Cash or Debit Cards? Payment Acceptance Costs for Merchants

By Fumiko Hayashi

Over the last two decades, public authorities around the world have intervened in the payment card industry to address growing interchange fees charged to merchants for processing card transactions. The goal of these interventions has been to give merchants and their customers some relief from high fees, which are typically set by the card network (such as Visa or Mastercard) and received by the card issuer (such as a bank). The Reserve Bank of Australia, for example, started regulating interchange fees for credit cards in 2003 and debit cards in 2006. After a series of agreements between the European Commission and Visa and Mastercard reduced interchange fees during the 2000s, European Union legislators approved the European Commission's proposal to cap interchange fees for credit and debit cards in 2015. In the United States, the Board of Governors of the Federal Reserve System implemented a cap on interchange fees for debit cards issued by large banks in 2011 (though credit card interchange fees have not been regulated). Despite this regulation, some U.S. merchants still consider debit card interchange fees too high.

Interchange fees impose costs on merchants, but this does not necessarily mean accepting cards is more costly than accepting cash. Cash transactions impose costs as well: merchants may pay bank fees to

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deposit cash or hire employees to count and sort it. Previous studies have attempted to compare the acceptance costs of payment methods with mixed results: though studies consistently find that credit cards are the most costly payment method for merchants to accept in person (as opposed to online), studies vary on whether a debit card transaction is more costly than a cash transaction (see for example, Brits and Winder 2005; Gresvik and Haare 2009; Kosse and others 2017; Segendorf and Janson 2012; and Stewart and others 2014). Moreover, the relative acceptance costs of debit cards and cash have changed over time within some countries as the number of transactions made with each payment method has changed. Some merchant costs for accepting a given payment method are fixed regardless of the number of transactions made with that method, meaning the average cost per transaction will decline as the number of transactions a merchant processes with a given payment method increases.

In this article, I examine which of two payment methods—cash or debit cards—is more costly for merchants to accept in person in six countries: the United States, Australia, Canada, the Netherlands, Norway, and Sweden. I find that debit cards have been more costly for merchants to accept than cash in the United States in recent years, while cash has become more costly to accept than debit cards in the other five countries. Two factors explain this difference. First, although interchange fees are just one component of merchants' debit card acceptance costs, the fees alone are higher than the total cost of accepting cash in the United States. Second, the number of cash transactions has declined at a much slower pace in the United States than in other countries, keeping the cost of accepting cash from rising.

Section I explains the costs merchants incur to accept cash and debit cards in the in-person environment and how the average cost per transaction is related to the number and value of transactions. Section II compares the average cost of a cash transaction and a debit card transaction for merchants in the in-person environment within each of the six countries. Section III discusses why debit cards are more costly to accept than cash in the United States while other countries show the opposite pattern.

I. Components of Costs for Merchants to Accept Cash and Debit Cards in Person

Merchants incur various costs for accepting cash and debit cards. These costs can largely be divided into two categories: resource costs, such as labor, equipment, and materials; and fees paid to other parties, such as banks, card networks, payment processors, and cash-in-transit companies.

The first four rows of Table 1 summarize the resource costs for accepting cash and debit card transactions in the in-person environment (transactions in the online environment carry different costs and are not considered here). For both payment methods, resource costs can be divided into four subcategories: front-office costs, back-office costs, infrastructure costs, and costs associated with fraud, losses, and mitigation.

Front-office costs are associated with activities at the registers. Some of these front-office costs are specific to cash: for example, the labor cost of delivering cash to registers as well as of removing excess cash from the register and bringing it to the back office. Others are specific to debit cards: for example, the labor cost of bringing signed receipts to the back office. And some are common across both payment methods, such as the labor cost of changing rolls of receipt papers and the material cost of receipt paper and ink ribbons.

Many back-office costs are associated with accounting activities. Cash-specific back-office costs include the labor cost of counting and sorting cash, preparing cash deposits, and depositing cash at the bank. Back-office costs specific to debit cards include the labor cost of reconciling receipts to transactions recorded on the merchant account and processing chargeback requests from card issuers.

