Scanning Barcodes: Self-Checkouts' Effect on Labor Markets and Implications for Social Work

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Abstract

The self-checkout kiosk has become a prevalent form of technology that has brought up many questions of the future of jobs and employment for Americans. The COVID-19 pandemic introduced volatility in low-wage positions as well as reduced the buying power of the minimum wage (Cooper et al., 2019). Self-checkouts seem to be the next looming frontier of automation. By analyzing data from the United States Bureau of Labor Statistics (2003-2019), self-checkouts do not prove to be a detriment to human jobs. Instead, they prove to be the next iteration of jobs utilizing technology to improve organizational efficiency. Changes in the labor market reveal ways social workers can adapt to assist their clients in navigating the resulting impact of self-checkouts (Anderson, 2019). As such, it is a necessity for social workers to understand the changes to the labor market in order to effectively serve their clients and improve their quality of life. Social workers may need to help clients access crucial resources, such as financial assistance, safe childcare, and job skill opportunities.

Keywords: economics, labor, automation, self-checkout, COVID-19

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Introduction

Picture yourself in the checkout line, trapped behind several frustrated individuals buying more toilet paper than you have ever seen in your life. Out of the corner of your eye, you see a sweet escape; halfway across the store, there is an unanticipated opening in one of the self-checkout counters that have miraculously popped up overnight, much like the building of a fast-food chain location. As you rush over to punch in the quantity of green peppers you have just placed on the scale, have you left the overworked, single mother who would have checked you out with one less customer to deal with before her break, or one less reason she has a job?

David Humble patented his version of the self-checkout counter in 1984 due to frustration with the aforementioned queue times in supermarkets (Hamacher, 2017). While kiosks flopped at first, they made their way to the technology producing conglomerate known as IBM (Tiffany, 2018). Through IBM, the self-checkout counter blossomed, and by 2008 there were over 90,000 self-checkouts worldwide, mostly concentrated in the United States (Castro et al., 2010). The self-service kiosk is now expected to hit 325,000 units worldwide by 2021, a predicted increase of 261% in just over a decade (Hamacher, 2017). As of 2012, an estimated 15-40% of money spent in supermarkets flowed through the self-checkout (Demirci Orel, 2014). This relatively recent and high magnitude phenomenon could have several effects on the retail labor market.

Economic Theory-Based Predictions

On a more theoretical note, it could be argued this advancement fits into the framework of task replacing technological change. This model describes jobs as a series of tasks to accomplish. In this framework, a cashier position is made up of: canning items, walking the customer through the checkout process, and being friendly, among other tasks. View every

individual who goes through a self-checkout as a replaced routine manual task. The scanning of the customers' items is replaced by capital, or the objects which allow tasks to be done quicker or easier, which in this case is the self-checkout kiosk. However, one could question whether or not the task was replaced at all or displaced onto the consumer, as they are now responsible for what used to be a cashier's task. One could further presume this would lower the utility of the consumer, or the pleasure a consumer gets from their purchased goods and services, due to the introduction of checkout labor. Castro et al. (2010) respond to this by offering a model in which turning the consumer from a passive participant to an active participant saves the consumer work in the form of task participation time. In other words, asking the shopper to scan and bag their own groceries makes the checkout process faster in some cases, which is better for the busy shopper and also benefits the institution's efficiency. This could be interpreted as a partial replacement of a task due to the drastically decreased participation of the worker. That is to say, the self-checkout attendant need not scan and bag the customers' items. However, it should be addressed that there are many cases where a self-checkout is slower and harder than a manned cashier. Self-checkouts may be slower for people with disabilities, large families, or individuals who struggle using technology.

