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WERE LATE-NINETEENTH-CENTURY, SMALL-TOWN AMERICANS LIFE-CYCLE SAVERS?

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Were Late-Nineteenth-Century, Small-Town Americans Life-Cycle Savers?
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ABSTRACT

Although the mobilization of savings is an important function of banks and other financial institutions, there is remarkably little evidence that bears on how and how well the financial sector mobilized household savings in the nineteenth and early twentieth century. This paper documents financial wealth accumulated by working-class Americans to see whether their behaviors followed the predictions of the life-cycle hypothesis. Hand-coded data from an Upstate New York savings bank matched to federal and state census data provides longitudinal data on individual savers between 20 and 90 years old. Fixed effects estimates on an unbalanced panel generates results that are consistent with the life-cycle hypothesis. Wealth-at-age profiles exhibit the classic hump shape, with peak wealth occurring in savers' mid-sixties. At peak wealth, mean and median savers accumulated the equivalent of about one year's income for a working-class man. Wealth declines with the number of children present in the household. Moreover, the native- and the foreign-born, and individuals born into different cohorts all accumulated wealth in a fashion consistent with the hypothesis' predictions.

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1. Introduction

Although the mobilization of savings is one important function of banks and other financial institutions, there is remarkably little evidence that bears on how and how well the financial sector mobilized household savings in the nineteenth and early twentieth century. Through most of the nineteenth and early twentieth century, mutual savings banks were the principal, if not the only, formal financial market outlet for working-class savings. First established in England and Europe in the late-eighteenth century, savings banks were designed to serve the life-cycle and precautionary savings needs of the working poor (Fishlow 1961, Wadhwani 2011). Social reformers advocated a type of financial self-help among the working classes; by setting aside a few dollars, even a few pennies, each week, the working poor would not have to turn to charity during periods of illness, workplace injury, unemployment, and old age. In an era when commercial banks eschewed small deposit accounts, savings banks encouraged the keeping of small accounts; some savings banks opened accounts for as little as $1 and kept them active with a balance of just a few cents, but paid interest only on balances of $5 or more (Payne and Davis 1956, Olmstead 1976). The banks' trustees (directors) invested the pooled householders' savings into a small set of legally prescribed safe assets, usually government bonds, high-grade mortgages, and large interest-earning accounts at commercial banks. The trustees distributed the bank's earnings — typically between 3% and 6% per annum — on a semi-annual basis in proportion to average account balances.

In 1820 there were just 10 savings banks in the United States; by 1900, 652 savings banks dotted the northeastern US (Welfling 1968). Savings banks spread from the region's metropolitan areas into communities with just a few thousand residents. Existing analyses of savings account records show that savings banks played an important role in households' savings strategies (Schoenfeld 1925; Alter, Goldin and Rotella 1994, Wadhwani 2002). After 1900, however, an increasing array of specialized intermediaries emerged to serve an increasingly affluent, burgeoning working- and middle-class. Household investments in life insurance, which had been available since the early 1800s, grew quickly once "industrial life" companies such as Prudential and

Metropolitan Life marketed affordable policies to working-class breadwinners (Murphy 2010, Bodenhorn 2018b). Building and loan societies organized to channel household savings into home ownership. Benevolent societies provided rudimentary sickness and workplace injury insurance (Murray 2007). But in the period under study here, savings banks remained the most important outlet for household savings; in small towns they were often the only connection between working-class households and financial markets (Wadhwani 2002).

This paper analyzes the saving behaviors of working-class individuals in a small upstate New York town, Cornwall-on-Hudson, between 1871 and 1911, using the records of the Cornwall Savings Bank (hereafter CSB). The bank's first two deposit ledgers (1872-1896, 1896-1911) contain the complete deposit and withdrawal records of every depositor who opened an account during that 40-year period until the account was either closed or until January 1, 1911, which is the last recorded entry date for every account still open on that date. The ledgers also report balances and interest earned on January 1 and July 1 of each year. The analysis below uses January 1 balances (after interest is credited) for each year that the account is open. The resulting data set contains more than 4,600 depositor-year records on 339 depositors. Because individuals are observed over periods between five and forty years, it is possible to trace out long-term, presumably life-cycle, saving behaviors.

Any micro-level study of life-cycle behaviors faces two fundamental econometric challenges: it requires long-run longitudinal data; even then, identification of life-cycle behaviors is complicated. A logically identified model will be under-identified in practice because the effects of variables that relate to the life cycle, or reasonable proxy variables, are difficult to untangle. Both the life-cycle and permanent-income hypotheses, for example, posit that an individual's wealth-at-age will be determined by his or her anticipated income, consumption and time preference, expected working life and age at death, long-term interest rates, and so on. Further, permanent incomes, consumption preferences, working life and life expectancy are all correlated with education, nativity, beliefs about economic growth and labor productivity, among other factors. None of these factors change (much) over an individual's life (at least in theory). In short, the easily observable variables are necessarily collinear (age, year, birthyear, productivity growth) or do not change over the life cycle (birthyear, cohort, permanent income, time preference and so on). A fixed effects estimation of life-cycle wealth, then, is limited to variables that change over savers' lifetimes. The regression analysis here limits itself to the variables Modigliani (1968) identified as key determinants of wealth-at-age, which are the age of the saver and the number of children in the saver's household, both of which change over the life cycle. Year fixed effects are also included to account for common transitory income shocks driven by recessions, wars, and financial crises that will lead to unanticipated additions or subtractions from accumulated wealth. One advantage of longitudinal over cross-sectional data is that we can observe a "pure effect" of age on wealth accumulation (Kearl and Pope 1983).

The results are consistent with one of the principal implications of the Modigliani-Brumberg (1954) life-cycle hypothesis, namely the hump-shaped pattern of wealth-at-age. Individual and year fixed effects models estimated on the entire sample imply increasing wealth up to savers' mid-60s, after which wealth gradually declines. At age 65 median household financial wealth was about $400, or about a year's wages for manufacturing wage workers in 1900 (Lebergott 1960, Carter et al 2006 Series Ba4323). The estimates are interesting not least because average life expectancy at age 20 (an additional 38 to 43 years for cohorts born between 1850 and 1880) was less than the estimated age at maximum wealth, which implies that many individuals continued to accumulate wealth up to their deaths (Lee 2001). This may reflect either a powerful bequest motive or substantial uncertainty over remaining years of life at older ages.

The evidence is also consistent with the predictions of modern simulation analyses, which show that households with more children have lower wealth (Browning and Ejrnan 2009, Scholz and Seshardi 2007). Households with three children have significantly less wealth than households with a single child. Households with five or more children have significantly less wealth than households with three children. Thus, the historical evidence is consistent with two of Modigliani's predictions, namely, the hump-shaped wealth-at-age profile and declining wealth in children in the household.

The modest sample size limits the subsets of the population that can be analyzed, but some insights follow when considering difference by sex, nativity and birth cohort. When the sample is parsed by sex, the pronounced hump-shape of wealth-at-age predicted by the life-cycle hypothesis is more evident for women than men, which suggests that women retired; men did not, or not for long. When the data is parsed by nativity, the hump shape appears for native-born Americans and for individuals born in the United Kingdom (sample sizes for European-born are too small to generate estimates). There are, however, marked differences in saving behaviors by decadal cohort that may result from long-run productivity growth.

The article most closely related to this is Alter, Goldin and Rotella's (1994) study of savers at the Philadelphia Savings Fund Society after 1850. They find that men and women accumulated wealth for different purposes. They find that men tended to build up substantial balances that were withdrawn to make large purchases, such as homes or business assets. Women, particularly unmarried domestic servants, accumulated wealth for life-cycle purposes. These women had few other types of wealth. They were also unmarried and separated from families of origin, so they did not have access to sharing networks among kith and kin that provided a form of informal insurance provided by formal precautionary savings. They were also without the prospect of old-age security through intergenerational transfers. Women's age-wealth profiles at the CSB point to similar conclusions in that their life cycle financial wealth demonstrates the pronounced hump-shaped profile predicted by the life cycle hypothesis.

2. The life-cycle model in a nineteenth-century context

2. 1. The Modigliani-Brumberg (1954) model and its extensions

In its most basic version Modigliani's (1986) life-cycle model posits that the only motivation for saving and the accumulation of wealth is to finance consumption in retirement. The basic version assumes stable or constant labor earnings over an individual's (or household's) finite life and that the individual prefers a relatively stable or constant level of consumption over his or her lifetime. The resulting pattern of saving during the working years generates a wealth-at-age profile that rises linearly with age until retirement and a pattern of dissaving in retirement such that wealth-at-age declines linearly until death. Wealth-at-age traces out an inverted V-shape profile.