Infrastructure costs are associated with the equipment and devices used to accept payments. Cash-specific infrastructure costs are limited but include the cost of owning or leasing safes to store cash. Infrastructure costs shared between debit and credit cards include the cost of card readers, electronic signature capture devices, and telephone or internet connectivity for payment authorization and clearing. Infrastructure costs shared across payment methods include the cost of point-of-sale (POS) terminals and software to record and analyze payments.

Fraud, losses, and mitigation costs are generally associated with theft, fraud, or the steps taken to avoid them. Cash-specific costs in this subcategory include counterfeit currency, theft, and premiums

Table 1

Merchants' Acceptance Costs of Cash and Debit Cards in the In-Person Environment

Type of cost	Cash	Debit cards
Resource costs		
Front office	Processing cash transactions at the register (tender time)	Processing debit card transactions at the register (tender time)
	Delivering cash to the registers	Delivering signed receipts
	Cleaning excess cash	Changing receipt paper rolls
	Changing receipt paper rolls	Receipt papers and ink ribbons (material costs)
	Receipt papers and ink ribbons (material costs)	
Back office	Counting and sorting cash	Reconciling receipts and merchant account records
	Preparing cash deposits	Processing chargeback requests
	Depositing cash at the bank	
Infrastructure	Point of sale (POS) terminals	Card readers, PIN pads, and electronic signature capture devices
	Software to record and analyze payments	Telephone or internet service to request and receive authorization and clearing messages
	Owning or leasing safes to store cash	POS terminals
		Software to record and analyze payments
Fraud, losses, and mitigation	Cash shortage, theft, and counterfeit	Fraud losses incurred by merchants
	Premiums for insurance against theft	Premiums for insurance against fraud and data breaches
	Other mitigation measures	Other mitigation measures
Fees	Cash deposit	Merchant account service fees
	Banknote and coin ordering	Interchange fees
		Periodic fees and per-transaction fees to card networks and processors

for insurance against them. Costs specific to debit cards include payment card fraud losses incurred by merchants, premiums for insurance against fraud and payment data breaches, and fraud mitigation measures, such as secure storage of payment card data.

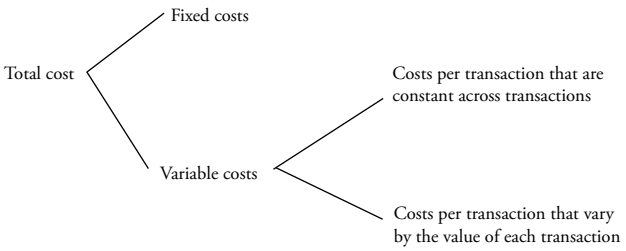
The bottom row of Table 1 summarizes the various fees merchants pay for cash or debit card transactions. Cash-specific fees include those paid to a merchant's own bank to deposit cash and order banknotes and coins. Cash-specific fees may also include those paid to a cash-in-transit

company if merchants use one when depositing cash. Fees specific to debit cards include interchange fees paid to banks that issue debit cards and periodic and per-transaction fees paid to card networks and payment processors.

Most studies that compare the cost of payment methods start by estimating the total merchant cost for each payment method (see, for example, Brits and Winder 2005; Bergman, Guibourg, and Segendorf 2007; Gresvik and Haare 2009; Stewart and others 2014; and Kosse and others 2017). Although some resource costs and fees are specific to cash or debit card transactions, others are shared across payment methods. To allocate these shared costs across payment methods, researchers typically use the share of a payment method in the total number or value of transactions. They then calculate the average merchant cost per transaction for a given payment method by dividing the total merchant cost associated with the payment method by the total number of transactions made with the payment method.

