

# **The End of the (Checkout) Line? Automation, Self-Service, and Low-Wage Jobs in the Supermarket Industry\***

**Christopher K. Andrews<sup>†</sup>**

**Abstract:** Drawing on existing research on automation, computers, and the effects of technology in the workplace, this paper examines the effects of automated self-checkout lanes on employment in the retail food industry. Using BLS employment data as well as interviews with store managers and union officials, this paper finds that the overall effect of automation on cashiers' skills is mixed, reducing the need for some routine tasks (e.g., scanning) while enhancing others (e.g., supervising), a trend consistent with existing literature examining the effects of technology on skill demands. Similar to Walsh's (1991, 1993) previous research on technological innovation in the retail food industry, a combination of social and political factors shape and limit the use of self-checkout lanes in supermarkets including chronic turnover, concerns regarding theft and loss, perceptions of customer service, maintenance, and perhaps most importantly, specific labor contract provisions regarding the use of technology in the workplace. However, growing pressure from low-wage nonunion competitors (e.g., WalMart) may cause supermarkets to consider expanding automation beyond current levels, thereby significantly affecting current employment patterns.

**Keywords:** Automation, self-service, skill-biased technological change, supermarkets

**JEL Classification:** J50, L81, M15, M54

## Introduction

In the perpetual quest to cut costs and increase value and productivity, businesses in today's service economy are increasingly turning to 'self-service'. Described as "the ultimate in outsourcing", self-service describes the substitution of paid or wage labor with the unpaid labor of consumers. Replacing the labor of workers with consumers', businesses are using self-service to slash labor costs and reduce costly overhead. Stated simply, "[s]elf-service appeals to companies for an obvious reason: it saves money."

Yet, the self-service trend is by no means new. Since the early 20<sup>th</sup> century, businesses such as supermarkets and cafeterias experimented with self-service as a way to cut costs. Piggly Wiggly, for example, was the first self-service grocery store, requiring customers to navigate and select items from the shelves, placing items in shopping carts that were then brought to a cashier at a checkout stand (Lebhar 1959). Later, retail and health care industries restructured to increase customer participation in the labor process and cut labor costs (Glazer 1993). Now self-service is ubiquitous; we pump our own gas, check our own bags at the airport, and clear our own tables at fast food restaurants.

What *is* new, though, is the increasing role technology plays in this process. As Ritzer (1999) notes, self-service increasingly describes transactions with *things* rather than people. Thus, like industrial manufacturing, the expansion of self-service appears to depend in large part upon the successful interaction of people and machines:

"[T]o work well, self-service requires the marriage of customers with machines and software. That union...is now doing for the service sector what mass production once did for manufacturing: automating processes and significantly cutting costs."

The advantages of self-service to businesses are clear. Self-service allows businesses to "transfer" work to consumers (Glazer 1993). The result is a novel twist on the contemporary trend of outsourcing, whereby work can be outsourced – or more appropriately, 'nearsourced' – to consumers. As consumers 'labor in', businesses may be able to shift waged labor 'out', shedding workers and reducing labor-related costs such as health care that have plagued American businesses in recent years.

What is unclear, however, is how the shift towards self-service will affect those employed in affected industries as well as the nature of and need for their employment. Will the introduction of self-service technology actually reduce the demand for labor or will it simply transform the type of work required? How will it affect the jobs that remain and what kinds of skills will they require? And what, if anything, does this suggest about the possible broader effects of self-service technology on work in the service industry?

## **The Great Automation Debate**

Concerns regarding self-service technology dates back to the 1960s when a national debate emerged concerning the effects of automation on employment. The “great automation debate” questioned whether new computer-based technologies would threaten the fundamental relationship between income and work by displacing workers and reducing businesses’ need for labor (Bix 2000; Rifkin 1995). A resulting Presidential Commission found that “technology eliminated jobs, not work”, yet conceded that technological displacement was perhaps a temporary albeit necessary step on the path towards economic growth (MacBride 1967:218).

Such rosy views were not shared by organized labor, which initially viewed automation as a direct threat to employment. Describing a future of “factor[ies] without employees”, the United Auto Workers and AFL-CIO feared that automation would not only erode union membership but would destroy millions of jobs and uncouple the relationship between employment and economic growth (Noble 1984; Weiner 1980; Reuther 1962). Nevertheless, declining political momentum and fears of a public backlash ultimately led unions to adopt a conciliatory position of accommodation. Accordingly, unions shifted their focus in collective bargaining from issues of production to job retraining, believing that while unskilled jobs might be eliminated by new technologies, there would be an associated increasing demand for skilled and technical jobs (Noble 1984).

## **The Deskilling Controversy**

Today, these two competing views – job displacement and skill upgrading – largely reflect the two dominant views concerning automation and the effect of technology on work. The first view, known as the ‘deskilling thesis’, contends that technological innovation in the workplace is used to reduce or eliminate skilled labor, fragmenting work into tasks that can be performed by unskilled workers in order to reduce labor costs and extend management’s control over the labor process (Braverman 1974). Examples include the use of machinery in automobile production (Rubenstein 2001), computer aided design (CAD) in drafting and design (Aronowitz and DiFazio 1994), and the use of computers in the insurance industry (Appelbaum 1987).