The fundamental implication of the life-cycle model's assumptions is that the resources an individual allocates to consumption at any and every age will depend on that individual's lifetime resources, namely, the present value of lifetime labor income plus any anticipated bequests. A secondary implication is that current consumption does not depend on current income so changes in household saving in the short run are determined by deviations of current income from average annual lifetime or permanent income. Modigliani's life-cycle model and Friedman's (1957) permanent-income hypothesis share the fundamental insight that large innovations in household saving are driven by shocks to transitory income, or the difference between current and permanent income. Short-run changes in saving rates and total wealth are, therefore, inelastic relative to permanent income and anticipated long-run interest rates. Saving will be responsive to shocks to transitory income.

Tobin (1967) extended the Modigliani model in which he maintained the preference for constant consumption over a lifetime but allowed for dissaving in youth that finances consumption when current income is less than permanent income. In Tobin's formulation, a household's net worth can and will be negative until the debt assumed early in life is paid off when, in later life, current income exceeds permanent consumption. As debt accumulated in youth is retired, households accumulate assets through their middle years to finance consumption in old age.

Modigliani (1986, p.706) argues that the advantages of his life-cycle model versus Friedman's (1957) permanent-income hypothesis is the life-cycle model's assumption of the representative household's finite life and changing family structure. The life-cycle model is designed specifically to focus on a household's changing needs over the life cycle, including changes in family size, maturation, retirement, and the bequest motive. This is not to say that late-nineteenth-century working-class households do not exhibit savings behaviors consistent with Friedman's permanent-income hypothesis. Bodenhorn (2018a) shows that working-class households responded to transitory income shocks consistent with Friedman's hypothesis.

The basic life-cycle model assumes zero interest rates, constant annual income, a fixed working life, zero economic growth, no liquidity constraints, accurate forecasts of income and family size, and no bequests. Subsequent theoretical extensions relax one of more these assumptions (King 1983) and show that one of the principal implications of the life-cycle model, namely the hump-shaped pattern of wealth-at-age, is robust to the relaxation of each assumption. Even buffer-stock models of saving, which posit that households engage in mostly precautionary saving and that positive wealth is held to insure against random fluctuations in income, can be nested within a life-cycle approach (Deaton 1991, Carroll and Samwick 1997, Cagetti 2003).

Browning and Ejrnans (2009) argue that the hump-shaped pattern of consumption-at-age (and wealth-at-age) profiles emerges after accounting for the number and ages of children in the household. Scholz and Seshadri (2007) develop and simulate a life-cycle model that incorporates uncertain lifetimes, uninsurable income, uninsurable healthcare expenditures and borrowing constraints and show that (1) the timing and number of children has substantial effects on when households begin saving for retirement, (2) most of the cross-sectional variation in wealth is caused by variation in household sizes, and (3) the effect of heterogeneity in the number of children on wealth-at-age is of about the same order of magnitude as heterogeneity in incomes.[1]

One result persists with each modification: the hump-shaped wealth-at-age profile. Cross-sectional differences in earnings, household sizes, risk preferences, and so on affect the slopes and the peaks, not the humps, broadly conceived. Modigliani (1986) believed the model would prove to be robust to such extensions and it has proved to be so.

Wolff (1981, 1999), however, argues that the life-cycle model fails to account for wealth accumulation by the poor and the rich. The poor do not save; the rich acquire most of their wealth through intergenerational gifts and bequests. Further, the model does not capture the wealth-at-age pattern of financial and business assets. Wolff (1981, p.94) asserts that the explanatory power of the life-cycle model is limited to the "white, urban, educated, middle-class accumulation of the standard forms of middle-class wealth — housing, durables, and financial wealth. This is the group that saves out of its labor earnings to accumulate housing, durables, and liquid assets for its retirement years." He believes that the life-cycle model describes the wealth accumulating behavior of the middle two-thirds of the population. The model provides a poor characterization of the top and bottom deciles, but it is not obvious that the failure of a theory to accurately depict the tails of a distribution represents a refutation of a theory.

[1] Kessler and Wolff (1991) provide cross-sectional evidence on household wealth in the United States and France consistent with Scholz and Seshadri's (2007) third result. Larger families and lower-income households report lower wealth, though additional children reduce wealth less than moving down one quintile in the income distribution.

2.2. Working years, old age, and the nineteenth-century life cycle

Wolff's (1981) caution that the life-cycle model as widely understood may reasonably capture the behavior of a particular twentieth-century demographic – white, educated, urban, middle-class — should raise concerns over any uncritical application of the approach to a late nineteenth-century working-class demographic.

Three trends transformed the U.S. economy in the second half of the nineteenth century, each of which would have encouraged changes in how households saved for old age. First, urbanization and industrialization pulled an increasing share of the population off the family farm. Davis and Gallman (1978) show that investment in land and structures constituted a large if not the largest share of investment up to the Civil War. For most families, the family farm was the principal (non-human) asset in the retirement portfolio, and one used to finance consumption in old age, either through sale or an *inter vivos* transfer to one or more children who agreed to support aged parents past their working years. Second, declining fertility meant that there were fewer children ready to support elderly parents. Third, the emergence of a broad array of financial institutions widened access to safe depositories for household wealth. These financial institutions included savings banks, building and loan associations, benevolent societies that provided rudimentary health and unemployment insurance, and industrial life insurance companies (Bodenhorn 2018a, 2018b). This confluence of changes in development, demographics, and finance led Sutch (2010, p.4) to assert that households increasingly "substituted bank accounts for babies." Financial wealth replaced sons and daughters as old-age consumption insurance.

Moreover, thinking about the life cycle in the late nineteenth century requires, if not a redefinition, a reformulation of the notion of "retirement." In the twenty-first century, retirement often implies an abrupt transition from the workaday world to an extended period of leisure and tending to one's gradually deteriorating health. Few people in the late nineteenth century conceived of old age in such terms. From information reported in the decennial censuses, Lee (2001) estimates upper and lower bound expected years in retirement at age 20 by cohort. A young man who entered the labor market at age 20 in 1850, for example, had a remaining life expectancy between 38.4 and 43.7 years, only 1.7 to 2.7 years of which would be spent in retirement. By comparison, a 20-year-old who entered the labor market in 1990 anticipates 12 to 16 years in retirement (Lee 2001).

A critical assumption of the life-cycle hypothesis is that individuals form accurate forecasts of their life courses, so the question concerning working-class men's beliefs about their expected working life looms large in a study of life-cycle choices. In 1889 the New Jersey Bureau of Statistics of Labor and Industry surveyed more than 600 working-class men employed in several industries, though the glass-blowing and heavy manufacturing industries are over-represented. The Bureau asked a series of questions about the ages at which men started work in their occupation, the age at which productivity started to decline, the age at which they could no longer work at their occupation, and the life expectancy of men employed in their jobs. Table 1 summarizes the responses. Young men entered their occupations early, around age 16. Productivity declined around age 42 and men could no longer expect to work in their current occupation at age 57. They expected to live, on average, until age 66. These men's expectations are remarkably consistent with Lee's (2001) estimates of life expectancy at age 20 in 1890 (41 to 46 years) and working life (38 to 41 years) based on subsequent realizations.

Table 1

New Jersey industrial workers' surveys of job and life expectancies

	All Industries		Glass		Textiles		Manufacturing	
Relevant age	N	Mean (std dev)	N	Mean (std dev)	N	Mean (std dev)	N	Mean (std dev)
Entry into occupation	188	15.91	58	17.03	41	14.95	25	14.76
		(2.24)		(2.20)		(1.34)		(2.01)
Declining productivity/capacity	603	41.61	237	41.41	110	42.24	46	39.13
		(6.22)		(4.85)		(5.99)		(7.52)
Incapacity in occupation	582	56.22	233	56.06	106	57.31	43	48.58
		(8.08)		(6.98)		(7.35)		(9.17)
Death	149	66.4	53	70.32	31	60.48	17	56.24
		(9.34)		(6.59)		(5.48)		(7.72)

Source: New Jersey Bureau of Statistics of Labor and Industries (1889).

The decade between incapacity to work and death was not a period of extended leisure, however. It was a period of working in less taxing jobs and extended bouts of underemployment and unemployment (Margo 1993, Lee 2003). Based on the New Jersey and comparable surveys in other states, Ransom and Sutch (1986) and Sutch (2010) find that retirement in that era was more akin to a gradual decline in work after age 55. Wages paid for physically demanding occupations peaked near age 30, remained relatively flat to age 50, and then declined rapidly thereafter. Some men remained at work nearly up to death; a nontrivial fraction of men in their late 60s and early 70s reported positive earnings. Retirement was a phasing out process due to men's declining capacity for physically demanding labor, to the greater risk and longer spells of unemployment than those experienced by younger, more physically fit men, and to downward occupational mobility as older men transitioned into less strenuous and less remunerative jobs. Although men expected to work for most of their adult life, they also anticipated that their peak earnings would occur early and may have prepared for that eventuality by saving a relatively high fraction of income at younger ages (Sutch 2010, p.17). The combination of early peak income with a substantial transitory component is also consistent with the life-cycle/buffer-stock model proposed by Cagetti (2003).

