of these businesses were small neighborhood or garret shops, with fewer than twenty workers, concentrated in trades that could not easily be mechanized. Less than 7% of the city's manufacturing establishments matched the prototype of the industrial factory, operating with steam power and twenty or more workers. These factories tended to be concentrated in anomalous industries such as printing, where technological innovation in steam-powered presses was coupled with the substitution of wage workers for apprentices and skilled journeymen (Wilentz, 2004). As a rule, mechanization did not orient industry toward new pools of wage labor, such as immigrant and lower-class women. With increasing scale, non-mechanized manufactories displayed some growth in the percentage of their workforce that was female, from 21% among the smallest class of enterprises (with fewer than 6 workers) to 31% among enterprises with 20-49 workers. But the reliance of entrepreneurs on female workers did not rise consistently with scale in mechanized enterprises.

5. Conclusions

This article contributes to an active body of research on the historical evolution of entrepreneurship (e.g., Aldrich and Ruef, 2006; Haveman et al., 2012; Wadhwani and Jones, 2014), with a particular emphasis on household labor pools. Among historical social scientists, the transformation of labor markets has long promised an account of the profound shifts in entrepreneurship and work in the 18th and 19th centuries (Bendix, 2001; Smelser, 2006). Linking these institutional changes to more specific outcomes, such as the prevalence and composition of entrepreneurial households, has proven more difficult. This study offers a quantitative examination of these effects, looking at the shifting role of unfree and household labor among New York City residents over a sixty-year period. Net of access to capital, the results underscore the heavy reliance of the city's

entrepreneurs on slave labor and young boys in the early phases of industrialization. Given their household economies-of-scale and limited liquidity, access to unfree labor was especially important for the city's small artisans and shopkeepers. With the gradual emancipation of slaves and (*de facto*) end of apprenticeship and indenture, the labor supply for these entrepreneurs dwindled. In the later phases of industrialization, business proprietors were increasingly drawn from city residents who could hire wage workers, or substitute for them using women and girls from their households.

A notable limitation in drawing inferences from these findings is that the repeated cross-sectional data do not allow strong claims to be made regarding the causal impact of changing household labor pools on entrepreneurial behavior. At the micro-level, it is unclear whether the loss of slaves, indentured servants, or apprentices led to the abandonment of entrepreneurial endeavors, or whether former proprietors contracted their households once their businesses no longer seemed viable. More importantly, at the macro-level, the question remains whether the evolution of labor market institutions was exogenous to the demand for labor among urban entrepreneurs. Did wealthy business owners, who stood to benefit from the flexible supply of wage labor, advocate for the abolition of slavery and legal reform of indentured servitude and 'long' apprenticeship? A preliminary analysis of the names in the tax rolls of New York City suggests that this was not the case. The most vocal opponents of forced labor in the city were Quakers and active members of the New York Manumission Society, only one of whom was identified as a prominent business founder in 1790 and 1810.[11] A more thorough examination of abolitionist and labor movements would nevertheless be required to establish that change in the legal conception of the master-servant relationship was exogenous to entrepreneurial behavior.

The ability to generalize from the case of New York during the early American Republic is also constrained by the particular details of its historical context. New York City had a labor-intensive

[11] The identification of Quakers in the tax rolls is simplified by the fact that New York levied a special tax on them as conscientious objectors during this period (Willis, 2000). The subsample of abolitionists and Quakers features fifty-four heads of household and includes one prominent entrepreneur – Alexander Hamilton, the founder of the Bank of New York – who was a resident throughout this period.

seaboard economy, centered on small-scale manufacturing and commerce without ready access to harnessable water power. As Walter Licht (1995: 7) has observed, even in the pre-industrial period, the fortunes of New York and the surrounding mid-Atlantic states, "rested on bonded labor as much as on the energies of household members". Consequently, the path to industrialization in New York City is unlikely to map onto some iconic cases, such as the much-studied factory town of Lowell, Massachusetts. Nevertheless, in U.S. urban centers such as New York, Philadelphia, and Newark, an economy of small household producers persisted to a remarkable extent alongside the emerging corporations and larger mills of the nineteenth century (Licht, 1995; Scranton, 1983). Just as scholars of modern entrepreneurship have learned valuable lessons from the experiences of average entrepreneurs (Aldrich and Ruef, 2006), studies of historical entrepreneurship can advance by analyzing urban samples or censuses of entrepreneurs (e.g., Hershberg 1981), rather than simply focusing on large enterprises.