However, this does not mean there is no need for workers in the self-checkout model of retail. Instead, workers need to be available at all times to solve nonroutine analytical tasks related to technical issues with the kiosks themselves. These tasks include making sure the items scanned by customers are the ones that end up in the basket (although this is partially automated by the scale in the bagging area, overrides are needed in fringe cases), and removal of security tags or the approval of purchase on regulated goods. This would lead to decreased demand for cashier labor, but increased productivity of labor supplied by self-checkout attendants reflected

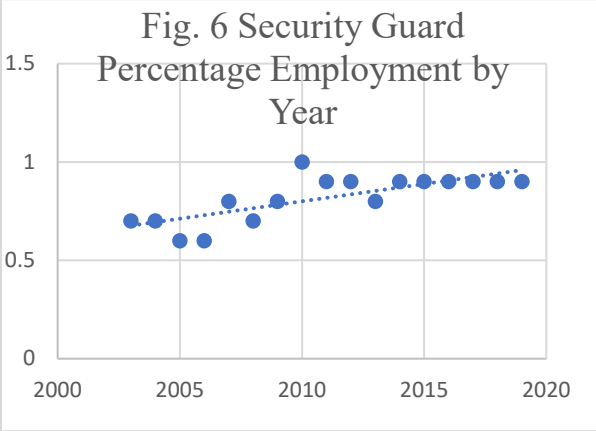
in decreased share of employment but higher wages. Further, due to increased risk (or reduced social consequences) of theft in this model, increased participation of asset protection workers, individuals hired by a store to prevent theft, is required. This could be viewed as an increase in productivity for asset protection rather than the creation of a new task. Either way, demand for and therefore wage of asset protection ought to increase.

According to the previously posited hypothesis, one would predict reduced employment share of cashiers with increased wages, as well as increased employment share or wage of asset protection agent. Therefore, those working the cashier positions would be worse off in the form of reduced wages. Those working as self-checkout attendants would be better off in the form of increased wages. It is not a stretch to believe these two groups are the same individuals leading to conflicting effects. However, on average they would be worse off due to the share of tasks replaced by kiosks, leading to fewer cashiers demanded. However, there is much debate on who works these entry level retail positions. In the United States, minimum wage work is seen as largely for teenagers and young adults as they pass into full-time careers. In reality, these positions more so represent women, those less educated, African American and Hispanic individuals, and those in poverty, not as temporary positions, but as permanent employment situations (Anderson, 2020). By using security officers as an analog, it is shown asset protections officers tend to be almost 70% men, be less than college educated, and represent races in line with national demographics (Zippia, 2020).

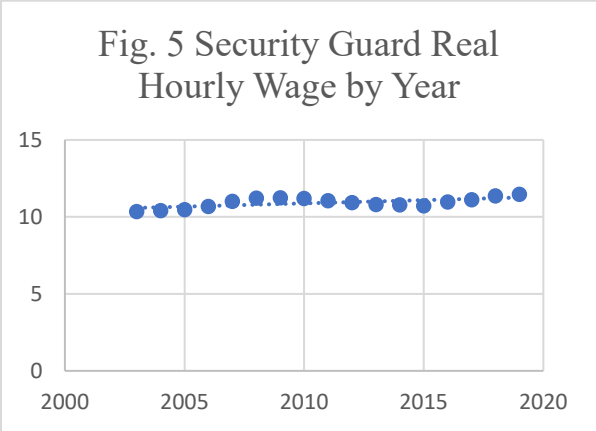
Analysis of Employment Trends

By analyzing raw employment data from the United States Bureau of Labor Statistics, one can observe several trends. The most prominent of which is the marked increase in the percentage of total employment that security guards have experienced shown in Fig. 6 (U.S.

Bureau of Labor Statistics, 2019). This holds with the prediction that labor demanded from security personnel would increase.

