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NARRATIVES ABOUT TECHNOLOGY-INDUCED JOB DEGRADATION
THEN AND NOW

By

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February, 2019

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Narratives about Technology-Induced Job Degradation, Then and Now
Robert J. Shiller
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ABSTRACT

Concerns that technological progress degrades job opportunities have been expressed over much of the last two centuries by both professional economists and the general public. These concerns can be seen in narratives both in scholarly publications and in the news media. Part of the expressed concern about jobs has been about the potential for increased economic inequality. But another part of the concern has been about a perceived decline in job quality in terms of its effects on monotony vs creativity of work, individual sense of identity, power to act independently, and meaning of life. Public policy should take account of both of these concerns, inequality and job quality.

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Fears about the effects of labor-saving machines on our jobs, as these machines replace many tasks, have a long history. The fears are expressed both in professional writings of economists and in popular stories. We here give a brief history of narratives expressing these fears and briefly consider the relevance of such narratives for public policy.

The term “narrative” is often used as a synonym for “story,” a sequence of events. But the word narrative has an important other aspect. A narrative is a *telling* of a story, that attaches meaning and significance to it, that often is intended as providing a lesson or a moral. A narrative can become an interpretation of ongoing events by comparing them with a story. With economic narratives, the narrative may represent a proto-economic model, understandable by the most general public.

Especially important among narratives are those about our life’s work—our jobs. While people in jobs of low prestige may not express much delight in telling the story of their life of work, it is a story they think about and that defines their contribution to loved ones and to society.

In my 2017 American Economic Association presidential address *Narrative Economics*, and in a forthcoming book with the same name, I have been arguing that it is important for economists to appreciate the popular economic narratives that go viral, that come and go according to epidemiological patterns. Just as a disease, an economic narrative, a story that is connected to things that matter in the economy, rises like an epidemic to influence a large fraction of the population. The epidemic alters their economic actions and their voting. It then influences government economic policy, and also drives economic fluctuations. During the

growth phase of the narrative epidemic, the contagion rate has to be above the forgetting rates, allowing the narrative to grow in influence. Eventually the narrative fades away, after the contagion rate falls below the forgetting rate. Then the narrative may mutate, as viruses do, and another epidemic may return again, and again.

In this paper I will present a brief history of thought on both professional and public narratives related to the effects of machines replacing jobs. The immediate concern most expressed is that one will lose a job altogether, resulting in poverty and unemployment. But the spell of unemployment may not be the dominant concern. There is also the fear that the resulting eventual job switch will be to a job that is demeaning.

In a psychologically healthy environment, narratives establish honored membership in community. Everyone wants to be loved. Everyone feels a deep need to be part of a community that at the very least respects one's contribution. Narratives about jobs are among the most vivid, since we tend to spend most of our lives working in the market economy and to define ourselves in terms of our work there.

Ancient Religious and Philosophical Narratives about Work

In the book Ecclesiastes, in the Bible, written between 400 BCE and 180 BCE, a concept of meaning in work is laid out in vivid poetry:

III-1 There is a time for everything, and a season for every activity under heaven. a time to be born and a time to die, a time to plant and a time to uproot, . . .

V-11 As goods increase, so do those who consume them, and to what benefit are they to the owner except to feast his eyes on them?

V-18 Then I realized that it is good and proper for a man to eat and drink, and to find satisfaction in his toilsome labor under the sun during the few days of life God has given him—for this is his lot.¹

The book Ecclesiastes in its New International translation uses the word “meaning” or “meaningless” repeatedly. (The King James translation used the word “vanity” or “vanities”.) It is a book about the meaning of life. In fact, the opening line of Ecclesiastes is

“I-2 Meaningless! Meaningless!’ says the Teacher. ‘Utterly meaningless! Everything is meaningless’.”

But that was an expression of despair, and the book comes around to finding meaning in day-to-day work.

The religious narrative is not absent even for people who do not go to church, temple or Mosque at all, transmitted by ordinary talk, or in news or songs or plays. Work is as inevitable as the changing seasons or the life cycle. Consumption of goods beyond what is necessary may be meaningless. Toilsome labor is not onerous because it is part of our life story.