The theory and findings in this study have a number of broader implications. One concerns the relationship between entrepreneurial activity and the institutions that govern household labor. When viewed historically, there was tremendous variation in the ability of households to access markets for free and unfree labor. Entrepreneurs in Pennsylvania relied heavily on indentured servants rather than slaves (Salinger, 1987), while the South did not have a large market for wage labor until it was constructed by the Freedmen's Bureau in the aftermath of the Civil War (Ruef, 2014). In Britain, the classic Industrial Revolution was affected to a greater extent by the decline of traditional apprenticeship, rather than the end of slavery or indenture. Despite such heterogeneity, a common element involved the diminishing ability of entrepreneurs to draw on coerced or dependent workers who lived in their own households. While developed countries began to experience marked declines in the size of household labor pools with industrialization in the 19th century, many developing countries only witnessed sharp declines in household size starting in the 1980s (Bradbury, Peterson, and Liu, 2014).

Even in developed countries, entrepreneurship scholars have only recently begun to grapple with the contingent scope of the household and its implications for the creation of new ventures.

Institutions affect family systems through the likelihood of demographic transitions, such as marriage, divorce, childbirth, and retirement, as well as norms regarding family interaction (Aldrich and Cliff, 2003). Power dynamics within entrepreneurial households are especially sensitive to opportunities for external employment and gendered expectations regarding motherhood and fatherhood (Yang and Aldrich, 2014). All of these factors influence the ability of individuals to mobilize household members and encourage involvement and succession in entrepreneurship across generations (Lumpkin et al., 2011). By considering the malleable boundaries of households, we are better positioned to understand how entrepreneurs recruit participants in these intimate settings and how participation extends beyond traditional conceptions of kin to include cohabiting partners, tenants, roommates, and the like.

A final implication concerns the role of institutional mechanisms in disciplining labor and in introducing labor market frictions that affect transitions to entrepreneurship. In our historical setting, the power of the entrepreneur over household dependents is laid bare through the legal construct of the master-servant relationship and the presence of bound workers. In slightly more subtle ways, parallel institutional mechanisms operate in modern economies. Interns labor for startups without pay, believing that the transfer of human and social capital from entrepreneurs will provide a pathway to future employment (cf. Mazurak, 2013). Women are discouraged from entrepreneurship when work-family policies make conventional wage employment more flexible (Thébaud, 2015). Non-compete agreements in firms limit the ability of employees to start their own ventures or find employment elsewhere (Marx and Fleming, 2012). Like these patterns in today's businesses, our perspective suggests the potential insights that may be obtained from analyzing how household and labor market institutions have enabled and constrained entrepreneurial activity throughout history.