3. Background: working-class savings and Cornwall, New York

The data, to be discussed in detail below, is drawn from the handwritten ledgers of the Cornwall Savings Bank located in Cornwall-on-Hudson, New York.[2] Cornwall-on-Hudson is in Orange County, just south of Newburgh on the Hudson River, about midway between New York City and Albany. This section provides some background on the savings bank industry and that of Cornwall itself.

3.1. Savings banks

From the seventeenth-century European settlement of North America through the American Civil War, land improvements (clearing, ditching, and fencing), along with

[2] I acquired the ledgers in 2016 through on online auction on eBay from a private seller who did not disclose how the ledgers came into his or her possession. I intend to donate the ledgers to an Orange County historical society or library, assuming I can find one that is interested in accessioning the volumes, once I am finished with them. They are leather-bound volumes about 12 by 18 inches and contain about 500 double-sided pages, though the last 100 or so pages in each volume are unused.

structures were the principal form of long-term or life-cycle household saving. Improved farmland might be bequeathed to a child in return for support in old age or sold to younger households moving up the agricultural ladder. By the early nineteenth century, however, an emergent urban working class had few outlets for life-cycle savings. Working-class households did not acquire urban property and commercial banks discouraged small deposits, if they accepted them at all. Mutual savings banks filled the gap.

The earliest savings banks were organized as nonprofit self-help institutions for the working poor. They facilitated working-class families' capacity to set aside funds that would see them through periods of seasonal unemployment and support themselves in old age. Although savings banks were organized to encourage thrift and self-reliance among the working poor, they evolved into repositories for the savings of the working-class more generally, and from small, charitable organizations managed by part-time volunteer trustees to mainstream financial institutions managed by full-time professionals (Payne and Davis 1956, Olmstead 1976, Alter, Goldin and Rotella 1994, O'Grada and White 2003). In 1820 ten savings banks had about 8,000 depositors with average account balances of $132 (Welfling 1968). In 1900 the industry had grown to 652 banks with 5.4 million depositors and average balances of $397. An estimated 20% of all adults in the northeastern US had an account (Bodenhorn 2018a). At mid-century, approximately 40% of male depositors were artisans, about 13% were common laborers; the remaining 47% were mostly semi-skilled operatives (Alter, Goldin and Rotella 1994). Seventy-five years later, the depositor profile was similar; Schoenfeld (1925) found that about 85% of new accounts were opened by wage earners, and she considers the behaviors of account holders to be an "excellent measure" of working-class saving practices.

3.2. Cornwall Savings Bank

Cornwall-on-Hudson was a town of less than 1,000 people circa 1900 located on the Hudson River about midway between New York City and Albany. Like all late-nineteenth-century towns and villages, Cornwall supported several blacksmiths and butchers, tailors and milliners, confectioners and grocers. The town was home to some light industry, including a woolen carpet mill, a carriage manufactory, a flour mill, a planning mill, and a brick machine manufactory. Moreover, Cornwall was a seasonal vacation destination. There were several large hotels that served as summer retreats for residents of New York City looking to escape the urban summer heat.

The Cornwall Savings Bank was established in 1871 to serve the town's citizens. The bank's original president, William T. Cocks, was a merchant and partner in a carriage manufactory; its first treasurer was a local milk dealer. The bank's trustees (directors) included an attorney, a coal merchant, a druggist, a boatman, a livery owner, and two farmers (New York Superintendent of Banks 1887). Prior to the CSB's opening, the nearest banks of any kind were the Bank of Newburgh, a commercial bank that was five miles from Cornwall, and the Bank of Orange County, a commercial bank in Goshen nearly 20 miles from Cornwall. As commercial banks, neither would have encouraged small savings accounts. Cornwall was, through 1910 at least, a one-bank town.

Figure 1

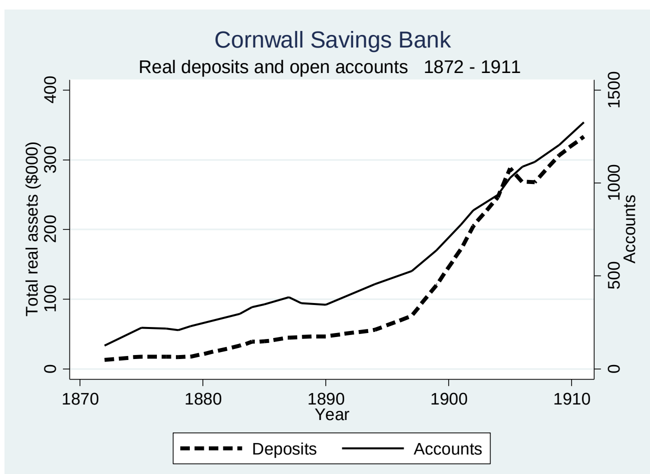
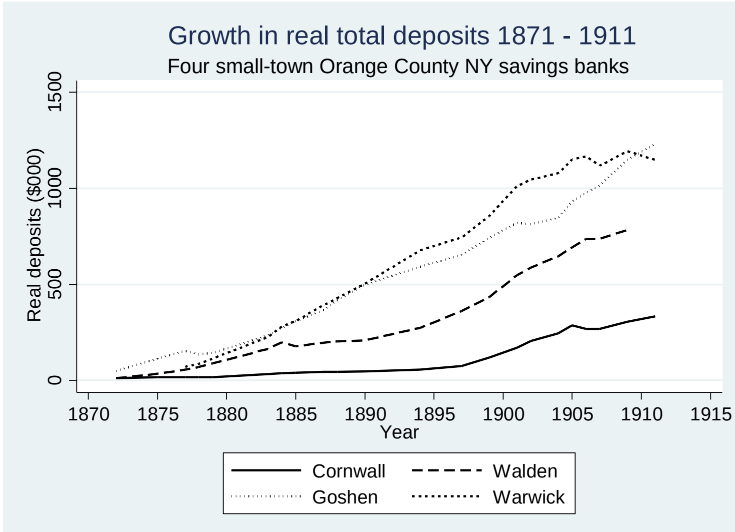


Figure 1 traces two features of the Cornwall Savings Bank's growth between its opening in 1871 and the end of the extant documentary records in 1911. The number of open accounts (right axis) increased from 126 after the bank's first full year in operation to 1,327 in 1911. Total deposits increased from $19,029 to $380,340 in nominal terms. Total deposits in real terms increased to about $490,000. In 1911, the average deposit was $285 (New York Superintendent of Banks 1872, 1911).

Figure 2



Of the seven savings banks in Orange County, New York during this period, the Cornwall Savings Bank was the smallest bank located in the smallest of the seven towns. Figure 2 plots the growth in real deposits at the savings banks in Cornwall-on-Hudson (population 1890 = 760), Walden (2,132), Goshen (5,021), and Warwick (6,000), all of which opened in the early 1870s and continued at least through 1915. The Cornwall Savings Bank was the smallest and remained so throughout the period. In 1911 the Cornwall Savings Bank, for example, had just one-twelfth the depositors as the county's largest savings bank, the Newburgh Savings Bank, and about one-seventh the Newburgh's (population 23,087) total deposits (New York Bank Superintendent 1911). The CSB's depositors, however, resembled depositors in savings banks across the region in terms of occupations, account sizes, and account activity.

4. Data

Any empirical study of household saving choices and wealth accumulation over the life cycle faces formidable data challenges. The ideal data would include long-term, longitudinal, individual- or household-level information on a large, representative sample of households, that contains information on the entire portfolios of each household's wealth that are free of systematic reporting errors. Very few extant studies, including several prominent studies of modern life-cycle behaviors, satisfy all these criteria. Some infer life-cycle behaviors from aggregate data (Lee 2001). Some rely on cross-sectional data (Wolff 1981, King and Dicks-Mireaux 1982, Kearl and Pope 1983, Alessie, Lusardi and Aldershof 1997, Cagetti 2003, Sutch 2010) and must impose relatively strong assumptions when creating synthetic cohorts for analysis; some rely on brief panels or panels in which individuals are observed at widely separated dates (Alessie, Lusardi and Aldershof 1997, Scholz and Seshadri 2007) so that inferences concerning life-cycle choices are drawn from as few as three consecutive annual observations. Some rely on retrospective survey data, which are subject to substantial recall and reporting error (Kearl and Pope 1983, Sutch 2010). Using detailed tax reports from 1990s Norway, Fagereng, Gottlieb and Guiso (2017) is one of the few papers that satisfy all the criteria, but it focuses on the changing share of wealth held in risky assets over the life cycle rather than total financial wealth.