The average cost per transaction for each payment method is related to both the total number of transactions made with that method and the average value per transaction (ticket size) made with that method. To help illustrate the relationship, Figure 1 breaks down the total merchant cost associated with a given payment method into "fixed" costs, which are constant no matter how many transactions are made with a payment method, and "variable" costs, which increase (or decrease) as the number of transactions made with a method increases (or decreases). The variable costs are further grouped into two categories based on whether the costs per transaction are constant across transactions or vary along with the value of a transaction. For example, a merchant may pay debit card processors a flat fee of $0.05 per transaction. This cost is variable in that the merchant will incur greater costs if their number of debit card transactions increases; however, this cost is constant across transactions in that both a $1 transaction and a $100 transaction incur the same fee: $0.05. In contrast, merchants may pay debit card issuers an interchange fee that is proportional to the transaction value—for example, 1 percent of the value of a transaction. In this case, the cost to the merchant is variable because it increases as the number of debit card transactions increases; the cost also varies by the value of each transaction. In this scenario, a $1 transaction would incur a $0.01 fee, while a $100 transaction would incur a $1 fee.

Figure 1
Merchant Cost Categories



These cost categories can help illustrate how the average cost per transaction will decline as the number of transactions increases. Consider, for example, a merchant who deposits cash at their bank once a day with a labor and transportation cost of $10 for every deposit. This travel cost is a fixed cost because the merchant will pay the same $10 whether they process 100 or 200 cash transactions a day. However, the average cost per transaction—the total cost of travel to the bank to deposit cash divided by the number of cash transactions at the merchant—is lower when the merchant processes 200 cash transactions ($10 / 200 = $0.05) than when they process only 100 ($10 / 100 = $0.10). Thus, the average cost per transaction declines as the number of transactions increases.

By contrast, because some variable costs increase with the size of the transaction, the average cost per transaction will increase if the value of the average transaction increases. Consider, for example, the variable cost of a 0.3 percent fee charged by the bank to deposit cash. If the average ticket size of a merchant's cash transaction is $10, the average cost per transaction for the cash deposit fee will be a constant $0.03 regardless of how many cash transactions a merchant processes. However, if the average ticket size of a merchant's cash transaction increases from $10 to $20, the average cost per transaction will also increase from $0.03 to $0.06. Thus, the average cost per transaction increases as the average ticket size increases.

II. Comparison between Cash and Debit Card Costs for Merchants

In several countries, central banks have conducted payment cost studies estimating the average merchant costs per transaction for cash, debit cards, and credit cards. In one of the first comprehensive payment cost studies, Brits and Winder (2005) collected cost information not just from banks but also from merchants in the Netherlands. Following their study, researchers at other central banks conducted similar studies in the 2000s (see, for example, National Bank of Belgium 2006; Bergman, Guibourg, and Segendorf 2007; Schwartz and others 2007; and Gresvik and Haare 2009). Although the Federal Reserve has not conducted a similar study for the United States, the Food Marketing Institute (FMI), a merchant trade association, estimated the average cost of various payment methods for U.S. food retail stores in the late 1990s (FMI 2000). In addition, a recent study by Felt and others (2020) estimated the average cost of cash, debit card, or credit card transactions for U.S. as well as Canadian merchants.

These studies commonly find that credit cards are the most costly payment method for merchants in the in-person environment, mainly because merchants are assessed higher fees for credit card transactions than debit card transactions. Whether a debit card transaction is more costly than a cash transaction, however, varies. Therefore, I examine in this article which of the two methods—cash or debit cards—is more costly for merchants.

To do so, I compare estimates from FMI (2000) and Felt and others (2020) for the United States with those from central bank cost studies conducted in five countries—Australia, Canada, the Netherlands, Norway, and Sweden. I focus on these countries for three reasons. First, debit cards were used widely by consumers in all six countries at the time of analysis. Second, estimates of merchant costs are available for these countries at two different points in time, allowing me to examine whether the relative cost of payment methods has changed over time. And third, the cost studies in these countries either focus on merchant costs in the in-person environment or estimate merchant costs in the in-person and online environments separately.

