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# The Digest

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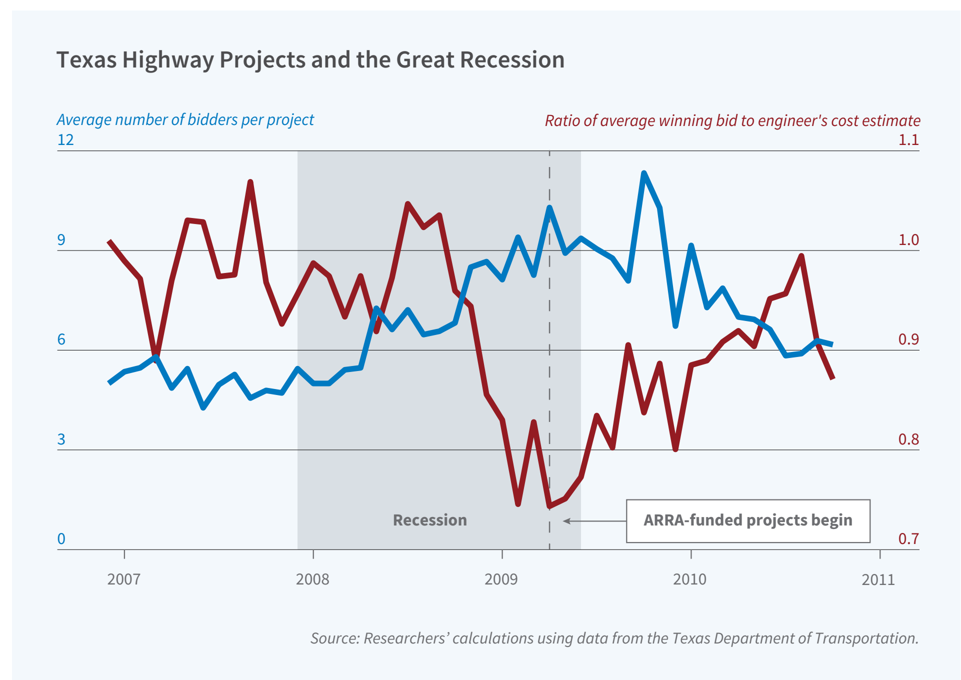
# Highway Construction Costs During the Great Recession: Evidence from Texas

In 2009, responding to the so-called Great Recession, the federal government initiated a stimulus program, the American Recovery and Reinvestment Act (ARRA), that included infrastructure spending. The state of Texas used this funding to improve highways. It reaped a double benefit: the spending helped buoy its economy and the state completed projects more efficiently and at lower cost than in pre-recession times. In 2009, ARRA funding accounted for 38 percent of the total value of highway contracts awarded in Texas.




Source: Researchers' calculations using data from the Texas Department of Transportation.

***The 2009 recession drove down contractor bids and increased competition for highway projects, resulting in cost savings and improved efficiency.***

In Highway Procurement During the Great Recession and Stimulus (NBER Working Paper 33299), researchers Dakshina G. De Silva and Benjamin Rosa find that the recession reduced not only direct costs, such as the price of building materials, but also contractors' opportunity costs in bidding for public highway projects. The researchers explain that "the dearth of private construction projects likely reduced contractor opportunity costs, which then contributed to the budget-efficient nature of projects procured during this period." With fewer private-sector projects in the pipeline, contractors had more incentive to bid for public-sector opportunities, and they put in lower bids than in non-recession years.

The study looks at four years of contracts let by the Texas Department of Transportation (TxDOT) for highway structures — typically bridges and overpasses. That includes 242 projects in the year before the recession and 626 projects during the recession, which overlaps with the enactment of the ARRA of 2009. Before the recession, the average bid was about $4.26 million; when the recession-era ARRA stimulus was in place, it fell to $3.44 million. A significant portion of the $789 billion of ARRA spending went towards boosting government purchases through public procurement, including $27.5 billion for highway construction.

In Texas, recession-era highway procurement attracted an average of two additional bidders for each project. The researchers estimate that contractors' opportunity costs of carrying out a public project, which affect their bids, declined by about 2.5 percent of project cost. TxDOT engineers' cost estimates fell during the recession, but the bids fell even more. Pre-recession, the average bid was 105 percent of the engineers' estimate; during the recession, it was only 93 percent. The researchers also find that the efficiency of the contracting process during the recession increased relative to contracting before the Great Recession.