The Cornwall Savings Bank data exhibit three desirable features: they span (potentially) long periods; matching savers to federal and state censuses provides information on household characteristics; and, because the principal data are bank account balances taken from the bank's ledgers, the wealth data should be reasonably free of systematic reporting error. The data do not capture the totality of households' assets because we do not observe any information on the accumulation of consumer durables, real estate, cash outside of savings bank deposits, or non-savings bank financial assets. But with limited savings options available to working-class households in the region, account balances at the CSB should capture a relatively constant share of local households' noncash financial wealth.

Data are drawn from the bank's first two deposit ledgers, which document depositor's accounts between 1871, when the bank opened to January 1911. Depositors enter the ledgers consecutively in chronological order of when accounts were opened, beginning with account #1, which was opened by Frederick Dezendorf, a married 29-year-old carpenter with four children between 3 and 17 years old, and continuing through account #4296, which was opened with a $5 deposit in the name of Christina L. King, a six-month-old girl, presumably by her father, a 35-year-old machinist who resided in Woodbury, New York. The first ledger takes the standard nineteenth-century form with debits (withdrawals) recorded in the left-hand column and credits (deposits and interest earned on balances) in the right-hand column. Accounts were balanced and interest credited on January 1 and July 1 of each year. The second ledger has separate pre-printed columns for date, drafts (withdrawals), deposits, interest, and balance.

When the bank opened in 1871, it paid 6 percent annually on balances held for at least six months. In the late 1870s the rate was reduced to 4 percent; after the mid-1880s, the bank paid 4 percent on small balances and 3 percent on large balances (New York Bank Superintendent 1872-1911). Such interest differentials became standard practice in the industry to discourage wealthier individuals from holding funds at institutions designed to serve working-class households and to discourage small businesses from using savings accounts like demand accounts (Olmstead 1976). Contemporary regulators worried about large accounts because wealthier depositors might encourage banks to adopt riskier investment strategies than regulators preferred — government bonds, high-grade corporate bonds, cash. The bankers themselves discouraged business deposits because daily deposits and withdrawals increased costs to banks whose purpose was to return an attractive, low-risk return to small wealth holders. The CSB's records include only small number of very active accounts, all of which were short-lived. They were presumably closed at the bank's insistence. The bank did, however, accept deposits on behalf of local charitable organizations, including the local Odd Fellows Lodge, a local church's bell-tower fund, and so on. These were not active accounts and are not included in the analysis.

Given the nature of the raw data, the sample is constructed on three criteria. First, it includes accounts that remained open for at least five years because any study of the life cycle depends on observing wealth holdings for extended periods. The five-year restriction might introduce some sample-selection bias if long-term account holders differ in some systematic way from individuals who keep accounts open for only a year or two, but the five-year condition should exclude individuals who opened accounts as a safekeeping for money that was not intended to be held as the financial component of life-cycle wealth. Second, the individual named on the bank account must appear in and be matched to one or more of the relevant censuses: the federal decennial censuses of 1870, 1880, or 1900, or the New York State census of 1875.[3] Matching was done by hand using given and family names. If two or more individuals in Cornwall-on-Hudson or its immediate area shared given and family names the record was not matched to the census. Matching between the bank ledgers and the censuses was not restricted to residents of Cornwall-on-Hudson, but most matched depositors resided in Cornwall or an adjacent town. Third, the account holder named in the deposit ledger must be at least 20 years old. The ledgers contain hundreds of accounts opened by parents on behalf of minor children. Accounts opened during childhood that did not remain open and active for at least five years after the individual's twentieth birthday are not included in the sample.

Alter, Goldin and Rotella (1994) find that younger and middle-aged men who closed their accounts usually did so because they either relocated or invested funds in housing or a business, I drop the last observation of zero-dollar balances for individuals who closed their accounts before age 55. The choice to do so is driven, in part, by the observation during a preliminary analysis that many such individuals appear in later censuses in places distant from Cornwall. Some do not reappear in the census at all, but life expectancies point toward some cause other than early death. Thus, closing a long-term account at a relatively young age is probably not a complete drawing down of life-cycle wealth. Large terminal withdrawals at younger ages point to moving financial assets more than exhausting them.

The resulting sample is an unbalanced panel of 339 individuals observed between 5 and 41 years between 1872 and 1911. There are 4,651 individual-year observations, so the average individual is observed for 13.7 years. The sample is about equally divided between men and women. Table 2 reports summary statistics. Panel A reports statistics that evolve over the life cycle, namely account balances or financial wealth-at-age, account holder's age, spouse's age when the account holder is married, and the number of children in the account holder's household. The average account balance for men is about $30 higher than for women. Women are about 18 months older, on average, than men. The husbands of women in the sample are eight years older om average than the wives of men in the sample. Households headed by male account

[3] The individual-level records of the 1890 federal census were destroyed and the New York State census of 1892 has not yet been fully transcribed and made available on Ancestry.com.

holders had 1.02 children present on average; households headed by women had 0.79 children present. The majority of male- and female-headed households had no children present. When children were present, there were usually three or fewer.

Panel B reports information on the observable characteristics of account holders that do not change over the life cycle. The average male depositor opened his account with a $150 deposit when he was 40 years old. He was born in 1845 and kept his account open and active for 15.7 years. Nearly three-quarters of men were native-born; just less than one-quarter were born in the UK (Ireland being the most common country of origin, though there are several migrant Englishmen and Scots). Only about 18% of male depositors owned their own homes. For the reasons discussed below this is probably not an informative statistic. Women opened their account with a larger initial deposit than men, but the other characteristics are similar; women were born in the mid-1840s, they kept their accounts open for 15 years, and most were born in the United States.

Because Alter, Goldin and Rotella (1994) find some difference between married and unmarried (mostly servant) women savers at the Philadelphia Savings Fund Society at mid-century, it may be important to account for potential differences here. Thus, the final two columns of Table 2 report summary statistics on unmarried women. Because the sample sizes are too small to reliably estimate median fixed effects models, these data are not analyzed separately, but the summary statistics do not point to notable differences between married and unmarried women, except for the number of children in the household. Unmarried women have about half as many children present as married women.

Table 2

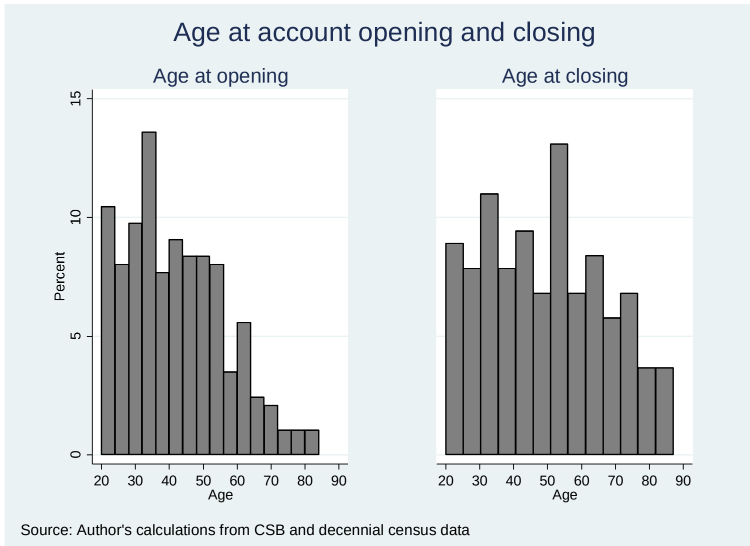
Sample statistics by sex and marital status

	Men		All Women		Unmarried women	
	N = 158		N = 181		N = 102	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
A: Variables that change over the life cycle						
Account balance	314.93	297.74*	308.36	285.88*	285.18	252.85*
IHS(account balance)	5.13	1.40*	5.22	1.28*	5.21	1.27*
Age	46.34	6.17*	47.56	5.68*	46.07	5.92*
Spouse's age (if married)	46.13	6.24*	53.84	5.35*	na	
Children present	1.05	0.70*	0.88	0.50*	0.41	0.10*
Children = 0	0.61		0.71		0.90	
Children = 1	0.10		0.06		0.03	
Children = 2	0.11		0.08		0.01	
Children = 3	0.09		0.05		0.00	
Children = 4	0.04		0.02		0.00	
Children = 5	0.02		0.02		0.00	
Children ≥ 6	0.03		0.06		0.06	
B: Variables that do not change over the life cycle						
Age at initial deposit	41.00	15.16	41.87	13.82	41.76	15.89
Initial deposit	147.41	217.12	174.67	314.74	156.84	290.07
Birth year	1845.42	18.99	1848.65	16.41	1847.98	17.37
Years account open	17.17	8.5	15.86	7.67	16.45	8.53
Born in US	0.76		0.79		0.81	
Born in UK	0.20		0.19		0.18	
Born in Europe	0.04		0.02		0.01	
Homeowner (0/1)	0.18		0.21		0.08	

Notes: standard deviations designated with * are within-individual standard deviations calculated using -xtsum command in Stata. Unmarried women include single and widowed women. Children over 20 years of age and still in the household are not considered as dependents and not included in calculations. There were few sons and daughters over 20 years in the records and most of those that appear reported an occupation. It is assumed that, although they resided with their parent(s), they were self-supporting.
Sources: author's calculations from CSB (1871-1911) and manuscript censuses.