Although these studies allow me to compare costs for merchants within each country, they do not allow for comparisons across countries,

as the methodologies used to estimate the costs differ. Studies in all six countries estimate resource costs and fees but differ in their treatment of some costs. For example, some studies include overhead costs, such as the costs of accounting, while other studies exclude them. Furthermore, comparing costs across countries may not be meaningful when the cost study periods are far apart. For instance, the most recent data for the Netherlands and Sweden are from 2009, whereas the most recent data for the United States are from 2018.[1]

Table 2 shows merchants' average cost per transaction for cash and debit cards in the in-person environment in all six countries. Average costs are shown in each country's own currency rather than U.S. dollars to avoid the effect of exchange rates on the cost estimates for the two different periods. The average cost per transaction is assessed using the average ticket size (that is, the average value per transaction) of each of the two payment methods. The last column shows the difference between the average cost per transaction for cash and debit cards as a ratio of debit card cost to cash cost. A ratio greater than 1 implies that debit cards are more costly than cash, while a ratio less than 1 implies that cash is more costly than debit cards.

Comparing estimates from the table yields three key findings. First, in the most recent year for which data were available, the average cost per transaction was higher for cash than for debit cards in all countries but the United States. For example, in Australia, debit cards had a 17 percent lower (1 – 0.83) average cost per transaction than cash in 2013. In Norway, the average cost per transaction was higher for cash than debit cards in both 2007 and 2013. In contrast, in the United States, debit cards had an average transaction cost about 2.5 times higher than cash in 2018.

Second, the average cost per cash transaction has increased over time in all six countries. In Australia, Canada, the Netherlands, and Sweden, the average cost per transaction was higher for debit cards than for cash in the earlier year; in the later year, cash carried a higher average cost per transaction. The cost increase in Sweden is particularly notable: the average cost per transaction for cash more than doubled from SEK 2.58 in 2002 to SEK 6.50 in 2009. Although cash remains less costly for merchants than debit cards in the United States, the cost to accept

Table 2

Merchant Average Cost per Transaction for Cash and Debit Cards in the In-Person Environment

Country	Currency	Year	Average cost per transaction at the average ticket size in domestic currency		Difference as a ratio of debit card cost to cash cost
			Cash	Debit card	
Australia	AUD	2006	0.24	0.34	1.42
		2013	0.29	0.24	0.83
Canada	CAD	2014	0.29	0.30	1.03
		2018	0.31	0.31	0.98
Netherlands	EUR	2002	0.17	0.29	1.71
		2009	0.20	0.19	0.95
Norway	NOK	2007	1.28	1.22	0.95
		2013	1.32	1.22	0.92
Sweden	SEK	2002	2.58	4.58	1.77
		2009	6.50	2.91	0.45
United States	USD	1999	0.12	0.34	2.83
		2018	0.19	0.47	2.48

Notes: For Australia and Norway, debit cards are those processed by the domestic debit card networks EFTPOS and BankAxept, respectively. The 2018 results for Canada and the United States are from Felt and others (2020). The 2000 results for United States are from FMI (2000), and debit cards are those processed by PIN-based networks.
Sources: Bergman, Guibourg, and Segendorf (2007); Brits and Winder (2005); Felt and others (2020); FMI (2000); Gresvik and Haare (2009); Jonker (2013); Kosse and others (2017); Norges Bank (2014); Schwartz and others (2007); Segendorf and Jansson (2012); Stewart and others (2014); and author's calculations.

cash nevertheless grew from $0.12 per transaction in 1999 to $0.19 per transaction in 2018.

Third, in all countries but the United States, the average cost per debit card transaction did not increase from the earlier year to the later year. In Canada and Norway, the average cost per debit card transaction barely changed; in Australia, the Netherlands, and Sweden, the average cost per debit card transaction actually decreased by about 30 percent in the six- or seven-year period. In contrast, in the United States, the average cost per debit card transaction actually increased by 38 percent from 1999 to 2018.[2]

Two factors may explain the upward trend of the average cost per cash transaction across countries: a decline in cash use and an increase in the average ticket size of cash transactions.[3] Table 3 shows the shares of

Table 3

Transaction Share and Average Ticket Size for Cash and Debit Cards at Merchants in the In-Person Environment