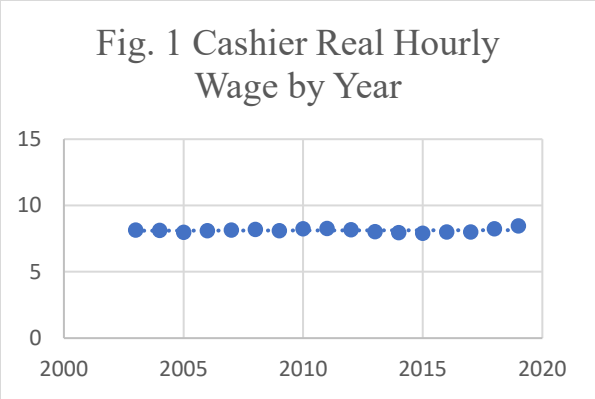


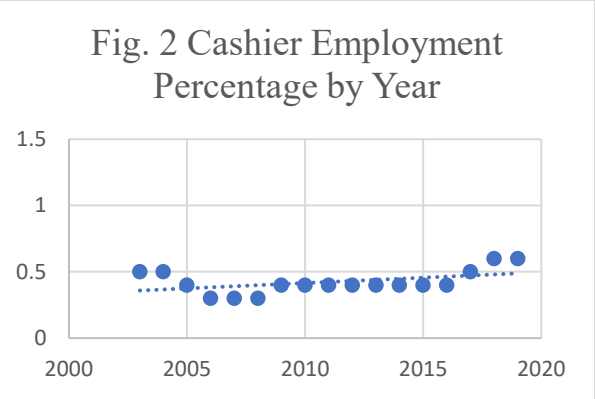
In addition to the increase in employment share, security guards also experienced an increase in real wage (U.S. Bureau of Labor Statistics, 2019). Real wage represents the actual buying power of the money earned in a position adjusted for inflation. This was calculated by deflating nominal, or unadjusted, wage with a manually averaged inflation rate from 2003 to 2019 of 2.06% using a base year of 2003; That is to say, the value of 2019 wages in 2003 dollars (World Bank, 2021). The results are also consistent with the hypothesis, which predicted an increase in productivity for asset protection officers shown via an increase in real wage. The increase can be seen in Fig. 5.



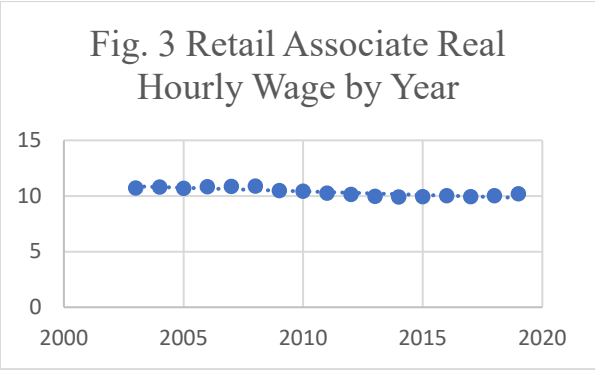
However, limitations exist in this method. A security guard is not necessarily an asset protection agent. The position of 'asset protection' goes by many names, such as loss prevention, store protection, risk specialist, or security officer. However, it is not known if this is the way the Bureau of Labor Statistics has assembled the category. Further, security guard is a broader title than just asset protection, and as such these inclusions in the data may render the analysis moot.

The next position analysis, however, is not quite so cut and dry. Cashier work has had a very small decrease in real wage over the 2003 to 2019 period (Fig. 1) but has also increased in employment percentage (Fig 2) (U.S. Bureau of Labor Statistics, 2019). While the small decrease in real wage is consistent with the hypothesis, it could also be due to larger shifts in the labor market as a whole. The increase in employment percentage with a simultaneous decrease in wage is also consistent with increased labor supply for the position. This could be due to many things, such as the introduction of Millennials into the labor market while older generations hold on to career positions, the erasure of middle skill professions, such as bookkeeping, causing increased supply for low-skill work, or any number of confounding factors. More than likely, this is due to the culture of paying cashiers the federal minimum wage regardless of their productivity, which has been rapidly declining in real value since it was last raised in 2009 due to inflation. While one cannot say for certain that the model of self-checkouts partially replacing the task of scanning and bagging groceries has no effect on labor markets, these data do not demonstrate such a trend.