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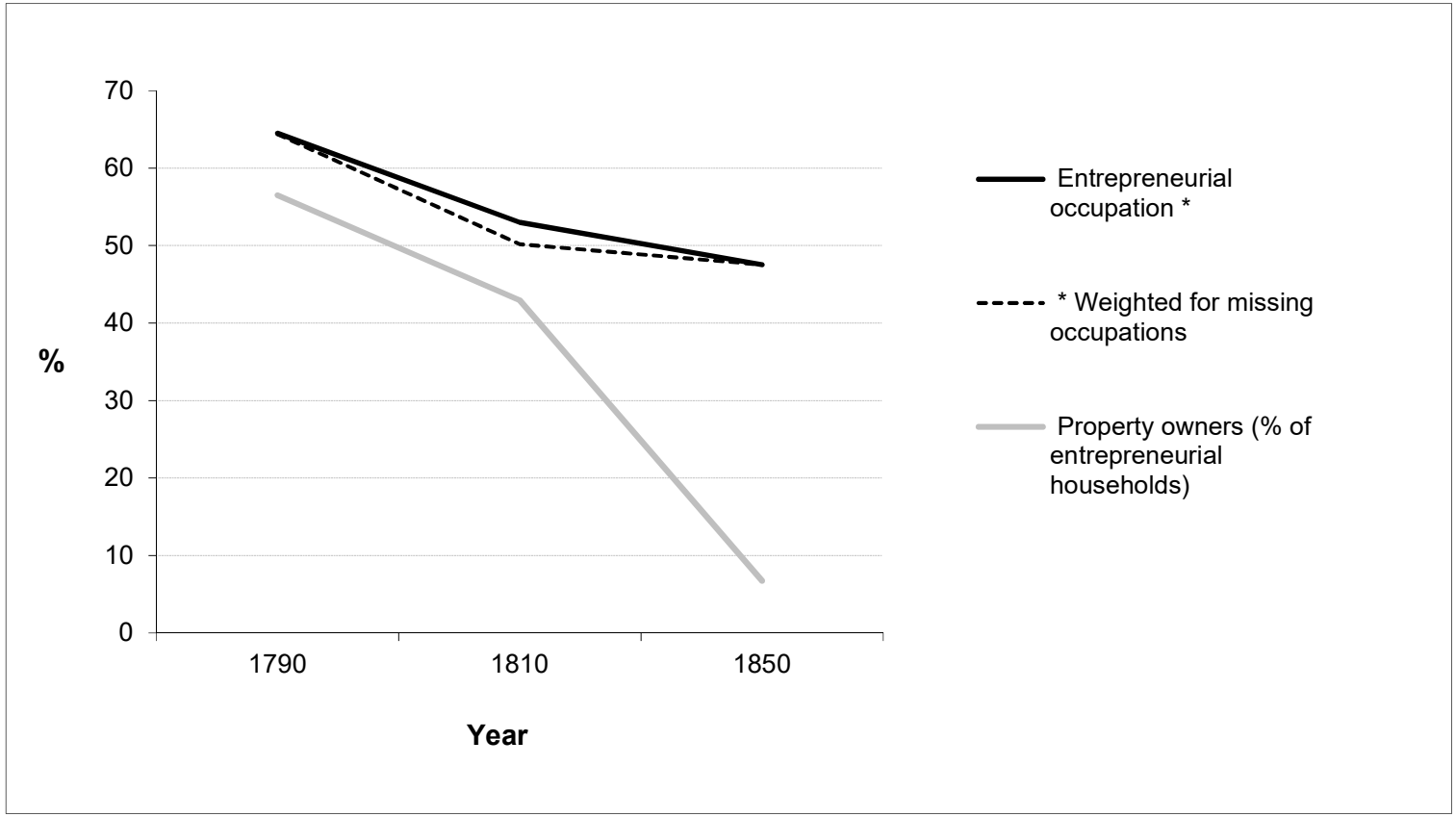

Figure 1. Entrepreneurs among entries in New York City directory or census, 1790-1850