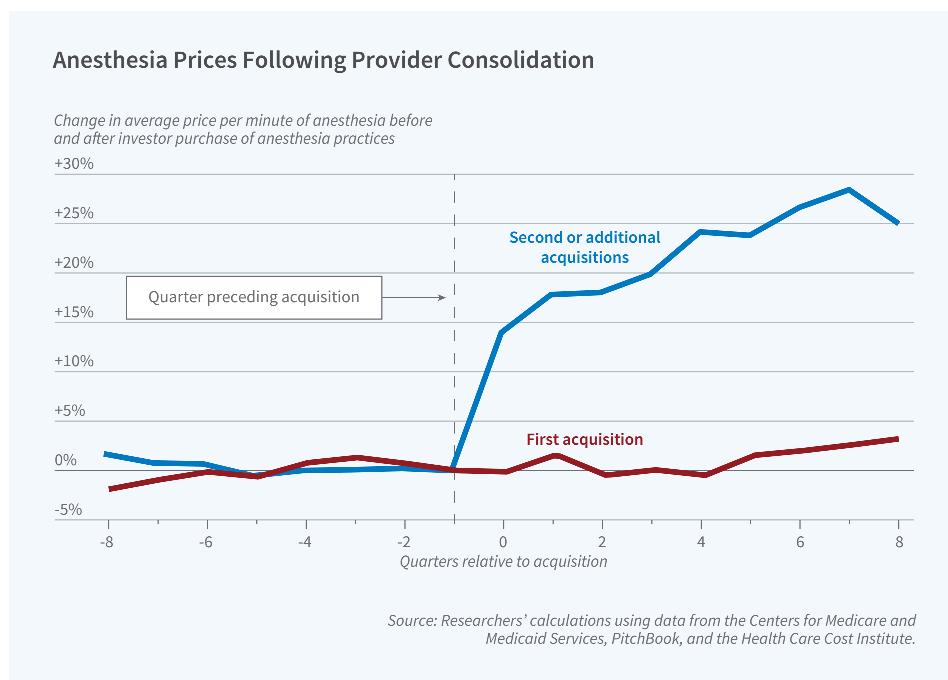
— *Laurent Belsie*

# The Price of Consolidation: Evidence from Anesthesia Practice Rollups

In a "rollup," an outside investor consecutively acquires many of the small firms operating in a particular local market, consolidating them into a single large firm. Unlike mergers, which involve only two firms and trigger regulatory attention when the firms collectively exceed a certain size, rollups have flown under the antitrust radar until a recent Federal Trade Commission (FTC) case targeting a rollup of anesthesia practices in Texas. Rollups have become increasingly important, particularly in the healthcare industry.

In Painful Bargaining: Evidence from Anesthesia Rollups (NBER Working Paper 33217), Aslihan Asil, Paulo Ramos, Amanda Starc, and Thomas G. Wollmann study the competitive effects of the rollups implicated in the FTC's case, as well as 18 similar rollups that together cover 20 percent of the US population. Combining data on clinicians and their employers from the Doctors and Clinicians national file, data on acquisitions from PitchBook, and data on insurance claims for medical procedures, the researchers build a comprehensive picture of the anesthesiology industry since the early 2010s. They define "rollups" as instances in which a single buyer acquires at least two practices in a single market using outside capital.

Rollups dramatically reshape local market structure by increasing concentration. To measure the effect of rollups on prices, the researchers conduct an event study. To rule out the possibility that investment funds always pressure practices they acquire to increase prices, the researchers first conduct their event study for the first practice acquired in each rollup. They do not find any evidence of a price increase in those cases. It is only when the investors own multiple practices that price increases emerge. They find an 18 percent average price increase in the first six months following subsequent, "add-on" acquisitions. Prices ultimately rise by 25 to 30 percent.




Source: Researchers' calculations using data from the Centers for Medicare and Medicaid Services, PitchBook, and the Health Care Cost Institute.

***When an investor group acquires one practice in a market, prices do not change, but multiple acquisitions are associated with an average price increase of 18 percent within six months.***

The researchers also test for but do not find evidence that the rolled-up practices deliver higher quality services. Qualitative evidence also suggests that while acquisitions typically affect business strategies such as price setting, they rarely affect clinical practice. Prices rise rapidly following rollups despite the fact that hospitals typically have long-term contracts with anesthesiology providers. One way rollup sponsors are able to sidestep this issue is by moving physicians from lower-price practices acquired during the rollup to higher-price practices, allowing an immediate shift to the prices charged by the latter.