Country	Currency	Year	Share of the number of in-person transactions (percent)		Average ticket size in domestic currency	
			Cash	Debit card	Cash	Debit card
Australia	AUD	2006	68	17	19	73
		2013	49	34	28	64
Canada	CAD	2014	49	29	18	43
		2018	32	35	21	42
Netherlands	EUR	2002	85	13	9	44
		2009	68	28	13	39
Norway	NOK	2007	24	68	218	370
		2013	15	74	156	339
Sweden	SEK	2002	71	25	165	583
		2009	40	51	252	411
United States	USD	1999	39	12	14	40
		2018	32	37	23	43

Notes: For Australia, the 2006 number of debit card (EFTPOS) transactions is the author's calculation using information from Schwartz and others (2007). The 2018 statistics for Canada are the author's calculations using information from Tompkins and Galociova (2019). Statistics for the United States are from the 2018 Survey of Consumer Payment Choice and the author's calculations using information in Felt and others (2020).
Sources: 2018 Survey of Consumer Payment Choice; Bergman, Guibourg, and Segendorf (2007); Brits and Winder (2005); Felt and others (2020); FMI (2000); Gresvik and Haare (2009); Jonker (2013); Kosse and others (2017); Norges Bank (2014); Schwartz and others (2007); Segendorf and Jansson (2012); Stewart and others (2014); Tompkins and Galociova (2019); and author's calculations.

cash and debit card transactions made at merchants in the in-person environment in each country along with the average ticket size of cash and debit card transactions. For all six countries, the cash share of in-person transactions declined from the earlier year to the later year. Moreover, in all countries but Norway, the average ticket size of cash increased from the earlier year to the later year. Both of these changes may have contributed to the increase in the average cost per cash transaction.

Two factors may also explain the downward trend of the average cost per debit card transaction in Australia, the Netherlands, and Sweden: an increase in the use of debit cards and a decline in the average ticket size of debit cards. From the earlier year to the later year, the debit card share of in-person transactions doubled in Australia and

more than doubled in the Netherlands and Sweden. In addition, in all three countries, the average ticket size of debit cards declined. Both of these changes may have contributed to the decrease in the average cost per debit card transaction.

It is worth noting that in 2018, Canada and the United States had remarkably similar shares of cash and debit card transactions as well as similar ratios of the average ticket size of debit cards to that of cash. The two countries had the same cash share of 32 percent and similar debit card shares: 35 percent in Canada and 37 percent in the United States. The ratio of the average ticket size of debit card transactions to cash transactions was 2 (42 / 21) in Canada and 1.9 (43 / 23) in the United States. Nevertheless, the average cost per transaction is higher for cash than for debit cards in Canada, while the opposite is true in the United States. Interchange fees may explain this difference: typically, no interchange fee is assessed for debit card transactions in Canada, while interchange fees are assessed for all debit card transactions in the United States.

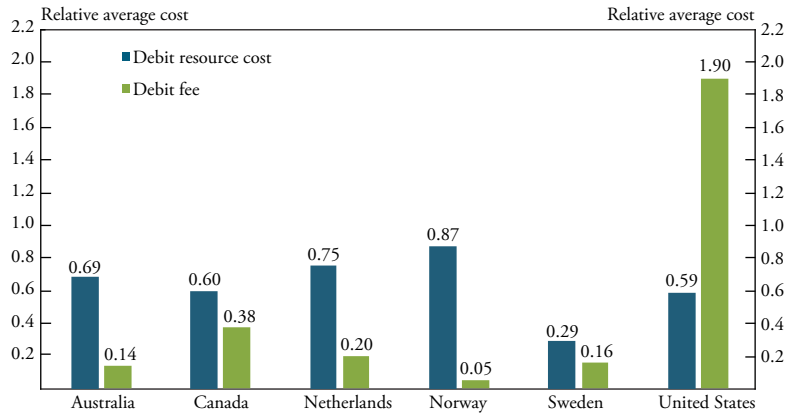
III. Why Are Debit Cards More Costly than Cash for U.S. Merchants?

Unlike other countries, the United States had a higher average cost per transaction for debit cards than cash as recently as 2018. To investigate what might explain this difference, I divide merchant costs for debit cards between resource costs and fees and examine whether these cost components differ in the United States relative to the other countries. Specifically, I divide the average cost per debit card transaction between the average resource cost per debit card transaction and the average fee per debit card transaction. To calculate these cost components, I use 2018 data for the United States and data from the later year of the two study years for the other five countries.