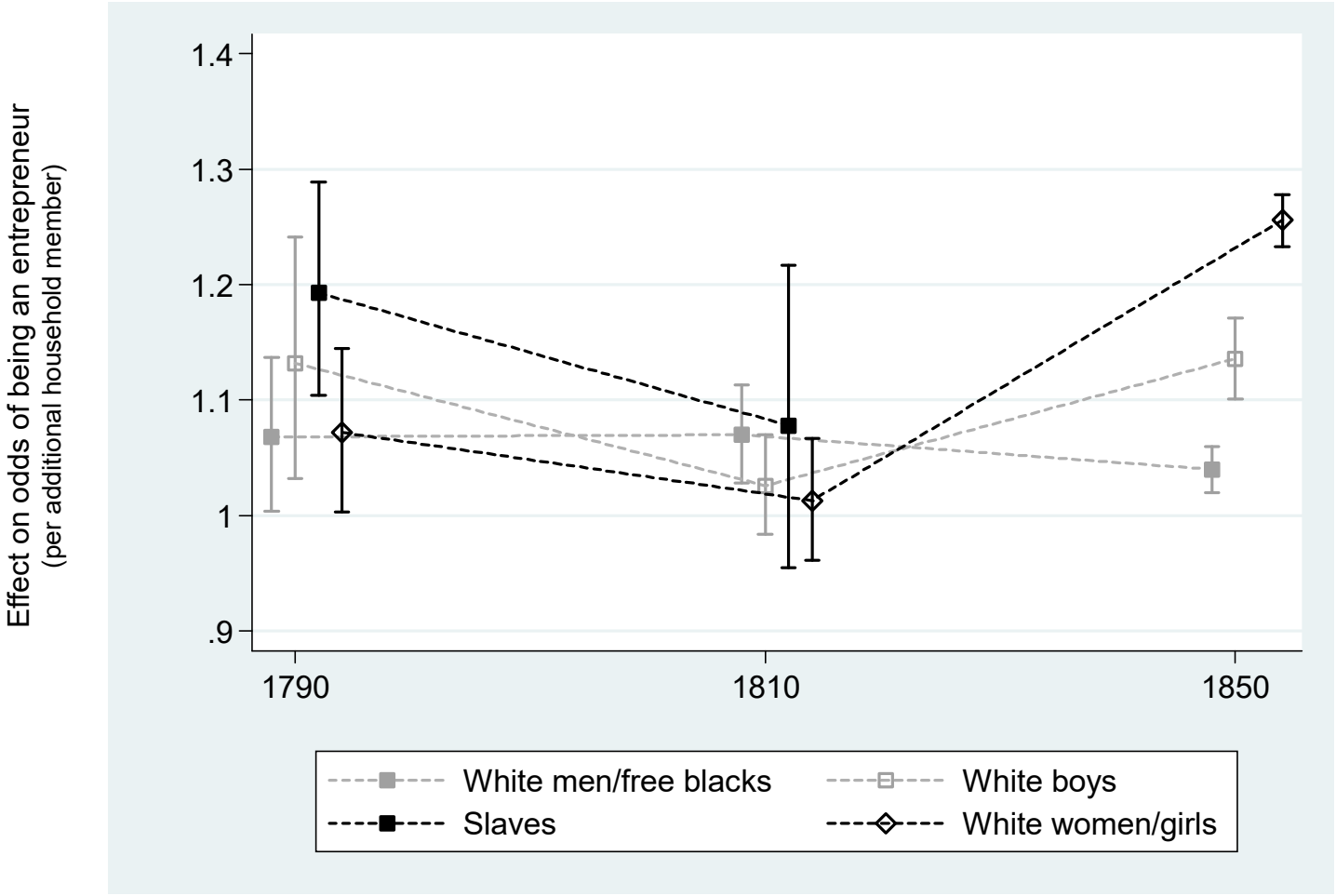

Figure 2. Importance of household labor pool to entrepreneurial activity in New York City, 1790-1850