The ‘skill-upgrading thesis’, on the other hand, describes a process in which the introduction of new technology results in a net increase or acquisition of new skills (Blauner 1964). Indeed, research suggests that the overall effect of technological innovation in the workplace has been to increase skill requirements and the associated demand for skilled labor relative to unskilled labor (Goldin and Katz 2008; Bartel, Ichniowski, and Shaw 2007; Levy and Murnane 2004). The result is what economists refer to as “skill-biased technological change”, in which the effects of technological change favors skilled over

unskilled labor and the associated demand in the labor market (Card and DiNardo 2002; Bekman, Bound, and Machin 1998).

This ‘mixed effects position’ reflects a sort of middle ground between these two conflicting views in which technology eliminates or erodes the need for certain skills while increasing or creating the need for others (Hodson and Sullivan 2002). The use of high-tech machinery, for example, may eliminate the need for certain unskilled work, while simultaneously requiring new skills to operate and maintain such equipment (Bartel, Ichniowski, and Shaw 2007; Milkman and Pullman 1991).

### **What Computers (Don’t) Do**

More recently, Autor, Levy, and Murnane (2003a; 2003b; 2002; see also Levy and Murnane 2004) have attempted to reconcile these views in their examination of the effects of computerization on skills and employment. They find that “computers are *not* in all respects skill-biased”, but rather computers’ abilities and limitations encompass various aspects and definitions of skill (2003a:122). Specifically, they note that “[c]omputers tend to displace certain types of tasks (routine cognitive and routine manual), complement others (nonroutine cognitive), and have little impact on yet another category of tasks (nonroutine manual)” (147). Accordingly, by decomposing jobs or occupations into a set or series of tasks, demands for certain skills will be shaped by the way in which tasks are affected by computerization.

Yet, management plays a crucial role in determining precisely how and to what extent technology affects the organization of work. Addressing criticisms of skill-biased technical change being overly deterministic and ignoring management’s role in workplace reorganization, Autor, Levy, and Murnane (2003a) state,

“[T]he process of computerization is hardly all-encompassing; many tasks in the computerized workplace remain to be performed by humans. It is the (re-)organization of these tasks that management decisions are likely to play a key role...in determining how tasks are bundled into jobs, with potentially significant implications for skill demands.” (132)

In other words, the effect computers will have on skill demands is “partly deterministic and partly discretionary”: where tasks are routine, employers will have incentives to replace workers with computer-based technology, yet ultimately employers will govern when and how it is used, shaping the resulting skill demands (ibid.). As Richardson (1996) bluntly puts it, “computers don’t kill jobs, people do”: the policies put in place by organizations concerning the use and role of technology, rather than the technology itself, determines the effect technology has on work and employment.

For example, in a case study of technological innovation in the retail food industry, Walsh (1991, 1993) found that a combination of intervening social and political factors ultimately shaped the adoption of boxed beef, frozen meats, and UPC scanners. Consumers, suppliers, government officials, labor unions, and management each played a significant role in shaping the final resulting form of each innovation, suggesting that economic as well as social and political factors should be taken in to consideration when examining the effect of technology in the workplace.

## **Summary**

Together, the aforementioned literature on automation, the effect of computers on skill, and technological innovation suggests that the effect of new self-service technologies in the retail food industry may be shaped not just by economic factors but also social and political considerations. For example, research on computerization and skill-biased technological change suggests that cashiers may be displaced given the unskilled and routine nature of their work, yet political and social dimensions of innovation (e.g., collective bargaining, consumer attitudes) may also shape the resulting economic outcomes.

Below, I address the effects of self-checkouts on employment in the retail food industry using what is best described as a ‘multi-method’ or ‘mixed methods’ approach, drawing upon official employment statistics as well as interviews with store managers, labor officials, and trade, newspaper, and industry publications. When possible, I have included interview excerpts to highlight dominant themes, as well as tables and figures to illustrate relevant trends.

## **Data & Methods**

This study adopts a ‘multi-method’ or ‘mixed methods’ approach, drawing upon several sources of data including interviews, nonparticipant observation, news and trade publications, and official employment statistics. This approach has the distinct advantage of allowing the researcher to ‘triangulate’ or approach specific questions through the use of different research methods. Comparing information regarding the use and implementation of self-checkouts from multiple sources of information provides a more complete, holistic, and comparable picture of the effects and use of self-checkouts in the supermarket industry.

The sample for this study was drawn from seven local stores of a regional supermarket chain (‘SuperFood’) in the Northeast region of the United States. A subsidiary of a conglomerate which owns and operates a number of supermarket chains in the U.S., SuperFood employs approximately thirty thousand people in two hundred stores and controls a significant market share of the region’s retail food industry. Seven stores were sampled across two counties (‘Meadowview’ and ‘New London’) bordering a

major U.S. metropolitan city and include much of the city's outlying suburbs and residential neighborhoods. Although roughly similar in population size, the counties differ somewhat in terms of demographic characteristics (see Table 1). While neither a statistically representative nor random sample, efforts were made to introduce variation and to control for potentially confounding variables such as store location, neighborhood, and customer demographics.

Over the course of six months, I interviewed fifteen store managers as well as the president of the local UFCW union representing the workers in the stores sampled. Additionally, the author spent a period of several months observing the behavior of staff and customers in the store environment. Secondary data sources include occupational and industry data from the U.S. Bureau of Labor Statistics (BLS), as well as news, trade, and retail food industry publications.

### **The Employment Paradox**

If self-checkouts are in fact being used to replace or reduce the number of checkout staff, one would expect to observe a significant decrease in employment in the supermarket industry. At the national level, employment statistics indicate that there was indeed a drop in employment in grocery stores and supermarkets that roughly coincided with the introduction of self-checkouts throughout much of the industry during the early 2000s (see Figure 1). This would, at first glance, appear to provide some support to the claim that self-checkouts adversely affect employment in grocery stores and supermarkets.