Economists are accustomed to writing utility functions that depend positively on consumption of goods and negatively on labor supplied. But poems like the above are suggesting something very different.

This Ecclesiastes poem has a long history, I would say a long epidemic, the poem is contagious. It generates new epidemics from time to time, like a disease mutation starting a new epidemic. In the late 1950s, the folk singer Pete Seeger wrote a song, entitled “Turn, Turn, Turn” that took the opening words from Ecclesiastes III above. It became a number one hit on the Billboard Top 100 when it was recorded by The Byrds in 1965, got further impetus with Judy Collins in 1969, Emmylou Harris, yet other singers, and in plays and movies.

The protestant revolution, the Reformation, starting in the year 1517, was associated with a renegade Catholic monk, Martin Luther. Luther emphasized that every person has a *Beruf*, a calling, denying the then-extant emphasis on martyrdom. According to Luther, the work one

does has religious significance, and is deep with meaning about one's identity and purpose in life. One's work is not just one's lot in life, it is a source of inspiration.

A secular account of the pleasure in work is revealed in personal accounts of the meaning of work—placing the work as part of a life story. These longstanding concerns about the meaning of work continue today. The concerns about loss of meaning were expressed long before the appearance of significant labor-saving machines and continue today even beyond concerns about such machines. Changes in business procedures to routinize and standardize jobs, reduce the jobs to narrow tasks that machines cannot do yet, may have serious effects on the meaning of work.

For example, the advent of chain stores, whose very beginnings can also be traced back to the 19th or even the 18th century, seems to stir up the same feelings of loss of meaning. Such “Formula businesses” are in many cases banned by local communities, who do not want to see their unique spirit invaded by standardized and vulgarized businesses.

Narratives during the Eighteenth Century and the Industrial Revolution

Early indications of public concerns about the modern degradation of job quality may not have mentioned machines at all, though one suspects that the advent of the industrial revolution played a real role. A 1785 farmer, in an article written for the *Connecticut Courant*, the ancestor of today's *Hartford Courant*, describes his wondering if he should leave the farm and become a part of the more exciting urban environment. It is a narrative about the meaning of life, also a scene of happiness, though maybe not the same as joy in the repetitive tasks themselves. He describes a farm that seems to be comprised of only him and his wife, and a happy scene:

When young I entertained some thoughts of selling my farm. I thought it afforded but a dull repetition of the same labours and pleasures. I thought the former tedious and heavy, the latter few and insipid; but when I came to consider myself as divested of my farm, I then found the world so wide, and every place so full, that I began to fear lest there would be no room for me.²

His narrative includes scenes of simple pleasures on the farm:

My wife would often come with her knitting in her hand, and sit under the shady trees, praising the straightness of my furrows, and the docility of my horses; this swelled my heart and made every thing light and pleasant, and I regretted I had not married before.³

He also asserted that his farming was a statement of mastery and freedom:

The instant I enter on my own land, the bright idea of property, of exclusive right, of independence, exalts my mind. Precious soil, I say to myself, by what singular custom of law is it that thou wast made to constitute the riches of the freeholder? What should we American farmers be without the distinct possession of that soil?⁴

He does not mention labor-saving machinery in this piece, though his perceptions of life in the city might already show some influence from that. But one can imagine from what he says that he would not entirely welcome a machine that makes his plowing unnecessary.

The idea of robots got a firm foothold in the public imagination in the eighteenth century, though the word “robot” was not to come until the twentieth century. A Google Ngrams search shows that books referred to them as “automatons,” starting in the late 18th century, and this term saw another variation, “automation” in the second half of the twentieth century. The word “creativity” took hold toward the end of the twentieth century, perhaps in reaction to these supposedly intelligent humanoid machines who lacked it.