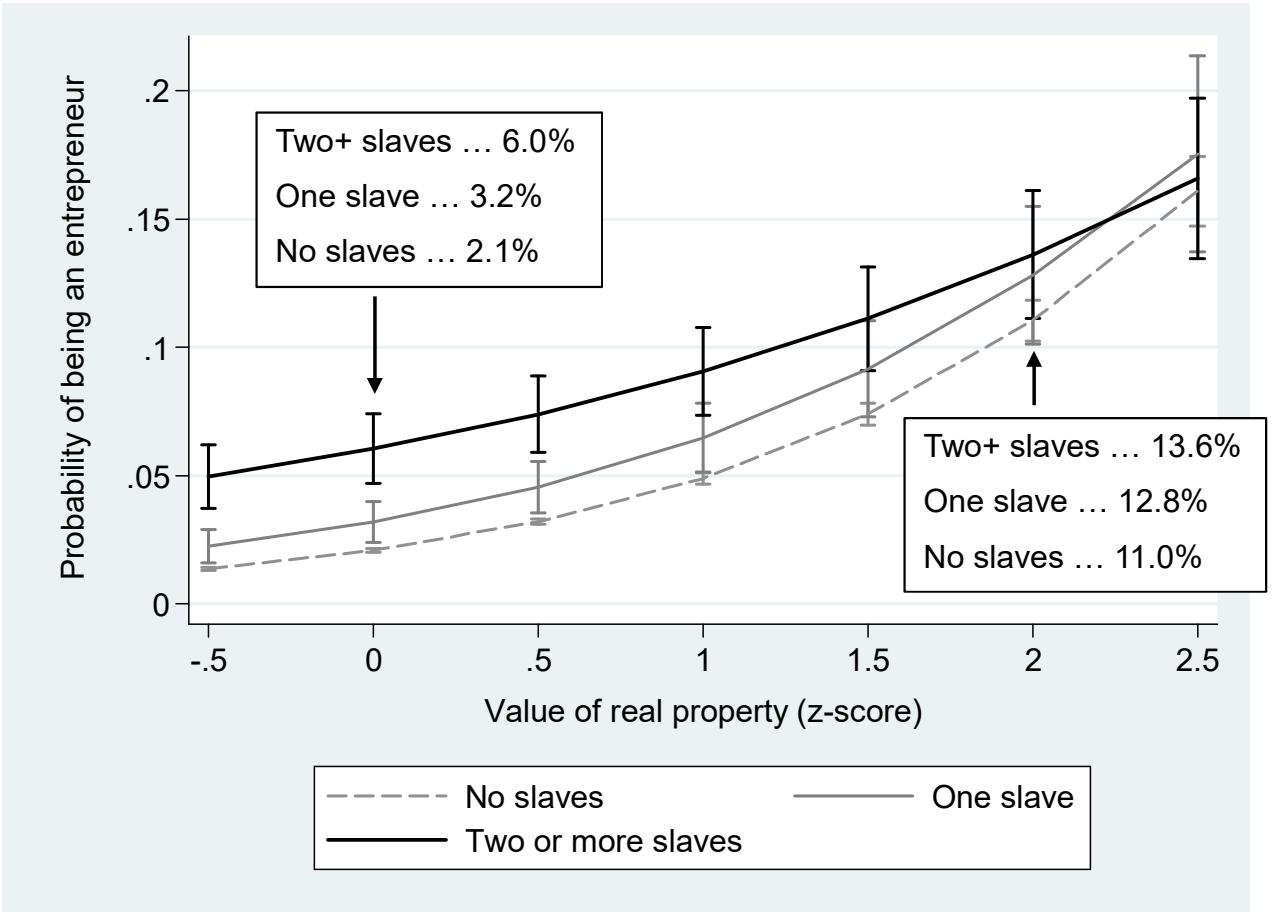

Figure 3. Interaction effect of wealth and number of slaves in household on probability of being an entrepreneur in New York City