However, while there were significant declines in employment in the periods 2000-2004 and 2008-2010, these could be attributed to the impact of national economic recessions. Furthermore, if self-checkouts were being used to reduce the need for labor, why did employment in the industry *increase* following these recessions? If self-checkouts were being used to cut labor costs, one would expect to see a persistent downward, rather than upward, trend in supermarkets' employment. This is simply not the case. In fact, when compared to the retail industry as a whole, employment in supermarkets and grocery stores has been relatively flat and stable (see Figure 2)

Moving from national to state-level employment, one can see that employment in the retail food industry appears to be steadily increasing, rather than decreasing, further casting doubt on the notion that self-checkouts coincide with decreasing employment (see Figure 3). The adoption of self-checkouts by local chains such as SuperFood simply did not coincide with an observable decrease in employment at the state level. Although there are some observable periods of decreasing employment, these, too, correspond to periods of national economic recession.

Yet, employment statistics indicate that labor costs in the supermarket industry continue to rise. Despite the introduction of self-checkouts into grocery stores and supermarkets, unit labor costs have

continued to rise (see Figure 4). To paraphrase Nobel-prize winning economist Robert Solow, the savings in labor costs associated with self-checkouts appear to be everywhere except in the statistics.

In sum, employment statistics provide little evidence to support the claim that stores are using self-checkouts to reduce or eliminate employment. In fact, they appear to indicate the opposite; supermarkets, and the retail sector more generally, appear to be experiencing a relative *growth* in employment and employment associated costs, casting doubt upon the notion that self-checkouts are negatively affecting employment in the retail food industry.

Yet *why* self-checkouts are not adversely affecting employment, however, is something that cannot be gleaned directly from such statistics. This is where qualitative data is helpful in addressing why such an effect has not occurred. Interviews with store managers reveal that there are several factors which collectively influence how self-checkouts are used, which in turn limit their impact on employment levels. These factors include chronic turnover, concerns regarding theft and loss, bureaucratic controls, maintenance, and perhaps most importantly, collective bargaining contract provisions regarding the use of technology in the workplace. Below, I address each of these factors, highlighting how they influence the use of self-checkouts and their effect upon employment in supermarkets.

### **‘Now Hiring’: Chronic Turnover & Labor Shortages**

First, managers claimed stores were looking to add rather than subtract labor and claimed to be in a near constant state of hiring due to a high degree of turnover. Far from replacing or eliminating employees, managers struggled to cope with chronic turnover and keeping staff positions filled. This difficulty in retaining staff, managers felt, was compounded by competitors in the low-wage labor market who could offer higher wages or benefits such as free meals:

Peter (store manager): It’s easy to hire somebody. It’s just retention. It’s a little difficult nowadays. More so than what it used to be. And a lot of that is the startin’ wage. Our union contract is basically six-sixty [\$6.60] an hour. So it’s tough to get somebody on board for six-sixty an hour when they can go to Burger King, McDonalds, and make nine, ten dollars an hour. And get a free meal out of it.

Competing for low-wage workers with retailers and fast food restaurants, managers claimed they were struggling to fill a variety positions that went unfilled for weeks, sometimes months:

Rick (store manager): It’s tough. We just had a job fair yesterday. My customer service manager arranged [it] herself here and had it and she hired like fifteen people. [Self-scan] hasn’t eliminated anything. I mean, I can’t speak for other stores if they try to save that way. But I certainly don’t. I can’t afford to ‘cause I need all the people I can get. I would literally hire twenty cashiers tomorrow if I could.

Struggling to compete with the starting wages offered by the local mall and other retailers, Rick and Rachel found it difficult to hire and retain staff – a problem I heard from most of the other managers I spoke with. Indeed, one of the major problems managers faced was staffing – finding people who were willing to work for relatively low-wages and, after perhaps eighteen months, health care coverage.

Demographics play a role as well. According to the Bureau of Labor Statistics, high turnover and short job tenure are endemic to the supermarket industry. This is due, in part, to the age distribution of the industry’s workforce; in 2006, roughly a third of all jobs in grocery stores were held by workers in the 16-24 age group. As a result, managers such as Rick frequently found themselves having to balance younger employees’ academic and extracurricular activities with store scheduling needs.

Rick: [A]round here you get a lot of young kids. They want football games off, they want dances off. So we try to work with them as much as we can. [We] always tell them their school’s first.

Managers who oversaw staffing and scheduling also claimed that staffing levels had remained more or less unchanged since self-checkouts were introduced, implying they had little to no appreciable effect on employment patterns:

Author: One of the things I’ve been looking at is this whole jobs issue. When self-scans first came out everyone said, ‘This is gonna’ take away people’s jobs, this is gonna’ cut back on hours-

Rachel (Customer Service Manager): We heard that a lot when they first came to SuperFood. I was running the front end when they first came to Century Village. And I used the same amount of hours that were scheduled or even more.

As I found from managers, there simply wasn’t proof that self-checkouts were adversely affecting employment. If self-checkouts were getting rid of jobs, they argued, why are we continuing to hire new workers? Moreover, managers who oversaw scheduling and staffing on the front end claimed the number of hours had remained relatively stable since self-checkouts were introduced, suggesting that there had been no significant changes to employment.