Figure 3 provides some insights into life cycle choices of savers beyond the summary statistics reported in Table 2. Men and women opened accounts at every age between 20 and 85, though it appears that milestone birthdays are important. There are notable spikes in account openings around ages 20, 35, 45, and 60. It is notable, as well, that a small number of individuals open account as late as age 80. Account closings, like account openings occur at all ages, but the distribution is less skewed, and spikes appear around age 50, 60 and 70, which is consistent with retirement or death.

Figure 3



5. Empirical approach

Estimates of the effects of age on wealth follow the standard individual fixed effects approach with all its attendant assumptions (Angrist and Pischke 2009). The estimated equation is:

$$w_{it} = \alpha_i + \theta_t + \gamma_1 \, Age_{it} + \gamma_2 \, Age_{it}^2 + \sum_{j=1}^{6} \beta_j \, I(Children_{ijt}) + \varepsilon_{it} \, ,$$

where w_{it} is a logarithmic transform of an individual's savings account balance on 1 January of year t; α_i are individual fixed effects that capture unobserved, time-invariant factors, which may include permanent income, long-term interest rates, time preferences and so on; θ_t are year fixed effects that capture common, time-varying shocks to individual wealth, which may include recessions, financial crises, wars and so on; $I(Children)_{ijt}$ is a vector of individual-level, time-varying indicator variables that take value of one for each of six variables that signify between one and six or more children present in household i at time t and zero otherwise; the reference category is zero children in the household; ε_{it} is the error term. Age enters as a quadratic. Preliminary regressions using a cubic, quartic and quintic in age generate similar results, but the higher-order terms are not typically significant, so all equations are estimated using a quadratic specification. (See Appendix A.) The modest sample size also suggests that a parsimonious model that captures the relevant features of the data is preferred to a more complex model.

The identifying assumption underlying fixed effects models is that unobservable factors that might simultaneously affect the dependent variable and one or more of the independent variables are time-invariant. Identification also requires repeated observations and a reasonable amount of variation in the right-hand side variables. If these conditions are satisfied, the coefficient of interests, γ_1 and γ_2, will provide unbiased estimates of the effects of age on wealth.

Are the identifying assumptions satisfied? Theory itself presupposes that most of the unobservable factors that will influence wealth accumulation – permanent income, time preference, education, experience, long-run interest rates – are fixed over the life cycle. In terms of the key right-hand side variables, there is substantial within-individual variance. The mean age is 46.9 years with a within-individual standard deviation of 5.9 years, or 12.6% of the mean. The mean number of children in the household is 0.96 with a within-individual standard deviation of 0.60 children, or 62.5% of the mean.

The effect of age and household structure are estimated with the inverse hyperbolic sine of wealth-at-age as the dependent variable. The advantage of the inverse hyperbolic sine transformation over the natural logarithm transformation is that it accommodates zero values of the variable of interest without the need to either drop the zeros or add some small amount, yet it otherwise mimics the log transform so that interpretations of regression coefficients as marginal effects is similar (Burbidge, Magee and Robb 1988, Bellemare and Wichman 2020). A second advantage of the inverse hyperbolic sine transform is that it generates a variable that is more normally distributed than the skewed distribution of wealth itself. A potential disadvantage is that the transform implies an equiproportional response of wealth to age at all ages, which is a nontrivial assumption when comparing the saving behaviors of 20-year-olds and 60-year-olds. All the equations were estimated using the standard natural logarithm transform (i.e., ln(w+0.1)) and the results are similar. A third, mostly ancillary, advantage of the inverse hyperbolic sine transformation is that it fixes the abscissa at zero in the graphs presented below.

6. Life-cycle savers?

This section reports the results of fixed effects OLS and fixed effects quantile (median) regressions of age, its square and children in the household on wealth-at-age. Results are reported for the full sample, as well as subsamples, including sex, nativity and cohort.

6.1. Full sample estimates

Column 1 of Table 3 reports the estimated coefficients on age, age squared, and children present in the household from a fixed effects regression with standard errors clustered on the individual account holder. The coefficients on age are consistent with the predictions of the life-cycle hypothesis, though the hump-shape is not as pronounced as it would be if retirement implies (nearly) complete exit from the labor market with old-age consumption financed by a drawing down of accumulated wealth. The quadratic form generates a shallow hump-shaped wealth-at-age profile that reaches its maximum at 64.6 years and maximum wealth of $365.[4] See Figure 4, which overlays the predicted values on a scatterplot of the inverse hyperbolic sine of real wealth.

One concern is that by imposing the quadratic form in the regression, the hump-shape is determined by the functional form rather than by the central tendency of the wealth-at-age data. The wealth-at-age regressions were estimated using cubic, quartic, and quintic specifications, as well. The results are reported in Appendix Table A1 and Figure A1. Each specification generates the expected hump shape, with a predicted

[4] In the standard log-level regression, the predicted value of the untransformed dependent variable conditional on the estimated coefficients is found by exponentiating the dependent variable. When it is transformed using the hyperbolic sine, the predicted value can be approximated by exp(ln(2) + ln(y)) except for very small values y.

maximum wealth occurring between ages 63.2 and 66.8 years. All generate similar time paths of spending down wealth in old age that includes positive wealth at age 90, though the predicted spending down is faster under the quartic specification than the quadratic or cubic. Given life expectancies, positive predicted wealth at 90 years implies that the mean household left a modest bequest.

Because the distribution of wealth is skewed by extreme values, median regressions provide alternative estimates of the central tendency of the data. In the case of savers at the Cornwall Savings Bank, there are many zero and small values (less than \$5), and a few large values (maximum = \$3,605). The raw mean is \$298 where the raw median is \$122; the 25th percentile is just \$28, and the 75th is \$371. Thus, the predicted mean is closer to the 75th percentile than the raw median. Although they have the potential to illuminate the central tendency of the wealth data, fixed effects quantile regressions must be interpreted with care. Unless $n \rightarrow \infty$ and $T \rightarrow \infty$ the estimates will be biased and inconsistent, though the bias is negligible when $n/T \leq 10$ (Machado and Santos Silva 2019, Santos Silva 2019). In the present case, $n/T = 13.7$, so some caution is warranted.

Table 3

Fixed effects estimates of wealth-at-age, FE and median regressions

	(1)	(2)	(3)	(4)	(5)	(6)
	Full sample	Full sample	Men only	Men only	Women only	Women only
VARIABLES	FE	Median	FE	Median	FE	Median
Age	0.173**	0.160**	0.112*	0.103**	0.264**	0.248*
	(0.033)	(0.057)	(0.044)	(0.038)	(0.047)	(0.118)
Age squared	-0.001**	-0.001*	-0.001*	-0.001*	-0.002**	-0.002**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Children = 1	-0.206	-0.209	-0.312	-0.305	0.302	0.300
	(0.257)	(0.432)	(0.314)	(0.284)	(0.274)	(0.675)
Children = 2	-0.245	-0.267	-0.437	-0.485	0.295	0.325
	(0.298)	(0.482)	(0.368)	(0.326)	(0.307)	(0.741)
Children = 3	-0.517	-0.538	-0.808	-0.844*	0.288	0.301
	(0.368)	(0.537)	(0.457)	(0.353)	(0.412)	(0.940)
Children = 4	0.025	0.009	-0.349	-0.356	1.361*	1.404
	(0.457)	(0.706)	(0.494)	(0.454)	(0.617)	(1.174)
Children = 5	-0.037	0.064	-1.384*	-1.341*	2.929**	3.008*
	(0.896)	(0.986)	(0.636)	(0.569)	(0.829)	(1.241)
Children ≥ 6	-0.173	-0.157	-0.686	-0.737	1.251	1.263
	(0.456)	(0.782)	(0.467)	(0.558)	(0.702)	(1.192)
Constant	0.067		1.907		-2.629	
	(1.044)		(1.275)		(1.845)	
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,651	4,651	2,197	2,197	2,454	2,454
R-squared	0.054		0.070		0.105	
Number of individuals	339		158		181	

Robust standard errors in parentheses

** p<0.01, * p<0.05

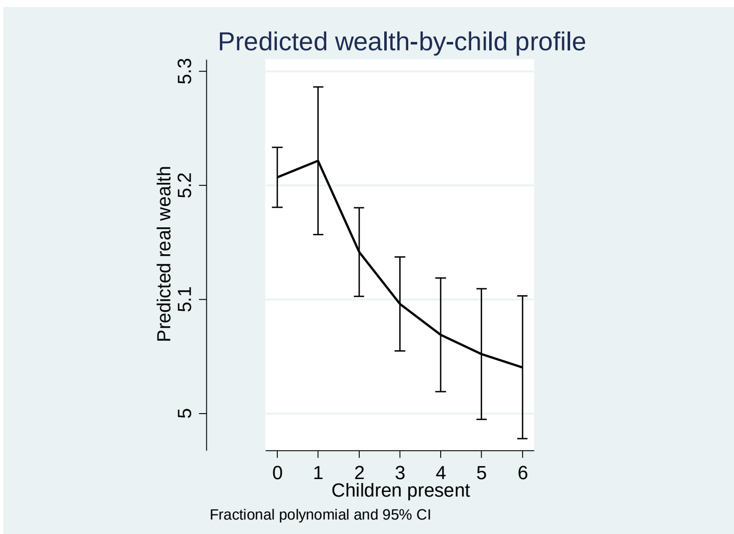
Figure 4

The results of the median regression reported in Column 2 of Table 3, implies a shallower hump-shaped time path of wealth-at-age than the mean regressions, where the predicted maximum occurs at 67.7 years. Predicted median wealth at 68 years is $401, which is approximately one-year's income for a working-class man. It appears that individuals draw down their wealth gradually in old age because few people had sufficient wealth to finance an extended retirement in the modern sense. Retirement was, as Sutch (2010) notes, a period of slowing participation in the labor market rather than exiting it altogether.