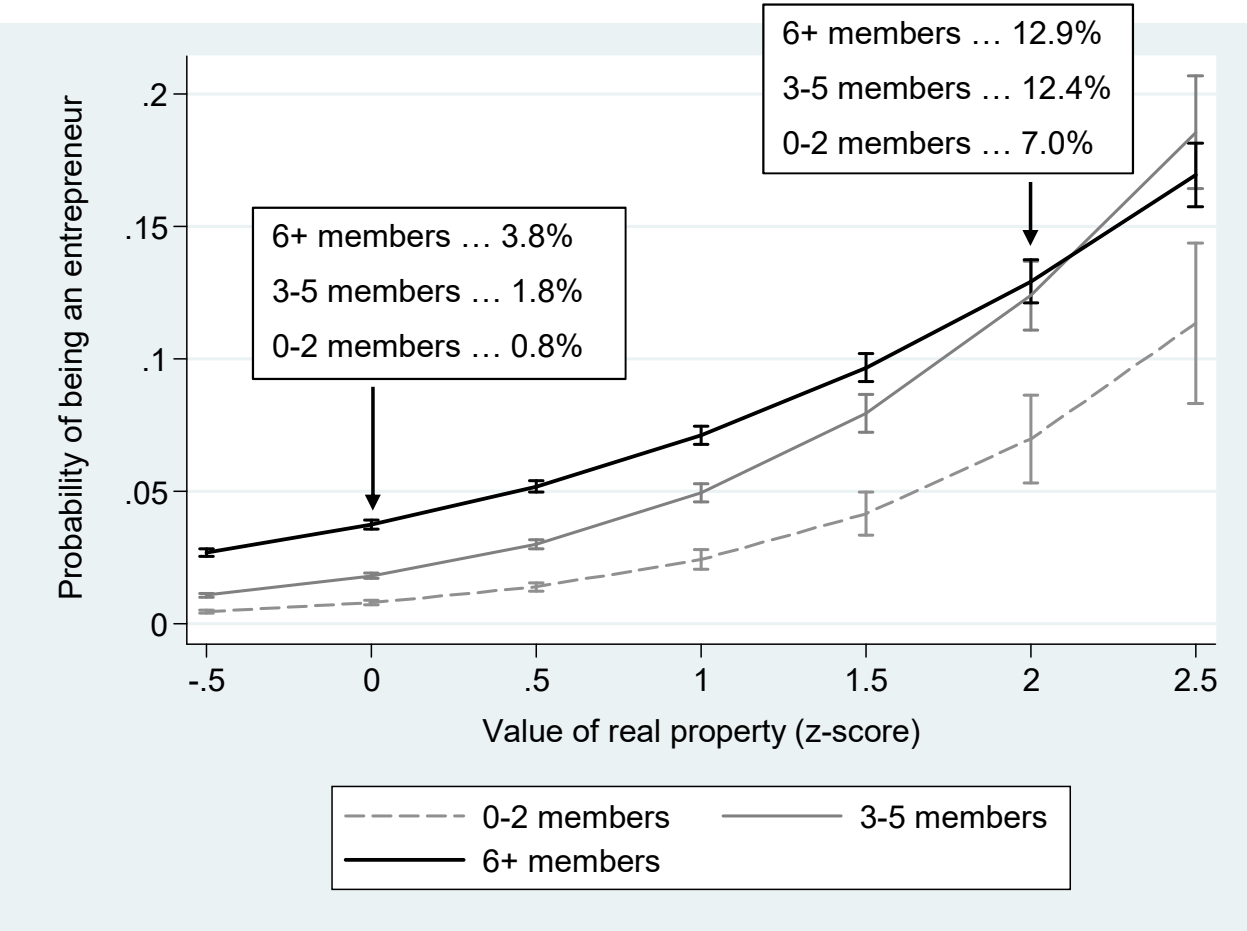

Figure 4. Interaction effect of wealth and size of household labor pool (excluding slaves) on probability of being an entrepreneur in New York City

Table 1. Ideal-typical forms of industrial systems

Form of industrial system	**Workshop / domestic system**	**Factory system**
Labor source	Dependent or forced labor	Wage labor (or equivalent)
Scale	Small	Medium to large
Technology	Craft production and "outwork"	Mechanized and capital-intensive production
Integration	Via sub-contracting	Via collocation

Table 2. Primary historical data used in the study

Data	**1789/1790 census and tax Assessments**	**1810 census and tax assessments**	**1850 census of households**	**1850 census of manufacturing**
Unit(s) of analysis	Households and properties	Households and properties	Households	Manufacturing businesses
Source	Willis (2000)	Willis (2000)	Ruggles et al. (2015)	Bateman et al. (2004)
Sample size †	5,968 household heads	17,443 household heads	93,840 household heads	195 businesses
Entrepreneurial occupations ‡	1,301 (64.5%)	4,107 (53.0%)	35,338 (47.5%)	---
Business property owners	240 (4.0%)	388 (2.2%)	2,376 (2.5%)	---

† Listwise deletion removes 499 households from the multivariate analyses for 1790-1850.

‡ Percentages reflect removal of cases without occupational information.

Table 3. Descriptive statistics (means) for residential properties and businesses in New York City, 1790 and 1810

	1790 †		1810	
	Residential properties	**Businesses**	**Residential properties**	**Businesses**
Slaves in household	0.92	1.49 ***	0.15	0.39 ***
White males in household (age 15 or younger)	1.20	1.32	1.24	1.32
White males (age 16+) and free blacks in household	1.91	2.47 ***	2.00	2.58 ***
White females in household	3.03	3.48 ***	2.70	3.11 ***
Value of buildings and land	$845.21	$1,139.62 ***	$1,567.20	$2,403.04 ***
Value of personal property ‡	$157.62	$287.92 ***	$154.78	$244.59 ***
Number of cases	5,880	545	20,353	1,072

Note: Two-tailed t-tests indicate statistically significant differences between households with residential properties and those with businesses at the $p < .001$ (***); $p < .01$ (**); and $p < .05$ (*) levels.

† Real estate and personal assets were denominated in New York pounds and converted to dollars using 1£=$2.50 exchange rate.

‡ Cases subject to imputation.

Table 4. Logistic regression (odds ratios) of business ownership among heads of household in New York City