### **‘Walking Off With the Store’: Shrink, Theft, and Walkoffs**

A second key factor concerns theft, or what is popularly referred to within the industry as ‘shrink’. Although most self-checkout lanes have theft-prevention technology integrated within the product, they still require a degree of external monitoring in order to deter and minimize theft. Therefore, even if self-checkouts eliminate or displace the need for certain types of labor (e.g., scanning items), they

still require other forms of labor (e.g., monitoring, maintenance) to ensure that they are not manipulated or abused by customers. As Carl points out in the excerpt below, despite existing security features, self-checkouts have certain ‘holes’ or gaps in their ability to detect and identify misuse and theft, underscoring the continued need for staffing:

Carl: There’s a lot of ways of beating the system. There’s a lot of holes. The machine’s not able to identify exactly what you’re purchasing. You could have a customer put five pounds of shrimp on there and weight it as bananas. You know, all you gotta’ do is key in the code for bananas and it’s gonna’ be seventy-nine cents a pound opposed to ten ninety-nine a pound. And that’s why you want to keep one person operating four machines to sort of deter that sort of thing from happening.

Another example of theft involves ‘walkoffs’, or people who scan and bag their groceries but then leave without paying.

Peter: [Y]ou have what we call ‘walkoffs’. Where if that one person is not on top of it a hundred percent of the time, somebody can easily just walk off without paying it. And that’s where you end up with shrink and you lose your sales, you lose your dollars.

Barry: We have walkoffs. They’ll ring everything up, run it through the machine, bag it up and walk out. That’s why one of the functions of the pay station cashier is to monitor the self-checkouts.

Walkoffs are a social category which includes not only shoppers who willfully misuse self-checkouts, but also customers who absentmindedly forget to scan items placed beneath the shopping cart, inadvertently departing the store with unpaid goods.

Barry: I’ve seen people try to sneak through with stuff on the bottom of their cart. ‘B-O-B’ is what we used to say to our cashiers and that means ‘bottom of basket’. Same as anything, it’s as honest as the people dealing with it. It’s a lot of the honor system going through there. But you also see people trying to switch meat labels, change packaging throughout the store, so it’s nothing new. Theft in this industry – the shrink and the theft – is ridiculously high. It’s a challenge. That’s why we try to keep it manned a hundred percent of the time.

In place of the “honor system”, self-checkout manufacturers stress that businesses follow ‘best practices’ to prevent theft and loss including staffing self-checkout lanes as well as the use of close-circuit television monitoring, each of which requires the use of additional labor.

Yet, theft through self-checkout continues to be a relatively common – and arguably costly – occurrence. A cursory search on the Internet provides countless cases of shoplifting using self-checkouts, suggesting that shoplifting and theft using self-checkouts is indeed quite common. One of the more spectacular cases of theft involved a woman who reportedly stole more ten thousand dollars worth of merchandise using the self-checkout lanes at WalMart. Other examples include a man who attempted to purchase 42-inch Sanyo Plasma TV after switching the original price tag of \$984 with one for only \$4.88 and a woman who was banned from Wal-Mart for life after bagging more than \$300 worth of stolen merchandise in a self-checkout lane. Examples such as these highlight stores' continued reliance upon human labor, albeit if only to monitor and deter theft, ensuring customers do not 'walk off' with the store.

### **'The Personal Touch': Customer Service and Satisfaction**

Although they may occasionally – perhaps inadvertently – walk off with unpaid merchandise, customers also limit the extent to which self-checkouts can be used to replace labor in a second manner, namely customer service and satisfaction. Walkoffs and other shoppers frustrated or unwilling to use self-checkouts may simply opt to shop at another store. Therefore, stores and managers that use self-checkouts to replace or reduce staff run the risk of losing loyal shoppers who prefer the traditional human-operated cashier checkout lane and the 'personal touch' of human service:

Barry (store manager): [P]eople are fairly loyal to their grocery store. I've found here – every store I've been in – you have a very loyal, committed base. And if you have a veteran staff, they know those people and they care about them. That's where some of the motivation is [to shop at this store].

Robert (assistant manager): They get to know that customer, that cashier. A self-checkout not gonna' recognize [the customer]. It doesn't have that personal touch. And I think that's what made SuperFood successful.

Indeed, managers such as Sam were well aware of the risks associated with substituting staff with self-checkouts and how their use may impact customers' perceptions of customer service:

Author: So, even if a store hypothetically wanted to have lots of self-checkouts, reduce employees, it would really be counterproductive because–

Sam: I'll take it a step further. I think if any company – whether it's SuperFood, Safeway, or Whole Foods – took the approach of eliminating cashiers- We are only as good as our employees dealing with the customers. As a customer coming into my store, how many different employees do you encounter? And it

only takes one, maybe two, bad experiences for that customer to be turned off to that store. We'd be shooting ourselves in the foot if we don't offer more cashiers than self-checkouts to give them a choice.

Another method of ensuring customer service came from the corporate level, which actively imposed limits on the number of customers they wanted going through self-checkouts in their stores. As a result, stores were limited in using self-checkouts not only *externally* – by customers and their willingness to use the technology – but also *internally*, by bureaucratic rules limiting their use. As the managers explained to me, each store had a specific threshold or limit for the percentage of sales the company wanted going through self-checkouts. In part, this was done to ensure that stores were adequately staffed. However, as Carl points out, it was also done to maintain a degree of personal service and face-to-face interaction that companies view as integral to providing quality customer service:

Carl: “They're trying to keep the percentage down around seventeen, eighteen percent. They don't want any more than seventeen percent of your business really going through the self-scans. So the company itself doesn't want to use them more than that. I mean, that tells you there they still want customers taken care of, they still want the staffers to be able to, you know, have personal communication.

