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The Impact of School Quality on the Transmission of Inequality

As access to public education spread across the United States in the early 20th century, some children benefited more than others. Children's schooling achievement was positively related to parental education, but the link between parental and children's education varied substantially by place of birth.

A child's years in school were affected by multiple factors, including, importantly, the local school environment. In **The Intergenerational Transmission of Human Capital: Evidence from the Golden Age of Upward Mobility** (NBER Working Paper No. 25000), [David Card](#), [Ciprian Domnisoru](#), and [Lowell Taylor](#) find that children's schooling choices were highly responsive to the quality of local schools. Children in areas with higher-quality schools on average spent more time in school, and this increased their likelihood of intergenerational upward mobility. Black children in the Deep South and white children in some rural areas were particularly disadvantaged by limited access to high-quality schools.

Using data from the 1940 census, the researchers document a positive correlation between parents' levels of educational attainment and the schooling outcomes of their children. They divide white families

into four groups based on parents' years of education: 0–4, 5–8, 9–12, and over 12 years. Then, using state-level teacher-to-pupil ratios and teacher salaries as proxies for school qual-

ity, they examine the impact of school quality on children from these different family backgrounds. Attending a higher-quality school had the largest effect for children with the

capital disparities between generations."

How much narrower, exactly? Their estimates suggest that when parents had an average level of schooling—five to eight

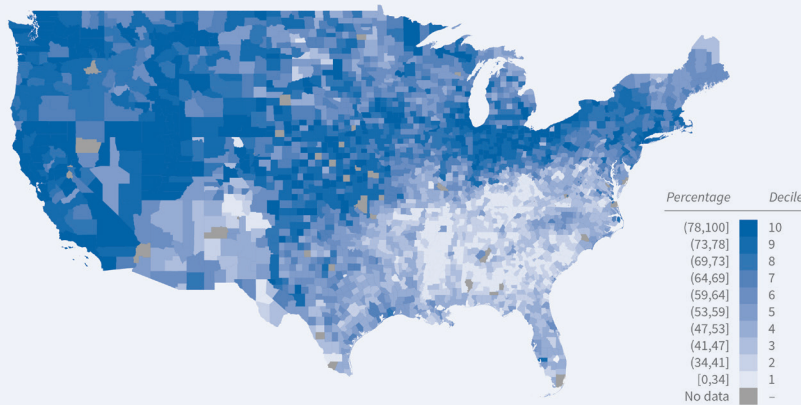
Evidence from the 1940s shows that schools can be vehicles for discrimination or can help improve equality of opportunity across generations.

grades—a \$500 increase in teacher salaries was associated with a three-fourths of a year increase in the child's completed education. Taken at face value, these estimates indicate that if a family lived in a high school-quality state like California, their children would obtain, on average, an extra two years of education compared to living in a low school-quality state like Alabama. Assuming a 7 percent return to each additional year of schooling, this resulted in around 15 percent higher earnings per year of work.

In the early 20th century, black families typically faced circumstances that differed greatly from those of their white counterparts. Most lived in the South, where children attended segregated schools. Thus the researchers conducted analyses separately for black and white families. In the study period, few black parents had

Upward Educational Mobility for Children Born in 1922–26

The share of parents with five to eight years of education whose children, born in 1922–26, completed at least nine years of education.



Source: Researchers' calculations using data from the United States Census Bureau

least-educated parents, and the smallest for those with the most-educated parents. They conclude that "higher average school quality in a state contributed to a narrowing of human

more than an elementary-school education. They were also unlikely to be able to lobby for greater school resources. In the Deep South, with its institutionalized segregation and lower salaries for black teachers, black children had lower outcomes than in other Southern states. In states with higher-quality schools, black children attained schooling at similar rates as their white peers. In California, upward mobility rates of white and black children were nearly equal.