The authors model supply and demand of anesthesia services to study potential interventions to improve consumer welfare. They find that divestitures are more powerful than health policy solutions, including price regulation.

— *Shakked Noy*

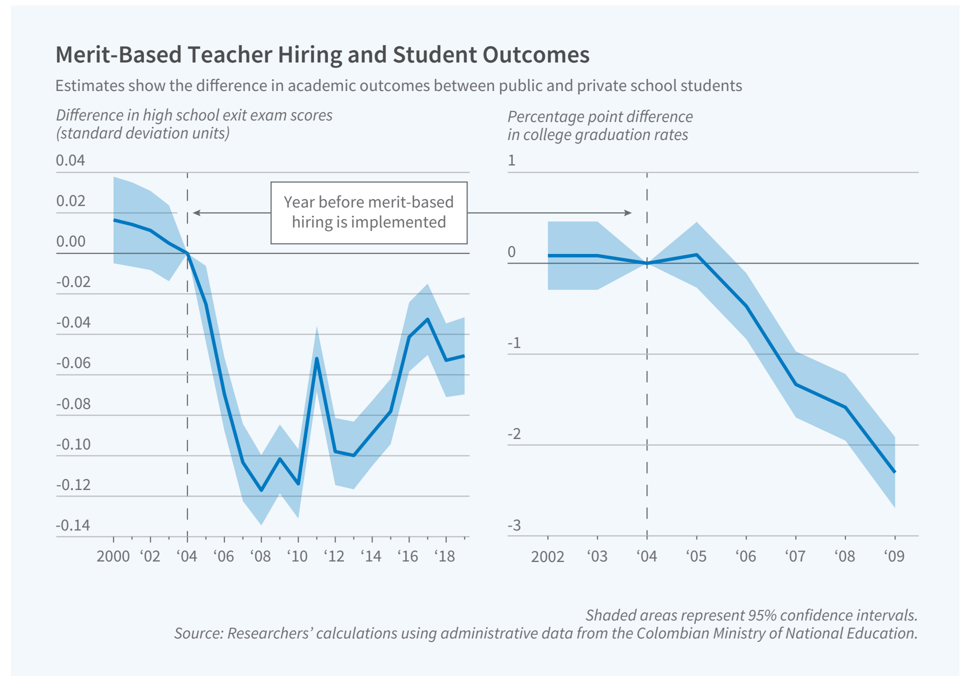
*Researcher Thomas G. Wollmann thanks the Fama-Miller Center, Becker Friedman Institute Healthcare Initiative, and William Ladany Research Fund for support.*

# Unintended Consequences of Merit-Based Teacher Reform in Colombia

While school enrollment rates have increased in nearly all developing countries in recent decades, student performance has remained largely stagnant. For instance, by 2010, elementary education in Colombia achieved near-universal enrollment, yet Colombian students' scores at the 75th percentile fall below the 25th percentile scores for students in OECD countries. These learning gaps have prompted policymakers to reform the hiring mechanisms of public teachers in an effort to improve student outcomes. In The Unintended Consequences of Merit-Based Teacher Selection: Evidence from Large-Scale Reform in Colombia (NBER Working Paper 33008), researchers Matias Busso, Sebastián Montaño, Juan S. Muñoz-Morales, and Nolan G. Pope use administrative records from Colombia's Ministry of National Education to examine how a nationwide merit-based teacher hiring reform affected the educational outcomes of public school students.

The reform, implemented in 2005, replaced a decentralized teacher hiring system with a centralized merit-based approach. The new system selected new teachers based on a standardized entrance test of subject knowledge and teaching aptitude. While private schools maintained hiring autonomy, public schools — which educate 70 percent of high school students — were required to follow these new regulations for their teacher hiring. The reform additionally increased starting salaries for teachers to make public school teaching positions more attractive.

Teachers hired under the new system seemed to be more qualified as they scored, on average, 17




***A merit-based teacher hiring reform succeeded in recruiting teachers with strong cognitive skills, but the replacement of more experienced teachers led to a decline in student outcomes.***

percentile points higher on pre-college examinations than teachers hired under the previous system. However, the reform unintendedly increased teacher turnover and decreased the overall stock of teacher experience, as experienced teachers were replaced by novice teachers. The proportion of teachers with less than five years' experience rose from 10 percent in 2002 to 30 percent by 2008.