As Carl notes, some customers still want and expect to be served by human beings in face-to-face interactions. Part of the perceived ‘quality’ of the service, part of the reason for shopping at that store rather than another, is not the price but the personal interaction with another person. In some cases, such as Barry's, customers may over time develop a rapport with specific employees, establishing a motivation for returning on subsequent visits. Others may simply prefer a human interaction over one that is computer-mediated. Therefore, even if stores could conceivably replace staff with machines, they hesitate to do so and as noted above, invoke formal rules and processes to limit their use in order to continue to provide customers with human service

### **‘Dealing With Jams’: Troubleshooting and Maintenance**

Yet another reason why self-checkouts may not be adversely affecting employment is that they are unable to operate efficiently independent of human staff. As managers and cashiers explained to me, self-checkouts are susceptible to a variety of problems requiring human intervention. Paper for printed receipts has to be replenished, items that fail to scan have to be manually entered, unwanted purchases need to be voided, and items need to be bagged to prevent the belt from stopping – any of which can bring the transaction to a complete stop. Therefore, stores assign staff to the self-checkout lanes not only to

monitor their use and put forward a friendly face but also to assist customers and troubleshoot when problems arise.

And problems do in fact arise. A 2006 study by retail analysts found that customers needed assistance one out of every three times they used self-checkout lanes. Occasionally, though, the machines themselves are the source of the problem and require maintenance.

Rachel: [S]elf-scan has a lot of maintenance. We probably have one self-scan down a day. There's a lot of maintenance on it. There's a contract with [a maintenance service company]. And they're available to us twenty four seven. And then we also have to wait on the parts. And then the parts come and then they come in and we can't find the parts. Sometimes it can be a hassle.

Reliability and the need for assistance, therefore, limit the extent to which self-checkouts can be used to effectively displace labor in the checkout aisle. Indeed, self-checkouts are hardly independent and require a good deal of human labor to function successfully. They require supervision and oversight by employees in assisting customers and troubleshooting problems and occasionally “freeze up” or experience mechanical failures requiring repair and maintenance. Mislabeled products, faulty codes, or simple human error on the customer's part are enough to bring any transaction to a halt.

More generally, though, it reflects what most researchers have come to acknowledge regarding computers. Although computers may effectively automate certain tasks or jobs, they are hardly independent in themselves and require a considerable degree of support and maintenance (Hirschhorn 1997; Shaiken et al. 1997). Therefore, while computer-driven systems like self-checkouts may reduce or eliminate the need for certain jobs in the front end of stores, they introduce a need for other types of work and tasks in the back end.

### **‘The Fine Print’: Collective Bargaining Agreements**

A fifth factor limiting the effect of self-checkouts on employment is the collective bargaining agreement between the chain and the local labor union. Explicit language within the current labor contract prohibits stores from using technology to eliminate employees. The labor agreement covering the employees at the stores I studied specifically states (under Article 2 ‘Management Authority’):

2.2 “In the event that the Employer contemplates the introduction of major technological changes affecting...work within the Grocery Department, advance notice of such changes will be given to the Union. If requested to do so, the Employer will meet with the Union to discuss the implementation of such changes before putting such changes into effect.”

2.3 “Should the Employer intend to substitute electronic checkout systems for existing equipment in any store, the Employer agrees to notify the Union in advance and to provide the Union a list of all employees regularly assigned to the store on the effective date of the utilization of said systems. Said employees shall not be removed from the Employer’s payroll as a result of the installation of such a system. Employees may continue to be transferred, assigned to other work, or laid off in accordance with the seniority provisions of this Agreement provided the layoff is for reasons other than the installation of such a system.”

As the document indicates, SuperFood simply could not substitute employees with self-checkouts; such actions were outright prohibited. Moreover, it was required to meet with the union to discuss the potential changes involved with the introduction of the new technology if requested. In addition, any future layoffs could not be attributed to the introduction of the new technology; stores would have to wait for existing employees to retire, quit, or voluntarily leave for another job.

In the short term, provisions such as these are likely to limit the effect of self-checkouts on employment. However, self-checkouts may affect employment in the long term as stores like SuperFood modify hiring practices to bring labor needs into line. Workers lost through “natural attrition” (i.e., turnover) may simply not be replaced as stores restructure their hiring practices in order to fit their labor needs. Therefore, the effect of self-checkouts on employment levels may be delayed as the effects occur at a slow and gradual pace rather than having a sharp and immediate effect. According to Barry, this was the agreement SuperFood had made with the local labor union. Stores would not cut hours nor would they terminate full-time employees; rather, the high turnover rate would be allowed to effect natural attrition among employees, permitting stores to gradually implement a transformation of their employment structure.

Barry: What we did – I should have mentioned this earlier – I introduced more hours, but at that point I let natural attrition take care making it balance out. ‘Cause people left and we wouldn’t replace them. For whatever reason. Whether they’re students and they get a real job, or another job, or that they got another job or got terminated for some reason we might not replace ‘em. Because now we got four self-checkouts. That’s how the labor thing comes to happen. We ain’t gonna just reduce the cashiers out ‘cause first of all they have a union. And the union got involved making sure this wasn’t a wholesale cut to their earning potential.

C: Is there an explicit agreement between the union and the stores?