The researchers illustrate the importance of teacher inputs in determining school quality

and student outcomes by studying 270 counties along Southern state borders with similar economic conditions, but different minimum wage levels for teachers. The difference in salaries between adjoining states was often large, particularly for black teachers. In the Deep South, black teachers often were paid much less than their white counterparts. The minimum annual salary in 1940 in Georgia, for example, was \$280 for white teachers and \$175 for black teachers, but in contrast it was \$320 for both white and black teachers in Tennessee, the bor-

dering state to the north. The researchers find that, on average, states with the lower minimum salary for black teachers, like Georgia, had lower average upward mobility among black students.

The research highlights the long-term effects of unequal access to quality public schooling but, they conclude, it also demonstrates that high-quality education is “a viable means of improving equality of opportunity across generations.”

—Anna Louie Sussman

Leverage, Fire Sales, and the 2015 Chinese Stock Market Crash

Leverage feedback loops in which highly levered investors facing margin calls are forced to sell off assets quickly, thus further depressing asset prices and tightening leverage constraints, are widely believed to have contributed to many past financial crises, including the U.S. stock market crash of 1929 and the global financial crisis of 2008.

In **Leverage-Induced Fire Sales and Stock Market Crashes** (NBER Working Paper No. 25040), [Jiangze Bian](#), [Zhiguo He](#), [Kelly Shue](#), and [Hao Zhou](#) analyze the role of such feedback loops in the Chinese stock market crash of 2015.

They conclude that this crash, in which the Chinese market lost approximately 30 percent of its value in about a month, was precipitated by China Securities Regulatory Commission regulations pertaining to shadow-financed margin accounts. These accounts, which had grown popular with the aid of the fintech industry, previously had not been subject to the same strict CSRC regulations as brokerage-financed margin accounts. Most importantly, shadow-financed margin accounts were

exempt from the market-wide maximum leverage level known as the Pingcang Line that applied to brokerage-financed accounts.

Using a dataset on both types of accounts

the existing shadow-financed accounts, particularly those closest to leverage limits, but not in brokerage-financed accounts.

The relationship between leverage levels

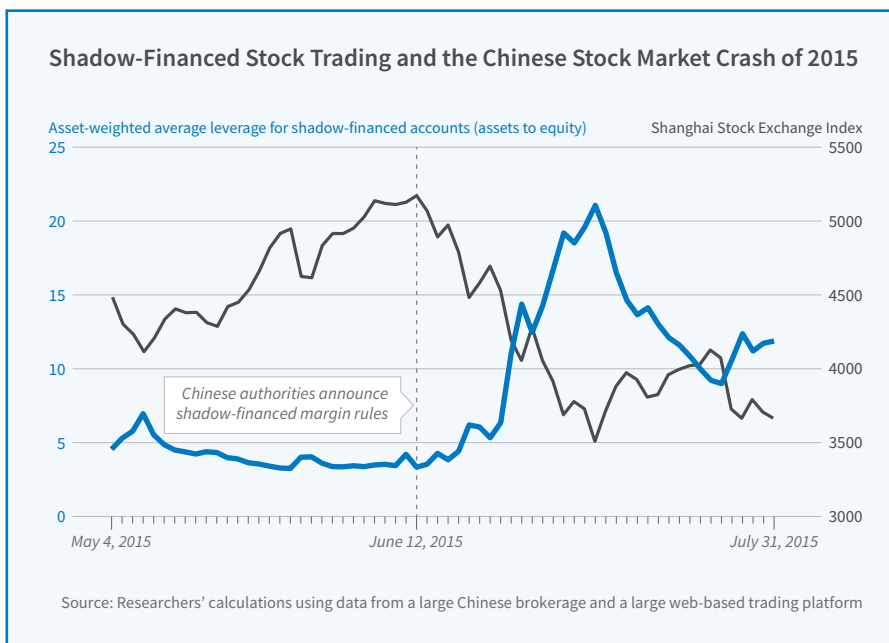
The 2015 Chinese stock market crash was precipitated by the release of draft regulations pertaining to shadow-financed margin accounts.

during the three months beginning in May 2015, the researchers found that margin investors sold heavily when their accounts approached maximum leverage limits. They also found that the announcement of tightening regulations on future new shadow-financed accounts produced a large increase in sales in

and selling was particularly strong on days when stock market prices declined, consistent with a downward spiral in which investors forced to deleverage contribute to declines in asset prices, thus further tightening leverage constraints and forcing more investors to sell assets. The researchers found evidence that government

regulations — particularly trading restrictions on stocks experiencing large price swings — may have exacerbated the crash. Specifically, they found that “investors seeking to deleverage significantly intensify their selling of unprotected stocks if other stocks in their portfolios cannot be sold due to stock-specific price limits.”