For the third analysis, the predicted trends are dashed against the cobbles. We expected an increase in labor demand and productivity for those who watch over the self-checkout kiosks reflected in an increase in real wage and employment percentage. Instead, both measures have been relatively constant over the 2003-2019 period (Fig. 3 & 4) (U.S. Bureau of Labor Statistics, 2003-2019). Here is why: self-checkout attendant is somewhat of a new job title. It is a position that was not in existence as of 2003 and is not even officially a position now. Perhaps it is included in the retail associate category nestled under the softlines workers and tech counter attendants, or maybe it is still in the cashier category. Either way, outside trends are too powerful to let the effect shine through or the hypothesis is misinformed.



Pros and Cons of Accepting or Rejecting SST Innovations

Self-service as an industry has been the subject of much academic contemplation. On the positive side, Demerci Orel & Kara (2014) found customers who used self-checkouts in Turkey

left the supermarket feeling good about their experience even compared to traditional checkout employees. Further, self-checkout service quality was found to be a significant determinant of customer satisfaction and customer loyalty (Demirci Orel & Kara, 2014). These effects were found to be disproportionately powerful in young people (Demirci Orel & Kara, 2014).

While self-checkout technologies are not outright automating the tasks of cashiers, they are a necessary part of garnering repeat business especially among young people (Demirci Orel & Kara, 2014). There could be significant costs of not introducing self-checkouts into supermarkets in the form of losses due to competition. This protection against losses is reflected in the increased employment share and wages of asset protection officers who are still necessary to prevent shoplifting.

This research also finds, however, that poorly executed self-checkout service can disproportionately discourage customers from coming back (Demirci Orel, 2014). These findings can also explain some of our findings about cashier employment trends. While market trends and innovations have led to reduced real wages, the main customer service element of the cashier position remains just as, if not more, relevant than ever.

Self-checkout kiosks are part of a much broader, more in-depth phenomenon known as self-service technology (SST). SSTs include anything from scanning your own boarding pass to catch a flight, to a self-pump gas station. Castro et al. (2010) suggest that temporary frictional unemployment, which is the unemployment period faced by a worker as they seek and train for a new position, is a consequence of the introduction of SSTs. However, they argue temporary setbacks faced by some displaced workers is hardly reason to believe SST is causing public harm (Castro et al., 2010). To the contrary, they posit the extinction of the gas jockey, the individual who used to pump gas before self-service pumps, and the introduction of the automatic teller

(ATM) has saved the public millions of dollars in both transaction costs and saved time (Castro et al., 2010). That is, as long as one does not live in New Jersey or Oregon, where pumping one's own gas is a fineable offense. The idea that once industries such as retail or banking are fully automated or self-serviced, then there will be no work opportunities is very common. Castro et al. (2010) refute this by showing that, historically, people always find some way to find employment. They then go on to state SST would be replacing low wage labor, which is historically followed by higher productivity and higher income jobs becoming available (Castro et al., 2010). Much like how the population has exploded in the past 100 years and yet there remains enough labor for everyone, if not more, one would expect tasks requiring a human touch will also be available in the future.

Policy

As for policy, it seems as though there are two options: Either fully or partially ban the implementation of SSTs, or let technology run its course and reap the rewards of increased efficiency later. One can see the effects of both by looking at previously implemented or banned SSTs. By analyzing gas prices, one can see that Oregon, a relatively rural state with a low population density and as such a low demand for gas, still ranks third highest in gas prices in the contiguous United States. For comparison, Oregon sits just behind California and Washington who account for 14.6% of the U.S. population, leading to heightened demand, and tax the commodity heavily (AAA, 2020). One can see while legislation against SST may preserve some forms of employment in the short run, the long-term costs of that preservation are passed on to the consumer. In this case the costs are manifested in disproportionately high gas prices.