Prior to the reform, from 2000 to 2004, the gap in test scores between public and private school students was stable, evolving in parallel. Post-reform test scores of public school students decreased by 8.2 percent of a standard deviation compared to private school students' scores. This decline is equivalent to that associated with having a teacher who performs 1 standard deviation below average. Mathematics and English scores showed the largest decreases at 14 and 16 percent of a standard deviation, respectively. The likelihood of enrolling in college within six months of graduation fell by 3.3 percentage points, a 21 percent reduction, and college graduation rates within six years of high school graduation decreased by 0.9 percentage points (a 10 percent reduction).

The researchers' findings suggest that more exposure to novice teachers after the reform was associated with larger declines in public school student outcomes. In schools where more novice teachers were hired, the decline in student outcomes was more than twice as large as in schools where no novice teachers arrived.

*— Leonardo Vasquez*

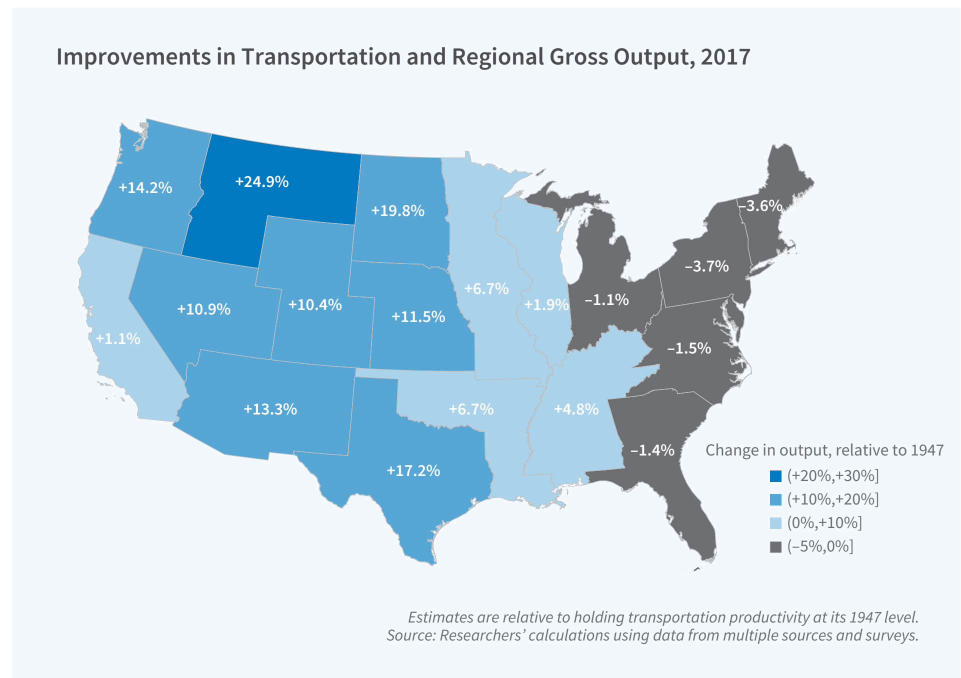
# Transportation Productivity and the US Economy, 1947–2017

Over the past century, transportation costs have fallen dramatically, yielding substantial economic benefits. In The Long-Run Effects of Transportation Productivity on the US Economy (NBER Working Paper 33248), A. Kerem Coşar, Sophie Osotimehin, and Latchezar Popov demonstrate how improved transportation efficiency has enhanced trade and boosted GDP.

The freight transportation sector saw remarkable gains in multifactor productivity — output growth beyond direct input increases — of 59 percent from 1947 to 2016, compared to 32 percent in other sectors of the US economy. This progress stemmed from several advancements, including the widespread adoption of motorized transport, interstate highway construction, and innovations in logistics.

To analyze these impacts, the researchers develop a multi-region model of the US economy in which transportation services are an essential input to delivering goods within and across regions. Their calibration relies on data on interregional trade flows from the Bureau of Transportation Statistics Freight Analysis Framework as well as data on production, employment, investment linkages, and input-output relationships between sectors from the Bureau of Economic Analysis.

The calibrated model suggests that transportation productivity improvements increased real GDP by 3.3 percent—an impact 2.3 times greater than would be expected based on freight transportation's share of economic value added. This multiplier effect extends beyond that coming from typical input-output relationships, arising instead from the complementary role of transportation services for trade and its stimulus effect on capital accumulation.




***Rising productivity in the US transportation sector over the last 70 years has added 3 percent to GDP.***

The benefits of improved transportation varied significantly across sectors and regions. Labor productivity grew most substantially in mining, agriculture, and manufacturing, with smaller gains in services. This increase primarily resulted from reduced shipping costs, which allowed firms to use more traded intermediate inputs. Labor productivity gains were largest in sectors that rely on intermediate inputs with high initial shipping costs.