J: No. SuperFood’s relationship with the union’s always been pretty good and there’s not a whole lot of animosity. The founder of the company was very much into continuity and not disrupting our customers. Strikes will do that, ok? So when the self-checkouts came in, we were told, ‘Don’t cut your hours’. You’ll

get your labor savings through natural attrition. When you lose a cashier you might not be so quick to replace them. That way, when you do overall reduce the hours, each individual cashier won't be affected by it. Joe down here, you know, who's getting twenty hours doesn't work here anymore. So, those twenty hours are gone but Bill here is still getting his thirty five hours. So, that twenty hours was eliminated but it didn't hurt anybody.

Moreover, market factors, rather than technology, appears to be driving the workplace restructuring described above. As stores like SuperFood increasingly shift towards a two-tier wage structure in order to compete with non-union, low-cost retailers such as WalMart and Target, unions fear a 'race to the bottom', in which businesses progressively cut wages and benefits in an attempt to lower operating costs and undercut competitors:

Author: Do you think that the industry is using this technology to sort of leverage a transition towards a part-time workforce?

Bill (union president): Well, they were doing that anyway. I don't think the technology has much to do with that. That's the way they wanna operate. They wanna turn it into a Wal-Mart industry where you got all low paid workers and you don't give 'em health insurance. That's where the industry is trying to go. So, there's always a big fight about that when we bargain contracts. This is a race to the bottom...A lot of this centers around union competition. WalMart's now the biggest grocer in the United States. They pay seven bucks and hour. People don't have health care. They lower their prices. You go down the tubes. You can't compete with them. So, this is driven two ways. It's driven because of the WalMart effect and it's driven because of health care costs, which are out of control...[T]hose are the two big drivers in the grocery industry. WalMart and health care.

In short, self-checkouts are not driving workplace restructuring; such changes were being driven by health care costs and the aggressive emergence of non-union competitors such as WalMart. Moreover, in SuperFood's case, these changes had already occurred prior to the arrival of self-checkouts. Each of these facts suggests that market forces, rather than technological innovation, is the reason for workplace restructuring. Below, I address how further computerization of the checkout lane through the addition of self-checkouts affects the training and skill demands of cashiers.

### **'It's Not Rocket Science': Skills and Entry-level Jobs in Supermarkets**

Grocery stores provide many people with their first employment; indeed, nearly all of the managers I spoke with started out their adult working careers in grocery stores as stock clerks and

cashiers. According to the U.S. Department of Labor, grocery stores account for nearly a quarter of all youth employment, second in employment only to restaurants and eating establishments (see Table 2).

As a result, entry-level positions such as stock clerk and cashier have minimal skill requirements. In part, this reflects the characteristics of the labor market; the skills required for these jobs have to be relatively simple and easy to learn because many of them will be filled by new workers, many of whom have never had any previous employment or work experience. Moreover, given the relatively high rate of turnover, grocery stores cannot afford lengthy training periods for new employees filling vacated positions.

Accordingly, entry-level occupations such as cashier require few skills or qualification; most of the skills and knowledge required are learned on-the-job. Typically, this begins by observing or working alongside a more experienced employee, though SuperFood now also uses computer-aided simulations and programs.

Barry: [motions to computer terminal nearby] This thing here is your CBT, your 'cashier-based training' or 'computer-based training' for cashiers. Your cashier's keyboard there and they sit here, it all opens up and they do simulated cashiering, take tests on it. So one session with that, then you throw 'em down there to bag for an hour or two so they get kind of comfortable with the feel and the pace and dealing with customers. And then you have that cashier and new person switch places and they scan while the experienced cashier bags for them. And then the second day we go 'here's your number, you're on number ten.'

Author: So it allows them to kind of prepare for it before the 'real thing' -

Barry: It ain't rocket science. We can train somebody in ten minutes.

Author: That's much shorter than I imagined.

Barry: It used to be- when I got hired, I went to a class over here, in New London. And then that Monday, I reported to store training school in Meadowview, and there were four or five of us and we had a trainer and we were all at the end of a checkout, by ourselves on training mode, and we worked eight hours that day. [We] came back Tuesday and worked eight hours there again and eventually graduated Tuesday afternoons to live customers, and then on Wednesday you were off and Thursday you went to your regular assigned store and started. Three days of intense training. Now, we hire 'em, throw 'em on this thing for two or three hours, bring 'em back next day, let 'em back for an hour or two then switch places.

As Barry indicates, training for cashiers has become compressed and is now often aided with the use of computers. While his training lasted for several days and occurred at a special training facility, new recruits in his store may now begin work in the checkout lane within hours of being hired, following a brief stint of training on a computer simulation. Although this speeds up the rate at which new hires can be put to work, it may also, as Barry notes, come at a cost in overlooking more subtle – yet equally valued – worker characteristics such as perceived friendliness and demeanor, or what are referred to as ‘soft skills’ (Tilly and Moss 1996):

Barry: [I]t’s not much of a training service. And there’s a problem with the customer service issue. Your customer expects a certain amount of service at SuperFood and he might not always get it. We try to screen the applicants carefully but sometimes you get some people who slip through the cracks and get in here and they’re not very nice.

Therefore, while computers have assisted stores in speeding up the training process, they may be less effective in developing the skills managers see as integral to the company’s overall success.

### **‘There’s Not a Whole Lot’: Learning to Operate Self-Checkout Lanes**

Given this background on the training and skills of cashiers, I proceeded to ask managers how they introduced workers to the self-checkouts, and in particular, the training and skills required to operate them. Theoretically speaking, the introduction of new computer-automated systems conceivably entails a significant reorganization of work and ostensibly requires additional training for workers to operate and manage them. Indeed, in stores that did not previously have self-checkout lanes, the arrival of the new machines typically coincided with a special training seminar to help employees and managers learn how to operate the new technology.