In 1769 the renowned inventor Wolfgang von Kempelen produced “The Turk,” a chess-playing robot in the form of a dummy in Turkish clothing seated attached to a large cabinet filled with machinery, on top of which was a chessboard. Visitors were invited to open the doors to the cabinet and look inside, where they saw some machinery. The device was designed so that a

complex mechanism obscured their view so that they could not see that there was a man, a chess master, hiding inside. A system of magnets allowed the hidden man underneath the chessboard to see the positions of the pieces on the chessboard, and a system of controls allowed him to move the arms of the automaton, and thus to move the chess pieces. The machine played chess brilliantly, defeating both Napoleon Bonaparte and Benjamin Franklin. The popularity of the word “automaton” begins with the von Kempelen narrative and lasts to the present day. Did people believe the machine was real? Their willingness to believe was enhanced since von Kempelen was also a renowned inventor, and his apparatus was cleverly done. Probably many did believe, but skepticism was also rampant, since they could not see how such a machine could possibly work.

The invention of the water-powered roller gin by Joseph Eve in 1788 and of the cotton gin by Eli Whitney in 1793 began to draw attention to the loss of jobs that might be occasioned by new machines. The new machines removed the seeds from cotton bolls so that they could be spun into cotton for cloth. The gin was vastly quicker than the hand-picking at the seeds that preceded it. This development occasioned some concern that the new machines would depress the price of slaves in the southern United States, since it would replace one of their main occupations.

One would think that if these machines were replacing manual labor, there would surely be concern expressed for the investment value of slaves. A search for articles about the price of slaves and labor-saving machinery produced only a little. Many years after the 18th century, *The Picayune* in New Orleans, a precursor after merger with the *Times-Democrat* to today's *Times Picayune* there, wrote in 1859, just before the American Civil War that resulted in the emancipation of the slaves, referring to a northern newspaper article:

The Philadelphia American and Gazette gets off a theory, in its peculiar style, to the effect that the South is opposed to labor saving machinery because “saving labor depreciates the slave.” It is mistaken, both in the fact and the reason. It was not a fact that the South has an antipathy to labor saving machinery, nor is it true that “steam as the slave and ingenuity as its driver” reduces the value of black labor of the slave States.⁵

The fact that slave prices were generally increasing right up to the Civil War has recently been called the “Cotton Gin Paradox.”⁶ Robert Fogel and Stanley Engerman added another element to the paradox, that slave prices should have been depressed as the abolitionist fury gained strength as the 19th century progressed, up to the Civil War, which should have shown an increasing probability that the slaves would be freed.⁷

Some of the earliest mechanization examples were threshing machines, which separated wheat from chaff. Andrew Meikle invented a celebrated thresher in 1786, which offered to replace a major task on traditional farms. It was powered by horses. The horse-powered machines led to a view of mechanization that suggested that at issue was the replacement of people by horses.

Thomas Paine was an extremely important thinker. In the context of the American Revolution, his book *Common Sense*, which appeared in early 1776, was a huge bestseller by July when the U.S. Declaration of Independence was signed. Less well remembered is his book *Agrarian Justice* 1797. He was worried already about the superfluity of labor, but not so much in the context of labor-saving machines, a concept he does not mention. But his model of the world was that of a single limiting constraint in an agricultural economy: land. His references to land are akin to the references to robots today. Who owns the land was the winner, instead of who owns the robots.

Thomas Paine wasn't describing the world of the future, he was describing the world of time immemorial, when labor was, in his view, already largely redundant, already in poverty. He did not seem to think of labor as a factor of production, but as merely a moral obligation to society. He advocated a sort of universal basic income to be given to everyone.

Nineteenth Century Economists' Narratives

Following the Luddite riots in 1811, economists began to be thinking about the effects of labor-saving machinery on the price of labor. In his 1821 third edition to his *On the Principles of Economics and Taxation*, ten years after the Luddite rebellion, David Ricardo added a "Chapter XXXI: On Machines."⁸ In that new chapter he said that he had made a mistake on the impact of labor-saving machines on human society:

My mistake arose from the suggestion, that whenever the net income of a society increased, its gross income would also increase. I now, however, see reason to be satisfied that the one fund, from which landlords and capitalists derive their revenue, may increase, while the other, that upon which the laboring class mainly depend, may diminish, and therefore it follows, if I am right, that the same cause which may increase the net revenue of the economy, may at the same time render the population redundant, and deteriorate the condition of labourers.⁹