Chart 1 shows the two cost components for debit cards relative to the average cost per transaction for cash within each country. This breakdown allows me to examine which cost component for debit cards—resource costs or fees—contributes most to the higher acceptance cost of debit cards in the United States. It also allows me to examine whether these cost components differ substantially between the United States and other countries. If a component is smaller (or larger) than 1, then that

Chart 1

Average Resource Cost and Fee per Debit Card Transaction Relative to the Average Cost per Cash Transaction



Sources: Felt and others (2020), Jonker (2013), Kosse and others (2017), Norges Bank (2014), Segendorf and Jansson (2012), Stewart and others (2014), and author's calculations.

component is smaller (or larger) than the average cost per cash transaction. The chart reveals that debit card fees are disproportionately high in the United States: the average fee per debit card transaction is almost double the average cost per cash transaction (1.9 versus 1). In the other five countries, the average fee per debit card transaction is much smaller relative to the average cost per cash transaction. For example, in Canada, the average fee per debit card transaction is less than half of the average cost per cash transaction (0.38 versus 1). Moreover, the average fee is smaller than the average resource cost for debit card transactions for all countries but the United States.

In contrast to debit card fees, the average resource cost per debit card transaction relative to the average cost per cash transaction is very similar across the United States (59 percent), Australia (69 percent), and Canada (60 percent). These findings suggest that high debit card fees help explain why debit cards are more costly than cash for U.S. merchants to accept in the in-person environment. Because the average resource cost per debit card transaction is lower than the average cost per cash transaction in the United States, debit cards could become less costly than cash for U.S. merchants if the average fee per debit card transaction declines.

The vast majority of fees U.S. merchants pay for debit card transactions are interchange fees. In 2011, the Federal Reserve Board implemented Regulation II, which caps the debit card interchange fees received by the large debit card issuers at $0.21 per transaction plus 0.05 percent of the transaction value.[4] For debit card issuers that are exempt from the fee cap, which includes small issuers with less than $10 billion in assets, interchange fees are generally proportional to the transaction value. According to the Federal Reserve Board, the average interchange fee for all debit card transactions—both regulated and exempt—was 0.78 percent of the transaction value or $0.31 per transaction in 2018.

In contrast, in the other five countries, debit card interchange fees were low in both of the two study years. In Canada and Norway, interchange fees have not been assessed for debit card transactions processed by the country's domestic debit card network (Hayashi and Maniff 2020).[5] In Australia, the Reserve Bank of Australia has regulated debit card interchange fees since 2006, and the interchange fee for EFTPOS, the domestic debit card network, was AUD 0.05 (about $0.05) or less in 2013. Although both the Netherlands and Sweden had debit card interchange fees in 2009, the fee level was low: even including other fees, the average fee per debit card transaction was EUR 0.04 (about $0.06) in the Netherlands and SEK 1.03 (about $0.14) in Sweden.[6] The higher level of debit card interchange fees in the United States, therefore, is the primary explanation for why debit cards are more costly than cash for U.S. merchants.

In addition to higher interchange fees, a slower decline in the number of cash transactions may also help explain why debit cards are more costly than cash for U.S. merchants. For example, a slow decline in the number of cash transactions may allow merchants to adjust their cash handling process more effectively than they would during a rapid decline. Furthermore, a slow decline may enable providers of cash services for merchants, such as banks and cash transit companies, to adjust their cash service operations without raising the fees they charge to merchants. Thus, a slow decline in the number of cash transactions may keep the average cost per cash transaction from rising.