Recent literature on automation and the computerization of the workplace suggests that such changes can result in increased skill demands and requirements for labor (Autor, Levy, and Murmane 2003b). Yet the actual training to operate and manage the self-checkouts was described to me as being ‘easy’, ‘minimal’, and ‘simple’, undercutting the notion that the technology genuinely required a significant increase in worker skills or qualifications:

Author: How much training did it take to transition staff from working with regular cashiers to manning these stations and helping customers with these stations?

Peter: If you know how to run a register, then running the self-checkouts is very easy.

Author: Like a couple hours?

Peter: Maybe an hour. At that. 'Cause it basically walks you through.

Author: So there's no different skill or training that people need to really use this new technology?

Peter: I mean, there's minimal [training]. There's not a whole lot.

Barry: It's very simple...[W]e'll give 'em a couple of hours training, though I could figure it out without much instruction. It's not very difficult. Very simple machines.

Author: So you could train most cashiers in a day?

Barry: I could have you out manning the pay station in about an hour. It's not rocket science.

### **A Glass Half Empty or a Glass Half Full?**

Given statements such as those above, it is hard to imagine that the introduction of self-checkout lanes will result in any significant or meaningful upgrading of skills. The brevity and simplicity of the training suggest that while self-checkouts may require some additional training for cashiers and other front end employees, such training is arguably minimal and cursory at best. As Barry says, “[i]t’s not rocket science”. Yet, it is equally difficult to describe the end result as a process of deskilling given that the occupation most likely to be affected – cashier – was already unskilled and frequently performed by staff with little to no previous work experience.

However, when examining the effect of self-checkouts as one in a *series* of innovations in the retail food industry there is perhaps more merit to such a claim. When considering the effect of self-checkouts in relation to similar innovations in retail such as universal product codes, computerized cash registers, and electronic scanning, one can certainly argue that numerous routine tasks have been automated. Supermarkets no longer require product labeling and electronic scanners and computerized cash registers simplify the checkout process. Self-checkouts are simply automating some of the routine tasks that remain, such as scanning and weighing product items, calculating prices, and collecting payment. However, a number of routine tasks still remain; bagging, for example, has not been automated and still must be performed by the customer or an employee. Moreover, self-checkouts do not eliminate the “soft skills” desired by employers in assisting and helping customers.

One effect self-checkouts may have is to increase the importance of such skills. As Autor, Levy, and Murmane (2002, 2003a, 2003b) point out, computer-based technology is amenable to automating

routine tasks that rely on procedural or ‘rules-based’ logic. However, computers are less effective in performing non-routine tasks. Accordingly, self-checkouts may further reduce the need for certain routine tasks previously performed by cashiers, leaving behind the non-routine tasks such as greeting and assisting customers, highlighting the significance of employees’ ‘soft skills’.

Whether or not this is a positive outcome for employees, though, is debatable. Research on work in the service industry indicates that non-routine work can be stressful and unpleasant (Hochschild 1983). A study of the encounters between cashiers and customers found that both parties may experience a degree of strain resulting from competing claims over who is in control over the encounter (Rafaeli 1989). Self-checkout lanes may further problematize this relationship, as they require a varying degree of involvement by each party. Customers are now expected to perform some of the tasks previously performed by cashiers, while some cashiers are now assigned to troubleshoot and assist customers. Although the basic roles of customer and employee are unchanged, self-checkout realign the roles and shift expectations about what is required and expected from each.

Moreover, self-checkout lanes increase stores’ dependency upon certain types of labor, some of which may be skilled. First and foremost, they require the participation of customers who must perform certain tasks to complete their transactions. This is indeed noteworthy; self-checkouts arguably require customers to perform a role similar to that of cashiers but which is uncompensated and transient. Much like flexible ‘just-in-time’ production systems, self-checkouts rely on timely labor that is quickly displaced. Yet, to operate successfully, self-checkouts also require constant supervision and maintenance. As noted earlier, stores have contractual arrangements with service companies and require the skilled work of computer technicians and mechanics to repair and maintain the machines. Although this labor is subcontracted to businesses outside the store, it nevertheless involves the need for skilled labor and adds to the type of labor needed by stores. Therefore, as grocery stores such as SuperFood become increasingly computerized, they will increasingly need and rely upon certain types of skilled labor to operate and maintain such equipment.

Following deskilling and reskilling, we come to the issue of ‘skill-bias’ – do self-checkouts reduce stores’ demand and need for low or unskilled labor while increasing the demand for skilled labor? Yes and no. Self-checkouts themselves do in fact eliminate the need for many of the tasks typically performed by cashiers by automating them outright or displacing them to be performed by the customers themselves. Additionally, they create a need for skilled labor to repair and maintain them, increasing stores’ need for skilled labor. Yet, as I illustrated above, self-checkouts are hardly independent; they require supervision and maintenance, and still require employees to help customers bag their groceries. Moreover, the fact that stores are constrained in their use of self-checkouts limits their effect on the demand for unskilled labor. Both internal (e.g., quality controls, staffing requirements) and external

controls (e.g., labor contract provisions) limit the extent to which self-checkouts can reduce or displace the demand and need for unskilled labor. These factors mitigate any potential skill bias and limit the degree to which self-checkouts may increase skill requirements.