The researchers also examined how fire sales affected the long-run asset prices of individual stocks. Stocks with high fire-sale exposure — those disproportionately



held by accounts approaching their leverage limit—experienced greater selling intensity and underperformed less-exposed stocks over a period of 10 to 15 trading days. Those performance differences, however, lessened when the horizon was 30 to 40 trading days.

The researchers conclude that shadow-financed margin accounts contributed more significantly to the market crash than brokerage-financed accounts. They note that their findings may inform the design of regulatory policy for the fintech sector, since they show that “fire sales

can result when new financial innovations (fintech in our case) advance ahead of regulation, much like unregulated margin trading during the U.S. stock market crash in 1929.”

—Dwyer Gunn

Sanctions Program Reduces Illegal Entries into the United States

Before 2008, more than 95 percent of Mexican nationals intercepted at the U.S. border were simply sent home without further repercussions. Over the next four years, under a sanctions program put in place by U.S. Customs and Border Protection, the Border Patrol began imposing administrative and, in some cases, criminal penalties for illegal border crossings. As of 2012, 85 percent of Mexicans apprehended at the border were subject to these sanctions.

Penalizing of immigrants for entering the United States illegally appears to have discouraged repeat attempts, according to an analysis of data from the program by Samuel Bazzi, Sarah Burns, Gordon Hanson, Bryan Roberts, and John Whitley in *Detering Illegal Entry: Migrant Sanctions and Recidivism in Border Apprehensions* (NBER Working Paper No. 25100).

In 2005, 22.6 percent of apprehended migrants sampled were re-apprehended within three months, and 28.1 percent within 18 months, of their initial apprehension. In 2012, the re-apprehension rates were 14.4 percent and 17.5 percent, respectively. The program is still in force today.

The researchers restricted their sample to adult male Mexican nationals with six or fewer prior apprehensions, because the Border Patrol often exempted women and children from sanctions while imposing heavy penalties on the small number of migrants with lengthy

records. They estimate that their sample group is representative of nearly 80 percent of Mexican nationals caught at the border from 2008 to 2012.

To control for other factors that could influence migration patterns, the study

The number of Mexican immigrants attempting to enter the United States illegally dropped sharply after the Border Patrol rolled out the Consequence Delivery System in 2008–12.

paired sanctioned Mexicans with non-sanctioned Mexicans who displayed similar demographic characteristics. Everyone apprehended was fingerprinted, whether or not they were sanctioned.

Re-apprehension rates for sanctioned migrants were 8.1 percentage points lower after three months and 6.1 percentage points lower after 18 months than those for their non-sanctioned counterparts. The researchers suspect that re-apprehension rates may under-

state the impact of sanctions on illegal entry.