Table 4 shows the average annual rate of decline for the number of cash transactions from 2012 to 2018 in the United States, and from the

Table 4
Annual Rate of Decline for the Number of Cash Transactions

Country	Period	Annual rate of decline (percent)
Australia	2006–13	4.5
Canada	2014–18	13.8
Netherlands	2002–09	5.9
Norway	2007–13	1.3
Sweden	2002–09	4.5
United States	2012–18	0.1

Sources: 2012 and 2018 Surveys of Consumer Payment Choice; Bergman, Guibourg, and Segendorf (2007); Brits and Winder (2005); Gresvik and Haare (2009); Jonker (2013); Kosse and others (2017); Norges Bank (2014), Schwartz and others (2007); Segendorf and Jansson (2012); Stewart and others (2014); Tompkins and Galociova (2019); and author's calculations.

earlier year to the later of the two study years in the other five countries.[7] The average annual rate of decline was the lowest in the United States: from 2012 to 2018, the number of cash transactions declined, on average, by 0.1 percent each year from 2012 to 2018. This rate is substantially lower than even the second-lowest rate of 1.3 percent in Norway. In the other four countries, the rate is much higher—4.5 percent or more. According to the Survey of Consumer Payment Choice, U.S. consumers, on average, have made fewer cash transactions in the in-person environment in the last several years; however, because the U.S. population grew over the same period, the total number of cash transactions in the United States did not substantially decline. The slow decline in the number of cash transactions may have kept the average cost per cash transaction from rising in the United States, helping to explain why debit cards are more costly than cash for U.S. merchants.

Conclusion

Although debit card interchange fees have been regulated in the United States since 2011, some U.S. merchants still consider them too high. Payment cost studies conducted by central banks in several countries commonly find that credit card payments are most costly for merchants to accept; however, whether debit cards are more costly than cash varies.

To assess whether debit cards or cash are more costly for merchants to accept in the in-person environment, I compare the average cost per transaction for cash and debit cards within six countries—Australia,

Canada, the Netherlands, Norway, Sweden, and the United States. I find that the average cost per transaction was higher for debit cards than cash in the United States as recently as 2018, while the cost was higher for cash than debit cards in the other five countries in the most recent years for which data are available. Two factors explain the higher debit card costs for U.S. merchants. First, debit card interchange fees—just one component of merchants' costs to accept debit cards—alone exceed the cost of accepting cash in the United States. Second, cash transactions have declined at a much slower pace in the United States than in the other five countries, keeping the average cost per cash transaction from rising.

Given recent changes in consumer payment preferences, my results suggest merchants may see an increase in overall payment acceptance costs in the near future. During the COVID-19 pandemic, many U.S. consumers shifted from cash to card payments in the in-person environment to avoid potential contamination; at the same time, many also shifted from in-person transactions to online transactions. If these shifts continue after the pandemic, the United States may experience a significant decline in the number of cash transactions, raising the average cost per cash transaction for U.S. merchants. However, the resulting increase in the number of debit (and credit) card transactions may not reduce the average cost per debit card transaction because interchange fees, which do not vary by the number of transactions made, account for the vast majority of the average cost per debit card transaction. Moreover, debit card interchange fees for contactless card transactions or "buy online and pick up at the store" transactions—especially those exempt from the interchange fee regulation—may be higher than those for typical contact card transactions in the in-person environment. Therefore, if debit card interchange fees do not decline, U.S. merchants may see an increase in their average cost per transaction both for cash and for debit cards.

Endnotes

[1]Although the methodologies and timings of the studies vary, the estimated average costs per transaction are less than $0.30 for both cash and debit cards in Australia, Canada, the Netherlands, and Norway. The estimated average costs are slightly higher in Sweden than in these four countries but still below $0.47 for debit cards.

[2]Interchange fees increased significantly during the 2000s, partly explaining the increase in the average cost per debit card transaction in the United States. Although these fees declined when Regulation II was implemented in 2011, they remained higher in 2018 than in 1999 (Hayashi and Ruiz 2020).

[3]Neither the average cost per transaction nor the average ticket size is adjusted for inflation. Thus, inflation may partly explain the increase in the average cost per cash transaction within countries over time.

[4]In 2017, more than 100 institutions (at the bank holding company level) were regulated issuers, and their customers' transactions collectively accounted for about two-thirds of all debit card transactions (Board of Governors of the Federal Reserve System 2019). Regulated debit card issuers may receive an additional $0.01 of the interchange fee as a fraud-prevention adjustment if they comply with the Federal Reserve Board's fraud-prevention standards. The debit card interchange fee cap has not changed since implementation.