Geographically, the Mountain and Central regions benefited most from transportation improvements, while the Northeast experienced relative declines in output and population that were amplified by transportation improvements. These shifts help explain long-term population and economic activity movements across US regions. Additionally, reduced transport costs encouraged regional specialization based on comparative advantages.

*— Whitney Zhang*

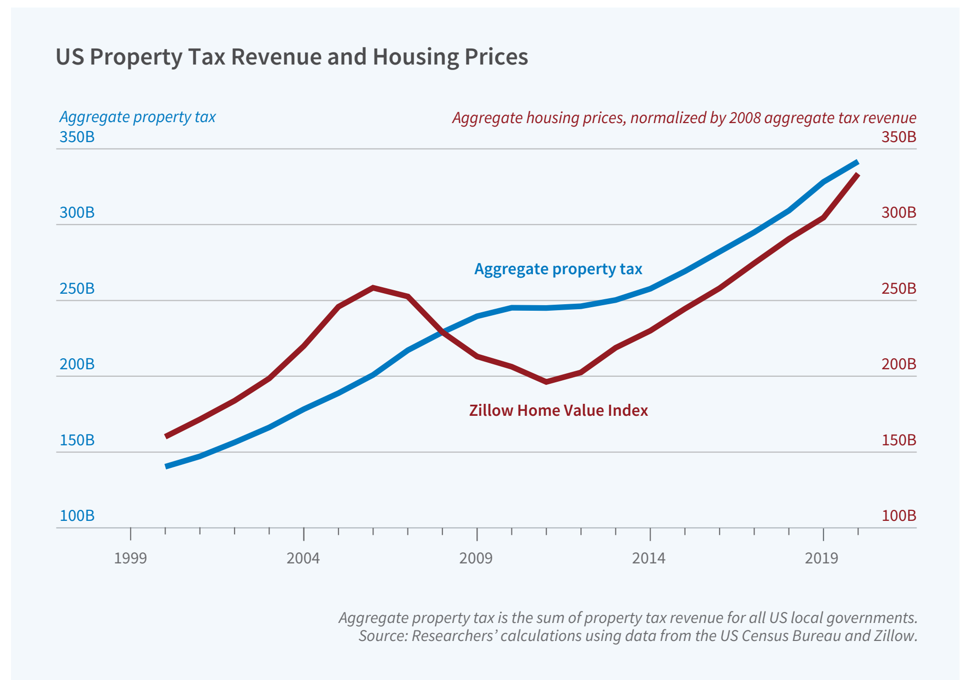
*This research was supported by the University of Virginia Quantitative Collaborative and the Canadian Social Sciences and Humanities Research Council.*

# Property Tax Assessments vs Market Values

Property taxes represent the largest discretionary revenue source for local governments in the United States. Because these taxes are collected by applying a tax rate to an assessed value of a property, the effective tax rate on a property — computed as a percentage of its value — depends on the tax rate and on the relationship between the property's assessed and market values. Although every state requires local governments to capture market fluctuations in their property assessments, they may not do so in a timely or effective fashion.

In Assessing Assessors (NBER Working Paper 33238), researchers Huaizhi Chen and Lauren Cohen analyze a comprehensive dataset of US property tax assessments and housing transactions between 2000 and 2020. They combine county-level census data on property tax revenues, property assessments, and transactions from the Zillow Transaction and Assessment Database with hand-collected data on tax assessors' identities and property holdings.

The researchers find that property tax revenues are stable even during periods of significant real estate market volatility. On average, a 1 percent change in the market value of properties in a jurisdiction results in less than a 0.30 percent change in assessed values in the next three years. The change in market values over the current and previous two years explains only about 8 percent of the variation in assessment growth. This disconnect appears strategic rather than incidental as counties are significantly more likely to reassess properties upward during market growth than to reduce assessments during a downturn. Furthermore, changes in total property tax revenue correlate more strongly with changes in local per-capita income than with property market returns, with income elasticity approximately three times larger than market price elasticity.




***Property tax assessments in the US often deviate from market values and tend to adjust in ways that stabilize municipal revenues.***

Counties with higher budget deficits show higher assessments relative to market values, a finding that is consistent with the use of assessments to generate revenue. A 10 percent increase in county-level expenses relative to revenue is associated with assessments about 10 percent higher relative to housing transaction prices. Changes in tax rates are also associated with waves of reassessment. Using data from Illinois, the researchers find that between 2006 and 2014, passing a school referendum — which typically raises tax rates — leads to a 23 percent increase in the probability of upward property reassessments without corresponding increases in actual market values.