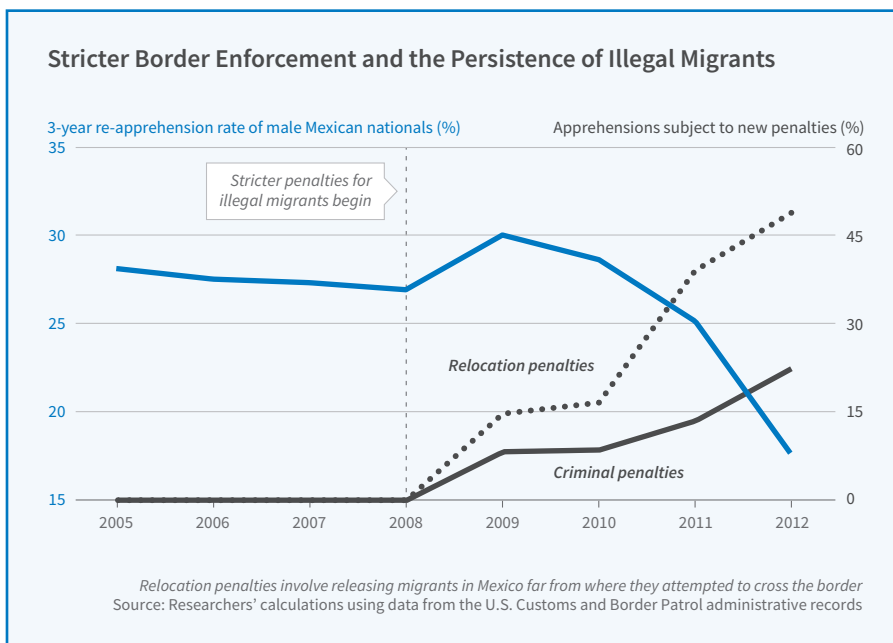
For those who are sanctioned, penalties may be as basic as administrative measures making it difficult for re-apprehended migrants to obtain legal entry in the future. Migrants might also be transported to, and

released at, a location in Mexico far from where they attempted to cross, thus disrupting smuggling networks. Repeated violations could result in prison time.

The sanctions program, known as the Consequence Delivery System, was introduced at a time when illegal immigration was declining as a result of the Great Recession in the United States and demographic shifts in Mexico. Without the sanctions program, the researchers argue, the

U.S. recovery would have been associated with a greater rebound in illegal immigration. They estimate that the program accounted for 28 percent to 44 percent of the reduction in re-apprehension rates from 2008 to 2012.

The impact of sanctions is also evident in surveys of apprehended Mexican nationals. In 2007, 88 percent said they intended to attempt another border crossing within three months. That figure fell to 77 per-



cent in 2009 and 49 percent in 2013.

The researchers find that basic administrative sanctions “appear to be equally as

effective as sanctions that entail costly detentions or relocations of migrants.” They note that sanctions represent a potentially lower-

cost deterrent than construction of substantial border barriers.

— Steve Maas

Medical Spending Is Higher When Doctors Can Be Sued

“**D**efensive medicine” is frequently advanced as one potential explanation for the high share of GDP that the U.S. spends on health care. This narrative holds that doctors sometimes provide excess medical care because of concerns about potential lawsuits, even when the incremental diagnostic value of such additional care is low. Testing this hypothesis is difficult, because there are few settings in which some patients can sue their providers and other, similar, patients cannot.

A new study by [Michael D. Frakes](#) and [Jonathan Gruber](#), **Defensive Medicine: Evidence from Military Immunity** (NBER Working Paper No. 24846), provides evidence on litigation risk and the behavior of health care providers. The researchers analyze data from the U.S. Military Health System (MHS) and conclude that for this patient population, removing the possibility of malpractice lawsuits reduces inpatient medical expenditures by 5 percent.

The MHS is a \$50 billion-a-year program that insures all active-duty military personnel and their dependents. Under federal law, active-duty patients cared for by active-duty physicians on military bases cannot sue their doctors or the federal government for malpractice. However, dependents and retirees can. In addition, any MHS patient, regardless of military status, can sue for malpractice if they are treated at a civilian facility under contract with the military.

The researchers examined the records of nearly 12 million distinct beneficiaries who were

served by the MHS between 2003 and 2013. They focused on inpatients, rather than outpatients, because their care entails greater liability risk and offers a better opportunity to observe treatment outcomes, among other reasons.

The researchers compare those active-

in the total care provided to those who could not sue for malpractice.