[5]In Canada, the domestic debit card network assesses interchange fees for contactless transactions. In both countries, international debit card networks, such as Visa and Mastercard, assessed interchange fees, but the vast majority of debit card transactions were processed by the domestic network.

[6]Since 2015, the European Union has capped debit card interchange fees at 0.2 percent of the transaction value (Hayashi and Maniff 2020).

[7]The number of cash transactions in the earlier year of the two study years in the United States is not available.

References

Bergman, Mats, Gabriela Guibourg, and Bjorn L. Segendorf. 2007. "The Costs of Paying—Private and Social Costs of Cash and Card Payments." Sveriges Riksbank, working paper no. 212. Available at https://doi.org/10.2139/ssrn.1022266

Board of Governors of the Federal Reserve System. 2019. "2017 Interchange Fee Revenue, Covered Issuer Costs, and Covered Issuer and Merchant Fraud Losses Related to Debit Card Transactions." March 21.

Brits, Hans, and Carlo Winder. 2005. "Payments Are No Free Lunch." *De Nederlandsche Bank Occasional Studies*, vol. 3, no. 2.

Felt, Marie-Hélène, Fumiko Hayashi, Joanna Stavins, and Angelika Welte. 2020. "Distributional Effects of Payment Card Pricing and Merchant Cost Pass-Through." Federal Reserve Bank of Kansas City, Research Working Paper no. 20-18, December. Available at https://doi.org/10.18651/RWP2020-18

FMI (Food Marketing Institute). 2000. "It All Adds Up: An Activity Based Cost Study of Retail Payments." Food Marketing Institute.

Gresvik, Olaf, and Harald Haare. 2009. "Costs in the Norwegian Payment System." Norges Bank Staff Memo, no. 4, May 14.

Hayashi, Fumiko, and Jesse Leigh Maniff. 2020. "Public Authority Involvement in Payment Card Markets: Various Countries. August 2020 Update." Federal Reserve Bank of Kansas City, Payments System Research, August. Available at https://doi.org/10.18651/ICF/PublicAuthority

Hayashi, Fumiko, and Rebecca Ruiz. 2020. "Credit and Debit Card Interchange Fees Assessed to Merchants in the United States: August 2020 Update." Federal Reserve Bank of Kansas City, Payments System Research, August. Available at https://doi.org/10.18651/ICF/USICF

Jonker, Nicole. 2013. "Social Costs of POS Payments in the Netherlands 2002–2012: Efficiency Gains from Increased Debit Card Usage." *De Nederlandsche Bank Occasional Studies*, vol. 11, no. 2.

Kosse, Anneke, Heng Chen, Marie-Hélène Felt, Valéry Dongmo Jiongo, Kerry Nield, and Angelika Welte. 2017. "The Costs of Point-of-Sale Payments in Canada." Bank of Canada Staff Discussion Paper, no. 2017-4.

National Bank of Belgium. 2006. "Costs, Advantages and Drawbacks of Various Means of Payments." National Bank of Belgium, *Economic Review*, no. 1, pp. 41–47, June.

Norges Bank. 2014. "Costs in the Norwegian Payment System." Norges Bank Papers, no. 5.

Schwartz, Carl, Justin Fabo, Owen Bailey, and Louise Carter. 2007. "Payment Costs in Australia: A Study of the Costs of Payments Methods." Reserve Bank of Australia.

Segendorf, Björn, and Thomas Jansson. 2012. "The Cost of Consumer Payments in Sweden." Sveriges Riksbank, working paper no. 262. Available at https://doi.org/10.2139/ssrn.2092577

Stewart, Chris, Iris Chan, Crystal Ossolinski, David Halperin, and Paul Ryan. 2014. "The Evolution of Payment Costs." Reserve Bank of Australia, Research Discussion Paper, no. 2014-14.

Tompkins, Michael, and Viktoria Galociova. 2019. "Canadian Payment Methods and Trends: 2019." Payments Canada.