The number of children present in a household is, Modigliani (1968) argues, as important a factor in wealth accumulation as age. The raw savings account balance data from the CSB reveal a modestly rising wealth in family size. But the raw data might lead to inappropriate inferences about the connection between wealth and children for two reasons. First, if wealth is rising in age and the number of children is rising in age through the relevant childbearing and child-rearing years, the correlation between children and wealth may be spurious in that it is, in fact, an age effect. Second, the number of children may be endogenous to wealth. Wealthier households, or those that anticipate greater wealth during the child-rearing years, may choose to have more children. An advantage of the fixed effects regression approach adopted here is that it may reduce any endogeneity or simultaneity bias.

Figure 5 reports predicted wealth by the number of children present in the household, after controlling for age, as well as year and individual fixed effects. The figure reports the within-household effect on wealth of an additional child present in the household. Wealth declines once households have more than one child present. The 95% confidence interval also implies that households with three or more children have significantly less financial wealth than households with no children or a single child. Family size, therefore, had a substantial impact on household wealth over the life cycle.

Figure 5



6.2. Men and women

In addition to the full sample estimates Table 1 reports mean and median regressions for men and women separately. What emerges is a notably different pattern in wealth-at-age between the sexes. Men's wealth holdings continue to increase through their seventies and are barely drawn down after that. Women's wealth holdings demonstrate the classic and pronounced hump-shaped pattern predicted by the life-cycle hypothesis. Wealth is drawn down relatively quickly after age 66, which is the age at predicted maximum mean wealth among women.

Figure 6

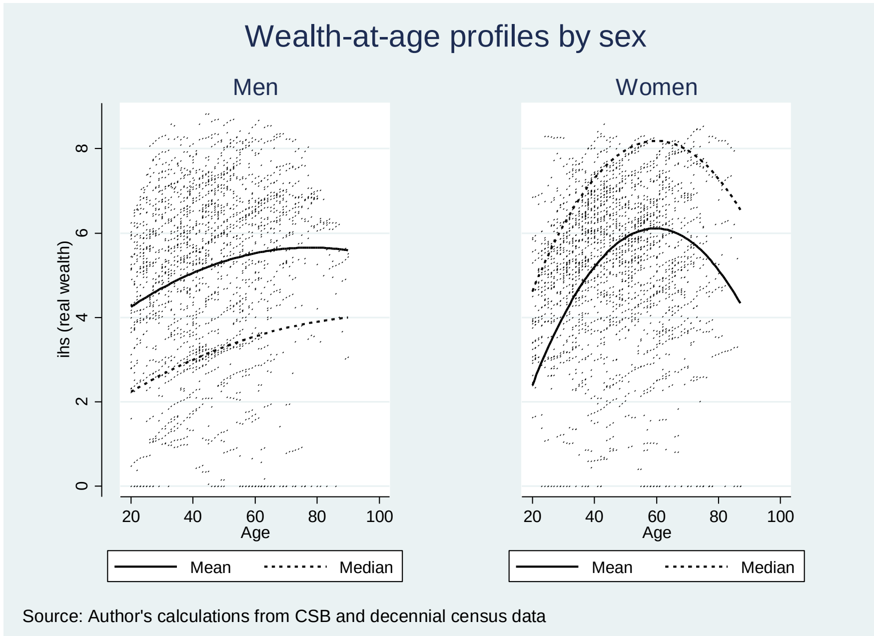


Figure 6 maps the wealth-at-age profiles when the data are separated by sex. The two noteworthy features merit discussion. First, consider that the financial wealth profiles for men do not trace out the expected hump shape. In their study of modern Norwegian households, Fagereng, Gottlieb and Guiso (2017) note a similar pattern for financial wealth (not all wealth) in their raw data. Among Norwegians, the financial wealth-at-age profile are generally upward sloping even for cohorts in their 70s and 80s. Once they adjust the data for survivorship and cohort effects, they find rapid accumulation of financial wealth up to retirement, after which it remains relatively flat. Like the men at the CSB, older Norwegians households are not running down their financial wealth in old age and retirement, a feature Fagereng, Gottlieb and Guiso (20170 attribute to a powerful bequest motive (see also Bernheim 1987).

Was a similar pattern evident among late nineteenth-century American men due to a strong bequest motive? Perhaps, but it may be driven by other factors as well. Around 1900 a 20-year-old male could expect to live to age 62. If he lived to age 60, he expected to live another 14.4 to 14.9 years (Ransom and Sutch 1986, Hacker 2010). The likelihood of living into one's 60s was high enough at age 20 for men to plan for that contingency, which is evident in the estimated mean and median life-cycle wealth profiles in Figure 6. If a man was fortunate enough to live to age 60, he faced nearly 15 years of diminishing capacity for work, which implied working at a less remunerative job, and that had to be included in a retirement plan. A man who survived to 70 had a life expectancy of 9.8 years, a period that had to be financed through a combination of intermittent and irregular labor force participation and accumulated wealth. And if a man survived to 80, his life expectancy was 6.2 additional years. The predilection among men to continue to accumulate financial wealth into their 70s and beyond must have been due, at least in part, to uncertainty regarding life expectancy.

A second factor driving a man's continued accumulation into old age, if he was married, was the uncertainty regarding his wife's life expectancy. The average age of the last observed account balance in the Cornwall Savings Bank ledgers is 57.8 years. The average age of these men's wives was 52.9 years. Among men whose accounts were closed after age 45, the average ages were 63.8 years for husbands and 58.3 years for wives. Wives were about five years younger than their husbands. Not only did married men have to concern themselves with uncertainty over their own life expectancies, they were concerned with their wives' uncertain life expectancies, which were increasing after the 1880s (Goldin and Lleras-Muney 2019). In a world without retirement annuities, older men continued to work and save well into their advanced years, partly in response to the uncertainty regarding their own lives, but those of their wives as well.[5] Older men genuinely retired – withdrew from the labor force completely – only when the lower (relative to permanent-income) wages they received fell below two margins: (1) the implicit value of free time to them; and (2) the expected utility of future ***household*** consumption financed by an extra day of work.

Although the classic life-cycle hump-shaped wealth-at-age profile is less evident for men than women, it does not refute the life cycle hypothesis. Two features are consistent with the hypothesis. First, an anticipation of downward occupational mobility in later life (if age 50 is indeed late life) encouraged young men to begin saving at young ages to finance permanent consumption in later life. Second, the considerable uncertainty regarding additional years of life at the milestone birthdays of 60, 70 and

[5] Ransom and Sutch (1986, p.12) estimate the labor force participation rate for all men over age 60 at 66.1% in 1900; for men over 70 is still exceeded 50 percent.