On the other hand, there are real negative effects people feel when this type of frictional unemployment hits them. The financial effects can be devastating for families who rely on this

income. However, families who rely on these entry level jobs that will be replaced by SST will face low retraining costs when finding a comparable position in another industry. This situation has more in common with manual textile craftsmen finding new work in textile factories than it does with the modern drought of middle-class positions (Castro et al., 2010).

Implications for Social Work in COVID-19

COVID-19 has brought discussion about cashiers and other low wage essential workers to a head. Low-wage workers are more often than not people of color, women, and lesser educated individuals (Anderson, 2020). They now have to work with fewer coworkers in increasingly dangerous environments, demonstrated by a sharp drop in the labor force participation rate over late 2020, which has not fully recovered as of August 2021 (U.S. Bureau of Labor Statistics, 2021b). Therefore, it is especially important that social workers understand the prevalent socioeconomic trends affecting these marginalized groups.

The leading concern for low-wage earners is the relatively out of date minimum wage. The federal minimum wage has not been adjusted in 12 years, the longest period without adjustment since the policy was introduced in 1933 (U.S. Bureau of Labor Statistics, 2021b). This is compounded by the very high rate of inflation during the COVID-19 pandemic due to increased government spending, primarily on corporate bailouts and to a lesser extent direct COVID-19 relief payments. The inflation over this 12-year period has led to the already meager $7.25 in 2009 to be worth 17 percent less in 2019 and perpetually devaluing further (Cooper et al., 2019) Social workers should prepare for increased rates of poverty among the already vulnerable populations who rely on these low-wage positions to survive.

The rapid degradation of the minimum wage, along with the newfound danger associated with being in public are among the causes of the 2021 labor shortage. The wages offered by

corporations are no longer enough to entice even the most disadvantaged populations to sell not only their time, but potentially their health. Social workers knowledgeable about assistance and relief programs ought to focus on outreaching to vulnerable populations, and especially single mothers who may have difficulty accessing childcare. Further federal assistance is unlikely due to exceedingly high rates of inflation in early 2021, demonstrated in a sharp 5% increase in the consumer price index from July 2020 to July 2021 (U.S. Bureau of Labor Statistics, 2021a). Social workers may want to keep rationing in mind when assisting clients.

Social workers might also want to be aware that SSTs have become the main form of checkout systems. It is not uncommon to have no attended checkout lanes open in a big box retailer. Social workers who often aid their clients by helping them find gainful employment should understand the risks a public facing job entails now. Stores and restaurants are still in need of labor, but in forms that are less available to vulnerable populations, such as physically demanding positions stocking shelves or unloading trucks, or positions that require training or experience.

Further, there is a significant amount of trauma associated with employment as it exists in COVID-19. Beyond the health risks and seemingly insufficient wages, many individuals entering the low-wage workforce were let go from permanent positions and are dealing with the additional feelings of loss, shame, and inadequacy associated with financial struggles in the United States. If at all possible, social workers should encourage clients to acquire technology or construction-based certifications and skills in order to take advantage of the one trillion-dollar infrastructure bill passed in August of 2021 (Cochrane, 2021).

Conclusion

While self-checkouts themselves may not have negative effects on the employment and wages of cashiers (and to the contrary, may have positive effects on employment trends of asset protection personnel), there are many forms of SST that still may. That being said, the positive effects of SST on demand side labor savings and consumer savings are hard to overstate. As such, this paper would recommend not banning any form of SST that does not directly harm the public. Further, the COVID-19 pandemic has created a situation that has left low-wage earners at the heart of intersectional disenfranchisement. Social workers need to take steps not only to mitigate the economic inequalities by helping clients access benefits and services such as monetary assistance and childcare, as well as assisting clients attain the necessary skills in order to take advantage of incoming stimulus and infrastructure bills.

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