The study found that defensive medicine was primarily practiced in the diagnosis stage. Among those patients who had no recourse to sue, the amount of diagnostic testing was 22

Spending on patients in the U.S. Military Health System who are treated in settings that preclude suits against providers is about 5 percent lower than spending on patients who can sue.

duty patients treated on base who cannot sue (and whose doctors are therefore immune from defensive medicine pressure) to active-duty patients treated off base who can sue. They then control for on- versus off-base differences by comparing to non-active-duty patients who can sue in either locale. And they also use the

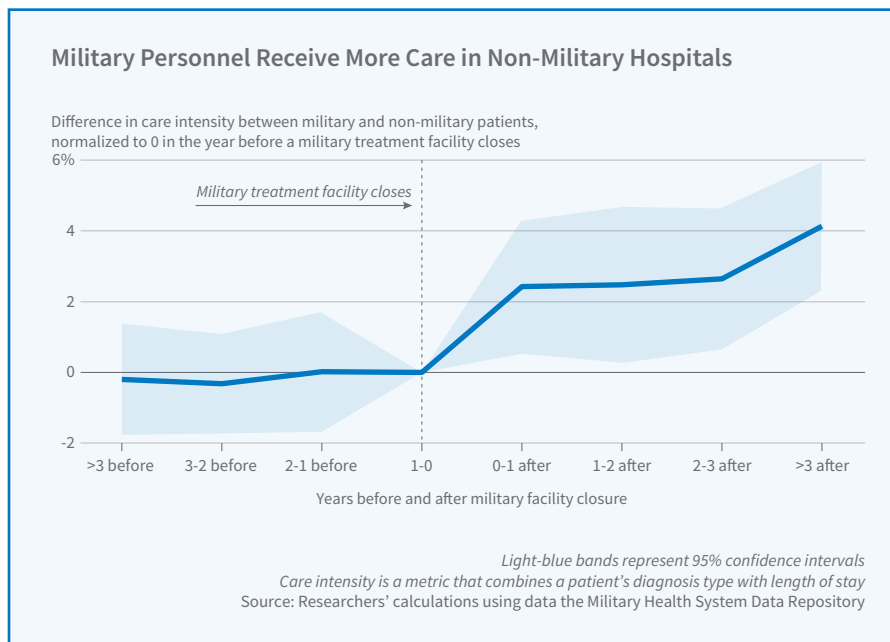
percent lower than among those who could sue.

The researchers examine several measures of the quality of medical care received, including mortality over various time periods and hospital readmission. They conclude that while the results are not dispositive, there is no evidence of worse health care outcomes for patients who don't have liability recourse.

The study raises two cautions about generalizing the results. First, MHS providers are more likely to be on salary than doctors at large; this may affect their incentives to conduct tests, inviting questions as to how liability incentives interact with financial incentives. Second, active-duty service members tend to be healthier than the population at large. Whether good health makes a patient subject to more — or less — defensive treatment remains an open

question. These caveats aside, the researchers conclude that the fear of malpractice litigation “is a key determinant of medical treatment patterns in the U.S.”

— Steve Maas



fact that a series of closings of base hospitals during this time period shifted many active-duty patients from a situation where they could not sue to one where they could. Using either approach, they find about a 5 percent reduction

Are Investors Inattentive to SEC-Mandated Corporate Reports?

Financial market prices move on information. Changing regulations as well as corporate reporting norms have increased the amount of information available to investors, raising questions about the capacity of investors to process it. By 2014, for example, 10-K reports were more than six times longer than in 1995. Are investors more likely to miss useful information as the volume of required disclosures increases?

In **Lazy Prices** (NBER Working Paper No. 25084) Lauren Cohen, Christopher Malloy, and Quoc Nguyen study the language and construction of all financial reports required by the Securities and Exchange Commission (SEC) for publicly traded firms in the United States over the two decades beginning in 1995. They construct portfolios of firms that had few textual changes in quarter-to-quarter reports and firms that had many changes, and find that portfolios that were long “non-changers” and short “changers” earned a statistically significant value-weighted abnormal return of between 34 and 58 basis points per month—between 4 and 7 percent per year—over the following year.