This leaves us with the ‘mixed-effects position’, in which some skill requirements are increased while others are reduced. Without skilled technicians to fix and repair the machines, stores would not be able to manage breakdowns and other temporary problems. Additionally, self-checkouts require periodic maintenance; parts need to be routinely checked and replaced and faulty software reprogrammed. Both of these involve some greater degree of reliance on skilled technical labor. At the other end, self-checkouts reduce the need for certain routine and unskilled tasks. Some of these are automated by the machine itself (e.g., weighing items, calculating payments), while others are displaced to the customer (e.g., scanning items, bagging). Therefore, it appears that while self-checkouts may reduce or eliminate the need for certain types of labor (i.e., routine, unskilled), they may also increase stores’ need for others (e.g., nonroutine, cognitive; technical, skilled).

## **Conclusion**

It is difficult to gauge the effect of self-checkout lanes on stores’ need and demand for certain types of skills on skills precisely because of the social and economic barriers limiting their effect upon employment. SuperFood’s limited use of self-checkouts, as well as their continued desire to provide human-operated cashiers and checkout lanes, limits the extent to which self-checkouts can affect stores’ demand and need for skilled labor. As long as stores limit the use of self-checkout to a few lanes, there will be little appreciable effect on skills.

Granted, stores will require some skilled labor to repair and maintain the machines. However, the fact that such skills are subcontracted out (i.e., outsourced) to external firms suggests that they are not highly valued nor needed on a regular basis. Indeed, it is not as if stores using self-checkouts have now created a number of skilled jobs in the store.

For those employees who do work with the self-checkouts, however, there may be some noticeable effect upon the nature of their work. Although the training to use and operate the self-checkouts was described to me as being relatively brief and simple, their operation and use subtly changes the role of the cashier. Replacing routine with unpredictability, employees assisting customers in the self-checkout lanes are required to help customers deal with problems that occur unexpectedly and unpredictably. Instead of controlling or directing the transaction, cashiers take on a supportive or secondary role in helping customers; if so desired (and assuming there are no problems), customers using self-checkouts can complete their transaction completely independent of any interaction with cashiers. This represents a major shift in power in the customer-cashier relationship described by Rafaeli (1989).

Additionally, although they still perform some routine physical tasks, such as bagging, much of the routine work is displaced, either automated by the technology itself or displaced to the customer. Employees, therefore, are left to manage more of the non-routine aspects of retail sales, such as helping customers and monitoring transactions. As was previously noted in the section dealing with theft and ‘walkoffs’, self-checkouts require oversight to prevent theft and abuse. This translates into a demand for greater vigilance on the part of the staff who may have to take on more of a supervisory role overseeing customers.

It is in this aspect that the effect of self-checkouts on skills is noteworthy. Neither eliminating nor enlarging skills, self-checkouts require employees to adopt a more supervisory role in overseeing their use. As customers take on more of the tasks performed by cashiers, cashiers in turn take on more of the tasks typically performed by managers in assisting customers, troubleshooting, and providing customer service. This involves not just a formal change in the labor process, but also entails a subtle change in the social relations of the supermarket, whereby customers using self-checkouts become – albeit temporarily – willing workers who may occasionally need or require the assistance of cashiers. In turn, cashiers may take on a more passive role, watching customers from a distance, occasionally intervening to assist them or help bag groceries. Further research should consider how this shifting of roles and tasks shapes the social relations of workers in such settings, as well as how customers and cashiers perceive one another as co-participants in the formal labor process.

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**Table 1. Demographic characteristics of selected counties**

	County	
	New London	Meadowview
Population	833,862	925,719
Race		
White	23%	61%
Nonwhite	77%	39%
Education		
High school graduate or higher	86%	91%
Bachelor's degree or higher	30%	57%
Income		
Median Household Income	\$68,410	\$89,284
Median Family Income	\$79,373	\$106,093

Source: U.S. Census Bureau, 2005-2007 American Community Survey.



**Table 2. Industries that employ the largest share of employed youths age 15–17 years, by sex**

Industry	Percent of Total Employed Youths	
	Male	Female
Eating and drinking places	31.3	32.6
Grocery stores	13.6	9.9
Miscellaneous entertainment and recreation services	4.5	5.7
Agricultural production, livestock	3.6	4.4
Construction	3.6	4.0
Department stores	3.1	3.6
Landscape and horticultural services	2.2	1.9
Newspaper publishing and printing	1.9	1.7
Agricultural production, crops	1.5	1.5
Gasoline service stations	1.3	1.4

Note: Figures based on youths working during school months, which are January to May and September to December.

Source: U.S. Department of Labor. (2000). *Report on the Youth Labor Force*, accessible online at [www.bls.gov/opub/rylf/pdf/chapter4.pdf](http://www.bls.gov/opub/rylf/pdf/chapter4.pdf)

**Figure 1. Annual employment in supermarkets and grocery stores, U.S. 1990-2012**

Source: U.S. Bureau of Labor Statistics, Current Employment Statistics survey 1990-2012.

**Figure 3. Annual employment in supermarkets and retail overall, U.S. 1990-2012**

Source: U.S. Bureau of Labor Statistics, Current Employment Statistics survey 1990-2012.

**Figure 4. Annual employment in grocery stores, state 1990-2008**

Source: U.S. Bureau of Labor Statistics, Current Employment Statistics survey 1990-2012.

**Figure 5. Unit labor costs for supermarkets and other grocery stores, 1987-2012**

Note: Does not include convenience stores. Unit labor costs are indexed to 2002 (i.e., 2002 = 100).  
Source: U.S. Bureau of Labor Statistics.