Ricardo gives an example of what might happen if new machinery allows the more effective use of horses. Then, capitalist farmers might substitute horses for hired men, and divert the resources for feeding the men to feeding the increased population of horses, with a consequential hardship for men. This is the flipside of Wassily Leontief's famous comparison of men with horses in the twentieth century, observing that mechanization has finally eliminated most of the need for horses, with the result that the population of horses has shrunk drastically, horses sent to the slaughterhouse.¹⁰

Alfred Marshall in his 1890 first edition of the textbook *Principles of Economics* wrote in a chapter on the division of labor tied the advent of laborsaving machines with the standardization of tasks:

We are thus led to a general rule, the action of which is more prominent in some branches of manufactures than others, but which applies to all. It is, that any manufacturing operation that can be reduced to uniformity, so that exactly the same thing has to be done over and over again in the same way, is sure to be taken over sooner or later by machinery.¹¹

He discussed the monotony of such work, but said it is not necessarily contrary to happiness:

Monotony of Work is an Evil of the First Order Only When It Involves Monotony of Life. . . The social surroundings of factory life stimulate mental activity in and out of working hours, and many factory workers, whose occupations are seemingly the most monotonous, have considerable intelligence and mental resources.¹²

Marshall in this same textbook anticipates the frequently expressed modern view that machinery replaces tasks for labor, but creates new tasks, which Acemoglu and Restrepo have called the “displacement effect” and the “reinstatement effect.” Marshall anticipates these effects in his 1890 textbook:

Thus machinery constantly supplants and renders unnecessary that purely manual skill, the attainment of which was, even up to Adam Smith’s time, the chief advantage of division of labour. But this influence is more than countervailed by its tendency to increase the scale of manufactures and to make them more complex; and therefore to increase the opportunities for division of labour of all kinds, and especially in the matter of business management.”¹³

The same idea has also been expressed quite recently by David Autor, a labor economist, who puts the current situation into perspective after centuries of worry about machines replacing jobs: “Why hasn’t automation already wiped out employment for the vast majority of workers?” was the title of a 2016 paper. His answer: “Tasks that cannot be substituted by automation are generally complemented by it.”¹⁴

But note that this principal that automation creates jobs is not a theorem in basic economics. It could be otherwise, and manual labor could see its fortunes collapse, just as Ricardo insisted.

Twentieth to Twenty-First Centuries Narratives

The word “robot” finally entered the languages of the world in 1920 with the play *Rossum’s Universal Robots* by the Czech playwright Karel Čapek. This play coined the word robot, from the Czech word for slave. The play was translated from Czech to English and became a hit in English-speaking countries, eventually, and spread to much of the world. The word robot then entered most of the languages of the world. The story depicted a company, headed by a Mr. Domin, that had started producing and selling robots, an invention of Mr. Rossum:

Domin

What sort of worker do you think is the best from a practical point of view?

Helena

Perhaps the one who is most honest and hardworking.

Domin

No; the one that is the cheapest. The one whose requirements are the smallest. Young Rossum invented a worker with the minimum amount of requirements. He had to simplify him. He rejected everything that did not contribute directly to the progress of work!—everything that makes man more expensive. In fact, he rejected man and made the Robot. My dear Miss Glory, the Robots are not people. Mechanically they are more perfect than we are, they have an enormously developed intelligence, but they have no soul.

The play gives no space to the thought that the robots might make one unemployed. Instead it is a vision of a horrible world without love and feeling. The robots in Karel Čapek’s play eventually rise up and kill almost all humans.

A Google Ngrams search shows that a new term “technological unemployment,” unemployment caused by new machines, rose rapidly into prominence in the 1920s and 1930s. Then in the 1960s there was another epidemic of attention to the problem of machines replacing jobs, with a newly popular word, “automation.” One observer in 1965 wrote a book *The Automation Hysteria* which described a “huge spate of alarmist literature” about this automation, and fears then of a future of unemployment worse than that of the Great Depression.¹⁵ The term “Triple Revolution” suddenly and briefly appeared in the 1960s too, the three revolutions being automation, weapons of mass destruction, and expanding human rights.