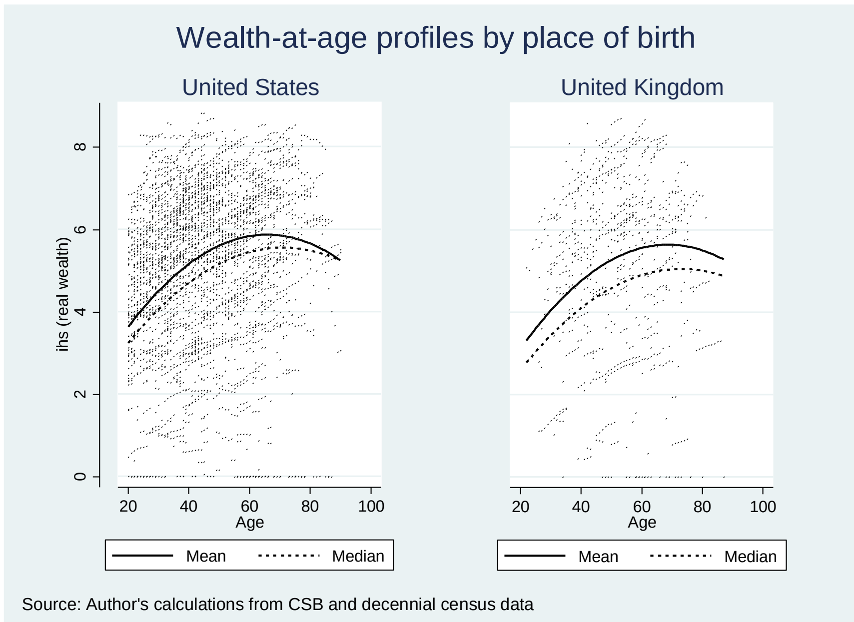
even 80, kept men in the labor market and accumulating assets nearly up to the end of their lives. There may have been a third – a bequest – motive for late-life work and saving, as well, that should not be overlooked. Some men may have had a strong preference for transferring wealth to wives and children on their deaths. Moreover, Deneweth, Gelderblom and Jonker (2014) note that the demand for respectful funerals increased in this era, especially among urban, industrial workers, and wealth held at death may have been a form of burial insurance.

The right-hand panel of Figure 6 raises the question: Why were women's wealth accumulation behaviors more consistent with the life cycle hypothesis than men's behaviors? The obvious answer – that women retired in that they withdrew from the labor force – seems appropriate. Goldin (1977) reports that in 1880 the white female labor participation rate in the South was 16.3% for women between 50 and 64 years and 5.6% for women 65 and older. Boustan and Collin's (2014) estimates of overall female labor force participation in the US in 1880 (17.1%) suggest the participation rate of older women in New York was probably considerably below values reported by Goldin for the South. But even if Goldin underestimates participation by half, female rates at older ages were one-sixth that of male rates. For men 60 years and older in 1880 the labor force participation rate exceeded 60% (Ransom and Sutch 1986). In the late-nineteenth and early twentieth centuries, married women were largely unattached to the labor force, even before old age. In old age women lived on any accumulated wealth, bequests, and transfers both public and private. The result was a hump-shaped wealth-at-age profile consistent with the life-cycle hypothesis.

6.3. Native- and foreign-born

Figure 7 overlays the predicted means and medians of wealth by nativity on a scatterplot of the data. (The coefficient estimates are reported in Appendix Table B1.) The wealth-at-age profiles resemble those observed above. The predicted wealth profiles for native-born individuals exhibits the hump shape consistent with the life-cycle hypothesis. Mean wealth among the native-born is maximized at 62.6 years of age; median wealth is maximized at age 65.7. Mean wealth at age 62.6 is $323, or about three-fourths of real annual average wages. Median wealth among the native-born is just $142, or no more than enough to finance a few months without income or support from outside sources.[6]

Figure 7



Among the Cornwall Savings Bank's depositors born in England, Scotland and Ireland, mean wealth is comparable at most ages to wealth of the native-born, except that the foreign-born continue to continue accumulating wealth later than the native-born. Median wealth holdings among the foreign-born are well below that of the native-born, but the UK sample includes just 818 observations on 58 individuals so the estimates may not represent the true state of wealth-at-age among the foreign born in Upstate New York generally. The results are comparable to those for the native-born, however. Coefficient estimates imply that mean wealth among people born in the UK is maximized at 65 years and equals $332; median wealth is maximized at age 56 and equals $124.

The evidence from the Cornwall Savings Bank suggests that saving and wealth accumulation behaviors among the native- and foreign-born were similar. In one regard,

[6] The apparent smaller gap in Figure 7 follows because the curves are predicted means and medians, not actual means and medians observed in the data and discussed in the text.

the similarity is not surprising once we recognize that English, Irish, and American savings banks targeted the same groups. Despite their original objective to instilling good financial habits in the working poor, savings banks in both the US and UK evolved into institutions that served the working and middle classes. Among men, depositors were overwhelmingly semi-skilled operatives, skilled artisans, and low-level white-collar workers. Among women who reported an occupation, most worked as dressmakers, teachers, and domestic servants (Fishlow 1961, Wadhwani 2002, Schoenfeld 1925, and Alter, Goldin and Rotella 1994). In a second regard, the comparability of wealth levels across native- and foreign-born households is surprising because migration was costly and there is a widely held belief that immigrants faced an initial substantial earnings penalty and integrated into adopted economies at rapid but different rates based on country of origin, though Borjas (1985) and Ferrie (1997) critique the standard view. Using linked longitudinal samples across censuses, however, Abramitzky, Boustan and Eriksson (2014) and Abramitzky et al (2021) find that the earning penalty is generally less than previous research finds because immigrants settled in areas that offered better prospects for themselves and their children. There was no wage penalty for English-speaking migrants. Estimated wealth-at-age for the native- and foreign-born among the CSB's account holders is consistent with recent findings on immigrant assimilation, though the sample size is too small to draw more than preliminary conclusions.

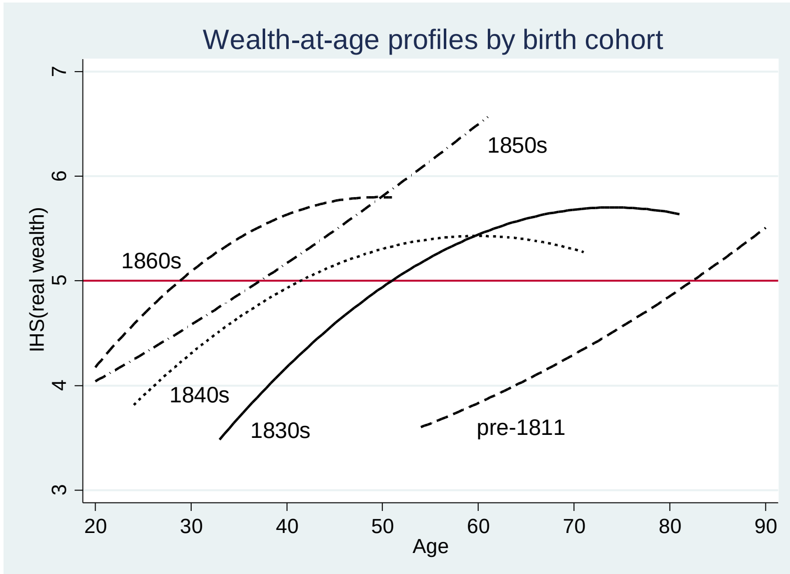
6.4. Cohorts: productivity growth and wealth accumulation by decade of birth

Several features of the late-nineteenth and early twentieth century economy point to the possibility of important cohort effects that will influence savings rates. Life-cycle earnings are determined by anticipated life expectancy, fertility, retirement age, long-term interest rates, labor market conditions, and macroeconomic phenomena including productivity growth. Anticipated productivity growth is an important determinant of life-cycle savings. In an economy experiencing substantial productivity growth, younger cohorts have greater lifetime resources than older ones so that they save more to finance greater permanent consumption in old age. The countervailing effect might be that higher lifetime or permanent income, especially at older ages may encourage later-arriving cohorts to consume relatively more in youth because more can be saved at later ages to finance retirement. Similar countervailing effects may result if later-arriving individuals anticipate longer lives, offering more years over which to save a given amount, which may reduce saving and wealth accumulation early. Alternatively, longer lives may mean more years of particularly low wages or irregular employment at older age – a longer effective retirement – which may encourage higher savings rates and more accumulation early in life. Determining which effect dominates is an empirical question.

Productivity growth occurred in nearly every sector and industry in the late nineteenth century United States (Broadberry and Irwin 2006). It was not the technological "big wave" of the early twentieth century documented by Gordon (2000), but it transformed the lives of all Americans. Between 1840 and 1900, gross farm output grew at an annual average rate of 2.7 percent; total factor productivity in agriculture grew by 0.5 percent per year (Gallman 1972). Between 1869 and 1909, even as millions of Americans moved off the family farm into urban manufacturing and service employments, output per employee in American manufacturing increased by 40 percent, an increase due in large part to the diffusion of the steam engine and the expansion of factory-based production (Broadberry 1992; Atack, Bateman and Margo 2008). Steam-based mechanization led to a finer division of labor, increased productivity, and increased wages, despite automation's deskilling effect (Atack, Margo and Rhode 2019). One consequence of this productivity growth was that real wages doubled between 1865 and 1915.

Figure 8 traces the wealth-at-age profiles for five decade-of-birth cohorts for which there are sufficiently large samples to estimate a curve. The solid horizontal line is consistent with real wealth of about $75. The graph portrays wealth-at-age patterns consistent with a combination of pure cohort effects and productivity growth effects. The cohort born before 1811 and residing in Cornwall-on-Hudson, for example, did not have ready access to a savings bank until 1872 or until they were in their early sixties or older. The pre-1810 cohort did not accumulate an average balance of $75 until their early eighties. It is not surprising that they held relatively modest amounts of financial wealth in the bank. By the time it opened, these individuals were already faced declining productivity and wages and, absent a convenient financial intermediary, used alternative savings vehicles.