	Model 1	Model 2		Model 3		Model 4	Model 5
	1790-1850	1790-1850	1790	1810	1850	1790-1850	1790-1850
Individual attributes							
Gender (1=female)	0.001 ***	0.002 ***	0.002 ***			0.014 ***	0.007 ***
	(0.001)	(0.001)	(0.001)			(0.012)	(0.005)
Race (1=black)	0.149 ***	0.253 ***	0.249 ***			0.193 ***	0.145 ***
	(0.045)	(0.078)	(0.076)			(0.059)	(0.044)
Previously in census	2.415 ***	1.975 ***	1.899 ***			1.443 ***	1.428 ***
	(0.127)	(0.106)	(0.103)			(0.084)	(0.083)
Previously entrepreneur	1.431	1.760	1.781			2.345 *	2.167 *
	(0.554)	(0.661)	(0.680)			(0.882)	(0.824)
Real property (z-score)	2.179 ***	2.020 ***	2.020 ***			2.175 ***	3.398 ***
	(0.039)	(0.036)	(0.037)			(0.043)	(0.142)
Household labor pool							
Slaves	---	1.124 **	1.193 ***	1.078	---	1.061	1.305 ***
		(0.044)	(0.056)	(0.080)		(0.047)	(0.060)
White males (age 1-15)	---	1.094 ***	1.132 *	1.026	1.136 ***	1.067 ***	---
		(0.018)	(0.063)	(0.026)	(0.021)	(0.018)	
White males (age 16+)	---	1.051 ***	1.068	1.070 **	1.040 ***	1.055 ***	---
and free blacks		(0.010)	(0.041)	(0.026)	(0.012)	(0.010)	
White females	---	1.208 ***	1.072	1.013	1.256 ***	1.198 ***	---
		(0.012)	(0.043)	(0.032)	(0.014)	(0.012)	
All non-slave labor	---	---	---	---	---	---	1.127 ***
							(0.006)
Interactions							
Real property × slaves	---	---	---	---	---	---	0.910 ***
							(0.016)
Real property × other	---	---	---	---	---	---	0.950 ***
household labor							(0.004)
Controls							
Year	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
Ethnicity	---	---	---	---	---	Fixed	Fixed
Industry	---	---	---	---	---	Fixed	Fixed
Log likelihood	-11,709.52	-11,436.37		-11,388.28		-10,789.96	-10,720.88
Number of cases	116,752	116,752	5,920	17,424	93,408	116,752	116,752

* p < .05; ** p < .01; *** p < .001 (two-tailed tests)

Table 5. Descriptive statistics (means) for manufacturing and other businesses in New York City, 1790 and 1810

	1790 †		1810	
	Manufacturing businesses	**Stores, service proprietors, etc.**	**Manufacturing businesses**	**Stores, service proprietors, etc.**
Slaves in household	1.49	1.50	0.27	0.41
White males in household (age 15 or younger)	1.46	1.26	1.29	1.33
White males (age 16+) and free blacks in household	2.53	2.44	2.04	2.65
White females in household	3.41	3.51	2.44	3.19 *
Value of buildings and land	$918.64	$1,219.34 *	$2,233.60	$2,420.13
Value of personal property ‡	$225.53	$309.69 **	$91.52	$262.45 *
Number of cases	141	404	112	960

Note: Two-tailed t-tests indicate statistically significant differences between households with manufactories and those with other businesses at the $p < .001$ (***); $p < .01$ (**); and $p < .05$ (*) levels.

† Real estate and personal assets were denominated in New York pounds and converted to dollars using 1£=$2.50 exchange rate.

‡ Cases subject to imputation.

Table 6. Distribution of technology and labor force in manufacturing businesses in New York City, 1850

	Size category †				
Source of power	1 to 5 workers	6 to 19 workers	20-49 workers	50 or more workers	**Row totals**
Hand or animal	35.9% (*21.8%*)	37.4% (*27.6%*)	7.7% (*31.2%*)	6.1% (*21.1%*)	87.2%
	e.g. shoemakers, tailors and milliners, tinkerers		*e.g.* furnituremakers and upholsterers	*e.g.* shipbuilding	
Steam or water	1.0% (*0.0%*)	5.1% (*28.2%*)	3.1% (*22.8%*)	3.6% (*18.9%*)	12.8%
	e.g. drug manufactory	*e.g.* cabinetmakers and wood products	*e.g.* enginemakers, printing, paper mills		
Column totals	36.9%	42.6%	10.8%	9.7%	100.0%

Note: Analysis based on 195 manufacturing establishments in Bateman et al.'s (2004) state sample from the 1850 Census of Manufacturing. Statistics in *italics* refer to the percentage of the labor force that is female in a particular cell.

† The size categories correspond roughly to the distribution of establishments that are below median size (1-5 workers), above median size but below the upper quintile (6-19 workers), in the second-to-upper decile (20-49 workers), and in the upper decile (50+ workers).