But the automation hysteria of that time was not just about the loss of jobs per se. Robert Theobald wrote an influential book in 1963, *Free Men and Free Markets*, that argued for deciding on a new and revised version of work and its meaning. He was an economist of sorts, though he dropped out of graduate school at Harvard. His book called for the government providing everyone with a “Due Income” (Basic Income). He was not enthusiastic about policies to promote high employment, asking, what is good about keeping people on the assembly line? He expressed faith in people: people will find something more meaningful to do when freed from drudgery. The question is not “How do we find jobs for everybody?” but “How do we find purpose and meaning and rights to resources for everybody” — which is a completely different question.”

Robert Theobald’s rise to fame was rapid, so that by the 1960s he was one of the most famous economists, in the 1960s after the publication of *Free Men and Free Markets* briefly outshining superstars Kenneth Arrow and Paul Samuelson. But, following typical epidemic curve pattern, his fame dropped precipitously, so he is almost forgotten today. His due income

narrative continues, but he was not the originator of the idea and his name is no longer attached to it.

Another influential voice at this time was John Kenneth Galbraith. In his best-selling 1957 book *The Affluent Society* he argued, after noting that progress had created a class of a rich and self-indulgent class, that:

The solution is a system of taxation which automatically makes a pro rata share of increasing income available to public authority for public purposes. The task of public authority, like that of private individuals, will be to distribute this increase in accordance with relative need.¹⁶

Concerns about automation as invading our lives were expressed in Herbert Simon's 1966 book *The Shape of Automation*. The book argued that it is not just manual labor that is threatened by automation. The jobs of physicians, corporate president and college professors may be completely automated. Such a prospect creates uncertainty about how people in these jobs will find any work that offers comparable purpose and meaning that they have today.

The unanswered question from then, to today, is whether there will still be a demand for the augmentation of this automation with the uniquely human. The need seems to be, as expressed by David Autor and David Dorn, "interpersonal interaction, flexibility and adaptability to offer services that are uniquely human."¹⁷ This interpretation opens the question whether there could be jobs in the future that are also uniquely meaningful to human beings.

Edmund Phelps in his book *Rewarding Work* (1997, 2007) said that work is "the main source of people's personal and intellectual development." Phelps poses a question to himself:

. . .but surely there is not much mental stimulation and intellectual development provided by the jobs filled by *disadvantaged* people, is there? I responded that, for most people participating in the world of work, even on the bottom rungs, even unstimulating work is more interesting and satisfying than the alternatives if they do not get out of the house."¹⁸

Getting “out of the house” seems to be a metaphor for getting connected with larger society.

Phelps proposes a subsidy to employers of low-productivity earners, so that the employees see it in their paychecks and do not see the subsidy directly. The subsidy will raise the market price of unskilled labor, and gives the appearance that the work of the subsidized labor force is highly valued. Well, such a subsidy *does* make their work highly valued, in the market.

One may wonder what economics literature Phelps is referring to when he singles out work as such an important aspect of personal and social development. It appears not to be from economics journals. If one searches Google Scholar for “work” and “the meaning of life” one finds many articles, but not in economics journals. Some of the journals that come up in this search are: *Journal of Career Assessment*, *Applied Psychology: Health and Well Being*, *International Journal of Organizational Analysis*, *Journal of Counseling*, *Journal of Adolescent Research*, *Personality and Individual Differences*, *Ethics*, and *British Journal of Psychology*. The absence of economic journals on this important topic is part of a bigger problem in academic research caused by specialization.

Anthony Kronman, former Dean of the Yale Law School, wrote in a 2007 book *Education's End: Why Our Colleges and Universities Have Given Up on the Meaning of Life* that it is not just economists who are missing the meaning of life:

Graduate students learn to restrict their attention to a single segment of human knowledge and to accept their incompetence to assess, or even understand, the work of specialists in other areas. But they also learn to accept the idea that this same narrowing of attention, which cuts them off from those in other disciplines, alone qualifies them to join the company of fellow specialists in their own field, spread over many generations and united in a common commitment to the subject they share.