Figure 8



Wealth-at-age trajectories for cohorts born between the 1830s and 1860s, however, are consistent with the increase in labor productivity and wages documented by economic historians. Depositors born in the 1830s reached the $75 threshold around age 50; those born in the 1840s and 1850s reached it at age 40. Depositors born in the 1860s reached it by age 30, but the sample size of the 1860 cohort is small enough that the entire wealth-at-age profile may not accurately reflect their genuine lifetime decisions. Nevertheless, it appears that rising real wages encouraged people to accumulate financial wealth earlier in their lives. A factor that should not be overlooked is the expansion of the financial sector generally and a growing comfort level each subsequent generation had interacting with financial intermediaries. Cohorts born after 1850 did not experience the two severe banking crises of 1837 and 1839, and they were probably too young to have been aware of the panic of 1857. Moreover, as savings banks spread into smaller towns, like Cornwall-on-Hudson, and proved to be safe repositories, more people were willing to hold more of their wealth in them.

7. Concluding comments

Despite economic historians' continuing interest in the financial industry's contribution toward long-run economic growth in early America, relatively little research has focused on how and how effectively the industry mobilized household savings (Bodenhorn 2018 provides a review of the literature). Commercial banks, whose lending and note-issuing practices have received the most attention, did not provide deposit accounts to working- and middle-class households. Savings banks filled that void by serving as safe repositories for modest life-cycle and precautionary savings accumulated by these households. Much more research is needed before we can pronounce on savings banks' contributions to growth, though there is preliminary evidence that they played a vital role in financing the construction of municipal clean water infrastructure in the late nineteenth and early twentieth century (Bodenhorn 2017).

This study provides preliminary evidence on how middling, small-town households made use of turn-of-the-century savings banks. It is too early to draw definitive conclusions, but the evidence reported here suggests that *fin de siècle* households accumulated wealth in a fashion largely consistent with Modigliani's life-cycle hypothesis, appropriately modified to account for labor market frictions and life expectancies faced by people born in the second half of the nineteenth century. Men did not anticipate an extended period of retirement in the modern sense. They anticipated a long period of declining and irregular attachment to the labor force after they reached their mid-fifties and they no longer had the physical stamina to work in physically demanding occupations. Given the realities of the era's work and longevity, men continued to work and accumulate savings into their mid-sixties and beyond. Men drew down their wealth after their mid-sixties at a modest rate. Men's decisions to work and limit dissaving may have been due to several factors, including a bequest motive and genuine uncertainty over their own and their spouses' life expectancies. Municipal clean-water investments mentioned above increased life expectancies, not least among those most susceptible to the ill effects of consuming contaminated water, namely the young and the old.

Women, too, were the beneficiaries of the clean-water investments and the lifetime trajectories of women's wealth holdings are more consistent with the life-cycle hypothesis' predictions than are men's trajectories (Goldin and Lleras-Muney 2019).

Women's life-cycle wealth holdings exhibit the pronounced hump shape because, unlike men, they did separate from the labor market. Formal labor market participation among women was lower at every age than among men, but the differences at older ages were pronounced; less than 10% of women over 55 worked for wages compared to about 60% of men. Older women relied on their accumulated wealth to finance consumption at older ages.

Evidence from the Cornwall Savings Bank also reveals strong cohort effects predicted by the life-cycle hypothesis. Productivity growth and rising real wages across nearly all industries in the second half of the nineteenth century seemingly encouraged young people to save more and save earlier. Whereas cohorts born before 1810 did not cross the $75 in real financial wealth before age 70, cohorts born in the 1850s crossed that threshold by age 30.

In the nineteenth century, social reformers encouraged working-class households to make regular contributions to savings banks accounts. Households that held financial wealth were more likely to remain self-reliant during periods of seasonal and cyclical unemployment. They were also more likely to be self-supporting in old age. Finally, Progressive-era reformers in the United States and elsewhere considered individual thrift an indispensable feature of civic well-being (Wadhwani 2002; Deneweth, Gelderbloom and Jonker 2014). In the United States, reformers argued that the republic's collective well-being turned on its citizens' economic independence and security, both of which were advanced through saving. These three reasons point to several avenues for future research. This paper provides evidence that savings bank depositors accumulated wealth to support themselves in old age. It remains to be seen whether and the extent to which depositors behaved in accordance with buffer-stock models of saving. And, depending on how we define and measure civic behavior — say, voting, public goods provision, or investments in public infrastructure — modern econometric analysis has provided the tools with which to test the hypothesis. Future studies of savings bank depositors hold the potential to advance our understanding of economic growth in the nineteenth and twentieth centuries.

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Appendix A: Higher order age effects in wealth regressions

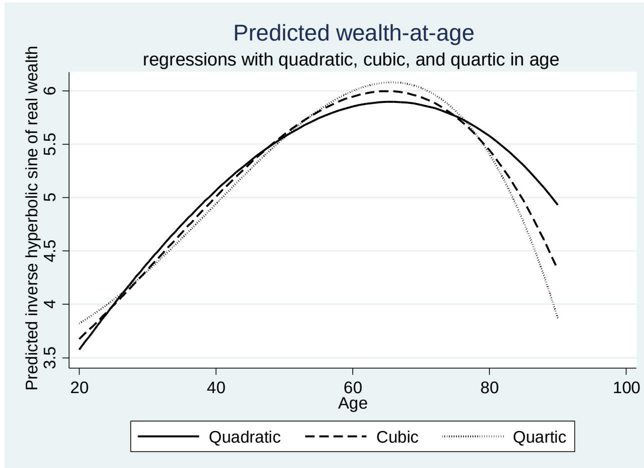
Table A1

Real wealth regressions with higher order age terms

VARIABLES	(1) Quadratic Mean	(2) Cubic Mean	(3) Quartic Mean
Age	0.17253**	0.02866	0.73658*
	(0.03288)	(0.09249)	(0.29691)
Age ^ 2	-0.00134**	0.00175	-0.02147*
	(0.00031)	(0.00190)	(0.00959)
Age ^ 3		-0.00002	0.00030*
		(0.00001)	(0.00013)
Age ^ 4			-0.00000*
			(0.00000)
Children = 1	-0.20582	-0.16371	-0.09183
	(0.25683)	(0.26565)	(0.26001)
Children = 2	-0.24508	-0.18149	-0.08062
	(0.29846)	(0.31014)	(0.31415)
Children = 3	-0.51733	-0.41360	-0.31662
	(0.36847)	(0.38150)	(0.37842)
Children = 4	0.02465	0.14043	0.22211
	(0.45660)	(0.46872)	(0.46626)
Children = 5	-0.03688	0.11219	0.14605
	(0.89586)	(0.90566)	(0.87897)
Children >= 6	-0.17271	-0.02463	-0.02003
	(0.45558)	(0.47420)	(0.46342)
Constant	0.06660	2.04986	-5.51213
	(1.04436)	(1.55489)	(3.28734)
Observations	4,651	4,651	4,651
R-squared	0.05449	0.05675	0.06248
Number of individuals	339	339	339

Standard errors clustered on individual
** p<0.01, * p<0.05

Figure A1: Predicted wealth-at-age using higher-order age terms in wealth regressions



Appendix B: Regression results. Savers born in UK and US.

Table B1

Fixed effects coefficient estimates of wealth-at-age, mean and median regressions

	(1)	(2)	(3)	(4)
	UK sample	UK sample	US sample	US sample
VARIABLES	Mean	Median	Mean	Median
Age	0.130	0.112	0.180**	0.167**
	(0.122)	(0.099)	(0.037)	(0.041)
Age squared	-0.001	-0.001	-0.001**	-0.001**
	(0.001)	(0.001)	(0.000)	(0.000)
Children = 1	-0.142	-0.125	-0.258	-0.275
	(0.498)	(0.641)	(0.296)	(0.297)
Children = 2	0.102	-0.009	-0.444	-0.463
	(0.585)	(0.572)	(0.346)	(0.343)
Children = 3	-0.477	-0.561	-0.710	-0.706
	(0.647)	(0.599)	(0.467)	(0.405)
Children = 4	0.447	0.428	-0.537	-0.592
	(0.850)	(0.795)	(0.435)	(0.506)
Children = 5	0.417	0.589	-0.637	-0.681
	(1.677)	(1.017)	(0.632)	(0.694)
Children ≥ 6	0.117	0.122	-0.505	-0.521
	(1.163)	(0.869)	(0.360)	(0.550)
Constant	0.271		0.131	
	(3.175)		(1.258)	
Observations	818	818	3,683	3,683
R-squared	0.078		0.061	
Number of ledgerno	58		268	

Robust standard errors in parentheses
** p<0.01, * p<0.05