The abnormal returns continued to accrue for up to 18 months after the date of the regulatory filing and they were not reversed subsequently. They were not related to firm size, time, industry, or one-time firm events. The authors conclude that changes in the language used in the reports contained important new information for investors, information that was gradually incorporated into asset prices. They suggest that the excess returns occur because investors failed to recognize the systematic and rich information contained in simple changes to a firm’s annual reports.

To quantify changes to firms’ annual

reports, the researchers compare quarter-to-quarter similarities between 10-Q and 10-K textual content using four different measures of similarity. Two of these measures compare the frequency of terms in the documents. A third counts the smallest number of opera-

A six-fold increase in the length of 10-Ks since 1995 has made much new information available to investors, but stock prices seem unresponsive to some potentially significant disclosures.

tions needed to transform one document into the other. For example, changing “We expect demand to increase” from one year’s filing into the next year’s “we expect worldwide demand to increase” requires adding “worldwide” to the first sentence and counts as a single operation. The fourth similarity measure uses word processor document-comparison software to show changes in

basis points per month, or over 22 percent per year. Also important were changes in language that pertained to the CEO or CFO, changes related to litigation and lawsuits, and increased use of words freighted with negative sentiment. More than 86 per-

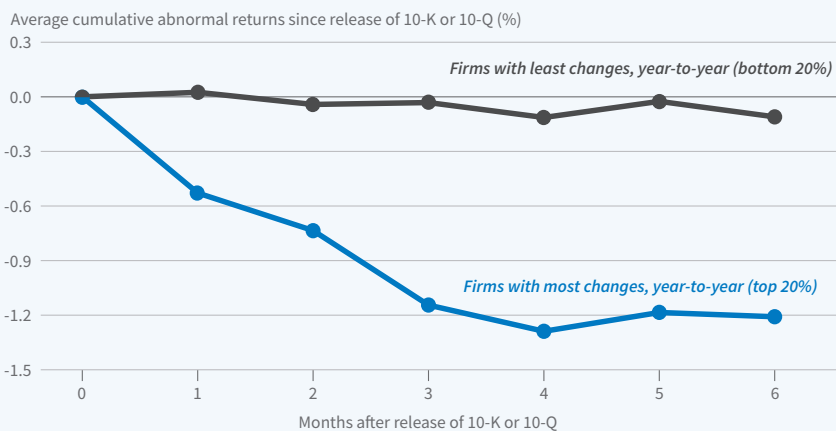
cent of changes were “negative sentiment” changes. This may suggest that the success of class-action lawsuits alleging underreporting of adverse information encouraged firms to report potentially negative material information to a disproportionate degree. The 14 percent of changes that represented positive sentiment were significant predictors of positive future abnormal returns.

To examine investors’ actions in greater depth, the researchers filed a Freedom of Information Act request for data that gave them the date and time each report was downloaded from the Securities and Exchange Commission’s EDGAR website, as well as the downloader’s IP address. The short-run announcement effects on stock prices were more pronounced when investors were downloading the current and prior year’s 10-K at the same time. The researchers assume that dual downloading

means that investors paid more attention to textual changes from one year to another, and conclude that when investors are focusing on changes from one filing to the next, information is incorporated more rapidly into stock prices. The subsequent abnormal returns are smaller when there was more dual downloading at the time of the SEC filing.

—Linda Gorman

Wording Changes in Firms’ Public Filings Portend Weaker Returns



Source: Researchers’ calculations using data from the Securities and Exchange Commission and the Center for Research in Security Prices

the two documents. The measure counts the number of words added or deleted and divides by the total number of words.

While changes in the wording of the management discussion section of company reports did predict large and significant abnormal returns, textual changes in the risk factors section were even more informative, predicting abnormal returns of 188

AI Improves Translation, Facilitates International Trade

Advances in machine learning have significantly improved the performance of various artificial intelligence (AI) systems. Error rates of top speech recognition systems, for example, decreased from 15 percent in 2011 to 5 percent in 2017. Despite such advances, economists have found only scant evidence that this technology has affected aggregate productivity. Some argue that complementary innovations will be required to integrate AI into production.