He argued that we are failing our students, or suggesting that life has no meaning, contrary to their deepest instincts.

Raghuram Rajan in his 2019 book *The Third Pillar: How Markets and the State Leave the Community Behind* argued that connections to community are far more important than most economists imagine. He says here that the community:

anchors the individual in real human networks and gives them a sense of identity; our presence in the world is verified by our impact on people around us.¹⁹

The first pillar of the economy is the markets, the second is the government, and the third is the local community, those one sees in the extended family, neighborhood and at work. The local community is the place where one's work narrative is most visible.

Social Hierarchy and Inequality

Narratives can trigger deep feelings based on the instinct for hierarchy. The pecking order matters to humans just as to chickens. With humans, the story of one's job affects one's social ranking. But there is in human society no consistent agreement on ranking. Each individual savors his or her own imaginary high ranking.

Political talk is strong on narratives about jobs. Politicians in the United States frequently refer to "hardworking Americans." One sees colorful appreciations of a life of hard work in obituaries, which often see fit to praise a life of devotion and hard work. For example, from an obituary in the 1930s:

Mr. Lloyd, whose puzzles challenged newspaper readers for more than 30 years, originated 10,000 puzzles by his own estimate. His goal was to create one puzzle a day. Working eight hours a day, in his Brooklyn studio he turned out an average of 300 a year."²⁰

Such colorful stories work to define a person's identity, his or her real significance in life. The stories involve suggestions of broad categories of social ranking but also the little details, of literary quality, like the one puzzle a day. Mr. Lloyd was significant because he appears to have been a unique source of pleasure to millions of people. Mr. Lloyd's occupation, and its meaning

to him in life, appears to be relatively less threatened by labor-saving machinery, but most people feel some insecurity in the security of their perceived narrative.

The narratives around the job, or lack of a traditional job, depends on the choice of words describing the activities of the person. Lack of a traditional job may be compensated for by the narrative that is applied to nonwork. Thus, today, people retiring on a pension take it as acceptable to go through decades of retirement without traditional work, because of the narrative that has emerged around them. In the United States, “Social Security,” with its “OASDI,” “Old Age, Survivors and Disability Insurance” has associated with it different narratives, that are far less controversial than any other form of redistribution to reduce economic inequality, even though it is just as well considered largely an institution to tax the rich and transfer to the poor. The difference is that it identifies only with sources of inequality that have good positive narratives, and it is framed as insurance, which is something paid for and earned.

Moreover, the fact that the narrative involves paying in to the insurance, with a deduction from one’s paycheck called F.I.C.A. for Federal Insurance Contributions Act, it is framed as a purchase for one’s own benefit. In fact, one is compelled to make the purchase, and for higher income people the purchase is not advantageous. Still, the fact that one paid for it seems to make the income redistribution acceptable. More than acceptable, the narrative of social security makes the system practically immortal. President Roosevelt, when asked in 1941 about the mandatory contributions for Social Security, said

“We put those payroll contributions there so as to give the contributors a legal, moral, and political right to collect their pensions and their unemployment benefits. With those taxes in there, no damn politician can ever scrap my social security program”

Some Policy Alternatives in Light of the Narrative History

The history of thought presented here highlights the fact that people have for centuries been concerned, when confronted with labor saving machines, with not only their effects on their incomes, but also with something deeper, the meaning of work and life, a concept which our psychology will not let us neglect.

The rise of populism and retreat into nationalism around much of the world in the twenty-first century may be related to past technological unemployment and as well to the narratives of loss of self-esteem. The potential for conflict from this event is worrisome.

Some kind of redistribution of income has long been advocated, in response to labor-saving machinery, as we have seen. In choosing among variants of this redistribution, it is important to consider the kinds of narratives that would be encouraged by the choice made. Some kinds of income redistribution look like charity or bailout, and as injustice to higher income people who may have worked hard for their success. Redress of inequality could be achieved along different lines than direct redistribution. We have seen the example of Social Security, that has been presented as a form of insurance rather than a tax. I argued in my 2003 book that framing our strategy for dealing with dislocations caused by labor-saving machinery as a form of insurance, collecting insurance premia today to provide protection against possibly much worse inequality in future decades, may make it a better narrative.²¹ I then called it “inequality insurance.” That name may not be suggesting the right story. The word “insurance” sounds honorable and apt, but the word “inequality” seems to suggest a narrative that the policy is a form of charity for the losers. Perhaps a name for a government program protecting people could be named after existing long-standing government social insurance. In the United States it

could be “human capital insurance” or even called something like “Social Security Part B” borrowing authority from an existing insurance program that is widely accepted.