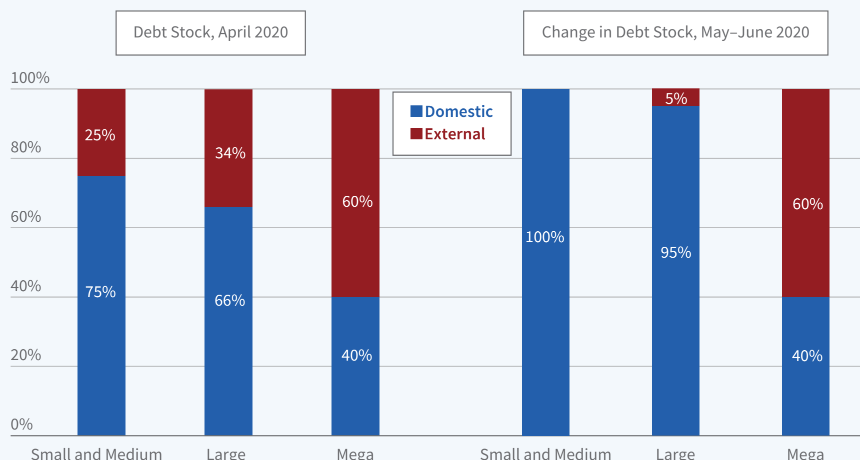
The research also uncovers patterns in how tax assessors treat their own properties. Their assessments grow at about a 1 percent lower annual rate than the average in their jurisdiction and about 0.7 percentage points slower than assessments of neighboring properties. This disparity is larger when the assessor tends to overvalue other properties in their jurisdiction.

*— Leonardo Vasquez*

# Government Support and Corporate Debt Restructuring

Since the global financial crisis of 2008, policymakers have increasingly turned to unconventional stabilization policies when confronting large macroeconomic shocks. When the COVID-19 shock hit in 2020 and capital flows retrenched, such tools took center stage, especially across emerging markets with limited fiscal space.

In Firm Financing During Sudden Stops: Can Governments Substitute Markets? (NBER Working Paper 33283), Miguel Acosta-Henao, Andrés Fernández, Patricia Gomez-Gonzalez, and Şebnem Kalemli-Özcan study the effectiveness of new central bank credit lines and government-backed credit guarantees on commercial loans to firms in Chile when the pandemic triggered a large sudden stop event — the abrupt withdrawal of international capital. They do so through the empirical analysis of a unique micro dataset of Chilean firms and by exploiting size-based eligibility thresholds on these policies that allow for clean identification of policy effects through regression discontinuity.




*Firms' eligibility to receive a COVID-19 credit on domestic debt share is based on yearly sales in 2019. Only small, medium, and large firms were eligible, not mega firms.*
*Source: Researchers' calculations using various administrative datasets from the Banco Central de Chile.*

***Government credit guarantees in Chile mitigate sudden stops in international capital flows by enabling firms to increase their domestic borrowing.***

The government's policies took two forms: a new credit line facility at the Banco Central de Chile for commercial banks that were expanding credit to firms below a given size threshold, and government guarantees on commercial bank loans for the same firms.

The researchers' analysis shows that eligibility for government guarantees caused firms to increase their domestic debt share. They also find that the mechanism underlying the increase in domestic debt is the pricing of credit risk. Analysis of loan-level data reveals that, during normal times, Chilean firms face a domestic uncovered interest parity premium on loans in local currency from domestic lenders of about 3 percent. This premium rose to 7 percent between March and May 2020, at the height of the pandemic-induced sudden stop, and then dropped below pre-pandemic levels after the policy interventions were implemented.

The researchers attribute their findings to the complementarity of the government's policies, which effectively reduced the cost of domestic currency debt relative to foreign currency debt during the sudden stop. By lowering risk aversion among domestic financial intermediaries and boosting domestic credit supply, the government credit guarantees helped compensate for the reduced availability of international capital. Banks, motivated by the new credit line facility, were incentivized to extend loans to smaller firms.

The unconventional policies pursued in Chile effectively lowered the relative cost of domestic capital in the short term, which suggests more generally that it is possible to incentivize domestic lenders to replace disappearing foreign capital flows during short-term stress events.

*— Lauri Scherer*

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