In **Does Machine Translation Affect International Trade? Evidence from a Large Digital Platform** (NBER Working Paper No. 24917), Erik Brynjolfsson, Xiang Hui, and Meng Liu explore the economic effects of one technology that has been easily integrated into business operations: eBay's Machine Translation (eMT) program. eMT, which has been rolled out for several language pairs such as Spanish-English in recent years, quickly translates search queries and results between languages. In the case of a Spanish-speaking buyer, for example, eMT translates the buyer's search terms into English, allowing for a search of relevant English-language listings, then translates the search results into Spanish for the buyer's review.

The researchers find that the introduction of eMT, which produced significantly better translation results than the previous translation program, increased international trade on the eBay platform significantly. After implementation, U.S. exports via eBay to Spanish-speaking Latin American countries

increased by more than 17 percent.

The researchers find stronger effects for products that likely had higher translation-related costs before the introduction of the new tech-

After eBay implemented a new AI-based translation program, U.S. exports to Spanish-speaking Latin American countries on the platform increased sharply.

nology. For example, the export increase was larger for differentiated products such as clothing, antiques, jewelry, and art than for homogeneous products such as cell phones or books, which have ISBN codes or other standardized identi-

improved translation, not unobserved contemporaneous events such as advertising.

The effects of the introduction of eMT also appear to be larger for eBay buyers who likely

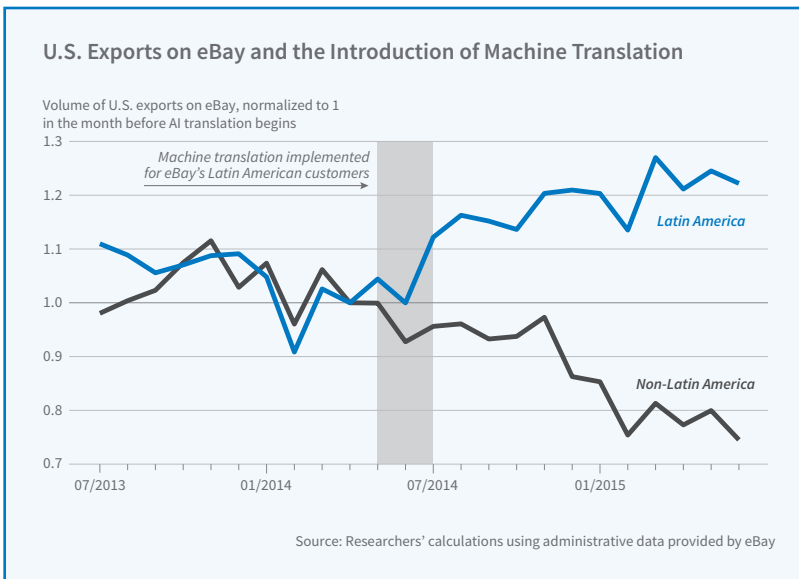
faced higher translation-related costs. Using eBay users' experience levels as a proxy for translation-related costs, the researchers find that inexperienced buyers—defined as those who have purchased less than \$2,500 of products on the platform in the prior year—saw a 6.1 percent larger increase in purchases than experienced buyers.

This study suggests that language barriers affect trade, and that reducing those barriers can meaningfully increase it. The researchers calculate that “introduction of eMT is equivalent of the export increase from reducing distances between countries by 37.3 percent.”

According to the researchers, this example shows how AI already is affecting productivity and economic activity in some fields. They note that in addition

to translation, AI applications are also emerging in speech recognition, computer vision, and recommender systems, with applications ranging from medical diagnoses to customer support, and from hiring decisions to self-driving vehicles. They predict additional economic effects from AI will soon be documented.

—Dwyer Gunn



fiers. Export increases were also larger for products with longer item titles, and for less expensive products, for which translation-related costs constitute a higher fraction of item value. Exports of products worth less than \$50 increased by 19.3 percent, while exports of more expensive items increased by a smaller amount. These effects suggest that the increase in exports is driven by

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