President Franklin Roosevelt attempted such a reframing of narrative by naming his Depression program “The New Deal.” It was inspired by a 1932 book with that title by one of his advisors, Stuart Chase. Thus the entire edifice of his redistributive policies was defined as a sort of business deal rather than a charity. The policies are thus presented with a positive orientation, and a business narrative, overcoming resistance and shame as from living off the government, upon retirement.

Private long-term “livelihood insurance” as I called it in my 2003 book, which could also be called occupational income insurance, could also help protect people who are investing in risky human capital, protecting against technological progress reducing the remuneration and quality of jobs in their specified field or area. Such insurance could not only protect people against career risks as measured by occupational income indices, but also enhance a narrative of risk-taking with human capital, investing in forms of one’s human capital whose subsequent advantages are uncertain. The policies would by pay out to a beneficiary if an occupational income index for the beneficiary’s category declines. With such a narrative, this insurance would not have the stigma of charity or government redistribution. With such insurance, there could be a name of the product, such as entrepreneur’s insurance, or a name that suggests a story of adventuresome human-capital investment. The sales literature for the private insurance could emphasize that it would enable people to make risky but possibly highly successful human capital investments, by telling stories of other human-capital entrepreneurs that are suggestive of a personal narrative. The insurance may thus enhance both the stability of personal income and the sense of meaning in work.

Mentorship programs for young people have been growing exponentially since around 1980, in recognition of the powerful force friendship with otherwise distant successful people can have on the youth's self-image and personal narrative. Such mentoring is especially important for segments of the population that already feel excluded from a success narrative.²² Such mentoring could also be tilted towards helping them define themselves in terms of a life story of their contribution to society, a human contribution that might never be entirely replaced by machines. Such a narrative might cause them to take actions that put their livelihood at risk, but at the same time would help them maintain their self-esteem if such risk-taking puts them in a situation where they must accept help in maintaining their living standard.

With the long history of concern about the meaning of work that we have seen here, it seems that it must be that innovations, in the form of different kinds risk management institutions, or of jobs, or of mentorship, may be as important to promoting human welfare in the midst of a technological revolution as any direct government redistribution of income or wealth.

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- ¹ The Holy Bible, New International Version, New York International Bible Society, 1973.
- ² Situations, Feelings, and Pleasures of an American Farmer, from *The American Farmer's Letters*" *Connecticut Courant*, July 4, 1785, p. 1.
- ³ Op. cit.
- ⁴ Op. cit.
- ⁵ "Labor Saving Machinery," *The Daily Picayune*, August 27, 1859, p. 7.
- ⁶ <http://transitionvoice.com/2013/04/the-cotton-gin-paradox/>
- ⁷ Fogel and Engerman 1974.
- ⁸ The preface to the third edition says "In this edition I have also inserted a new chapter on the subject of machines." Ricardo 1821.
- ⁹ Ricardo 1821, p. 469.
- ¹⁰ Leontief 1982.
- ¹¹ Marshall 1890, Chapter 9.
- ¹² Loc cit.
- ¹³ Loc cit.
- ¹⁴ Autor 2016 p. 3. See also Autor 2019.
- ¹⁵ Terborgh 1963, p. 3.
- ¹⁶ Galbraith 1958 pp. 311-12.
- ¹⁷ Autor and Dorn 2013. p. 6.
- ¹⁸ Phelps 2007, Preface to 2nd Edition.
- ¹⁹ Rajan, 2019, p. xiv.
- ²⁰ "Sam Lloyd." *Hartford Courant* Feb 25, 1934. p. 10.
- ²¹ Shiller 2003, Chapter 11.
- ²² Colley 2003.