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Social Media Contacts in Pandemic Hotspots Encouraged Self-Isolation

Designing a public health response to the COVID-19 pandemic requires an understanding of the factors that influence individual choices affecting the spread of the virus. In **Social Networks Shape Beliefs and Behavior: Evidence from Social Distancing during the COVID-19 Pandemic** (NBER Working Paper 28234), [Michael Bailey](#), [Drew M. Johnston](#), [Martin Koenen](#), [Theresa Kuchler](#), [Dominic Russel](#), and [Johannes Stroebel](#) explore how personal connections and social network exposure to COVID-19 cases affect social distancing behavior.

The researchers use de-identified data from Facebook that provide information along three dimensions: movement patterns, public posts on the platform, and membership in public Facebook groups. The first of these is used to construct measures of social distancing behavior, while the latter two provide information on beliefs about COVID-19 and related public health measures, and can thus shed light on the mechanisms through which social networks affect behavior.

The researchers find that US Facebook users whose friends lived in areas with worse coronavirus outbreaks on March 15, 2020, reduced their mobility in subsequent months

in the probability of staying home on a given day. A similar pattern was observed as the pandemic progressed in later months, and the location of hotspots changed: in every month, it

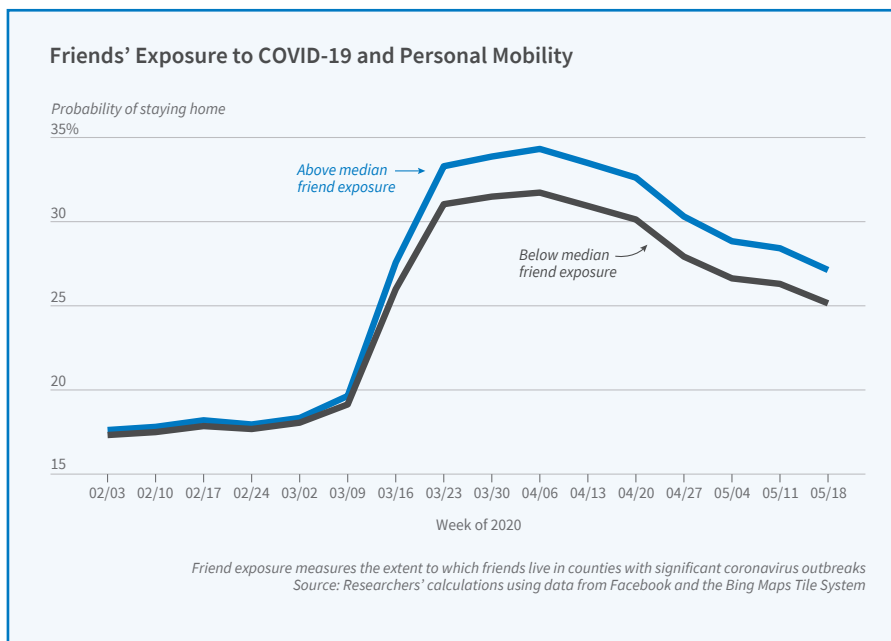
Individuals with friends exposed to COVID-19 outbreaks were more likely to stay at home, and less likely to oppose economic shutdowns to contain the virus.

more than otherwise-similar users with friends in less-affected areas. A one standard deviation increase in an individual's friend-exposure to COVID-19 cases early in the pandemic was associated with a 1.2 percentage point increase

was those individuals with the largest changes in friend exposure to COVID-19 who reduced their mobility the most. The researchers' use of mobility data at the individual rather than aggregate level allows them to rule out alterna-

tive explanations for their findings, such as differential ability to work from home in some locations, which might not reflect a causal link between social network friendships and distancing behavior.

The researchers then explore the mechanism behind the observed relationship between friend exposure to COVID-19 and social distancing. Using data on Facebook posts and group memberships, they find that friend exposure raised awareness about the risks



of the disease. In particular, users with higher friend exposure to COVID-19 were more likely to post about the coronavirus and less likely to make comments that opposed social distancing. They were also less likely to join Facebook groups advocating for a reopening

of the economy during the early months of the pandemic.

The researchers conclude that exposure to COVID-19 increases an individual's willingness to reduce mobility at least in part by raising awareness of the risk associated with

COVID-19 and thus shifting beliefs about the need to engage in preventative health measures. The findings highlight that social networks play an important role in determining individuals' beliefs and behaviors.

—Lauri Scherer

Lenders Treat Large and Small Firms Differently

In **Bank Liquidity Provision across the Firm Size Distribution** (NBER Working Paper 27945), [Gabriel Chodorow-Reich](#), [Olivier Darmouni](#), [Stephan Luck](#), and [Matthew C. Plosser](#) characterize how the nature of bank lending to businesses varies across firms of different sizes. They find that smaller firms have credit with much shorter maturities, frequently face expiring credit lines, are required to post more collateral on both credit lines and term loans, and yet pay more for the credit they get.

The researchers analyze supervisory loan-level data from the Federal Reserve. The data include all loans of more than \$1 million made by 29 banks, each with more than \$100 billion in consolidated assets, and cover \$3.15 trillion in total corporate commitments to 103,468 unique firms, roughly two-thirds of total corporate loan commitments from all banks in the fourth quarter of 2019. Nearly all of the commitments were commercial, industrial, or real estate loans. The firms were divided into five asset size categories, including 46,081 firms classified as “small firms” that each had assets of less than \$50 million and 1,886 firms classified as “large firms” that each had assets of more than \$5 billion.

The researchers report that banks appear to exercise discretion over pre-committed credit to smaller enterprises by lending at

short maturities and making frequent rollover decisions. At the end of 2019:Q4, only 15 percent of credit lines to the large firms had a maturity of less than one year, while 40 percent of the lines to the small firms matured or

were callable in just one quarter. Small firms were required to provide more collateral to back their loans. Fewer than 5 percent of the credit lines to small firms were unsecured, compared with 70 percent for firms with assets over \$5 billion.

age. The higher rates may reflect aspects of small borrowers that are not captured by observable characteristics, such as lender concerns about accurate reporting on financial statements and other kinds of “soft” information.

In 2019, less than 10 percent of small firms had unsecured revolving credit lines, while more than 80 percent of large firms did.

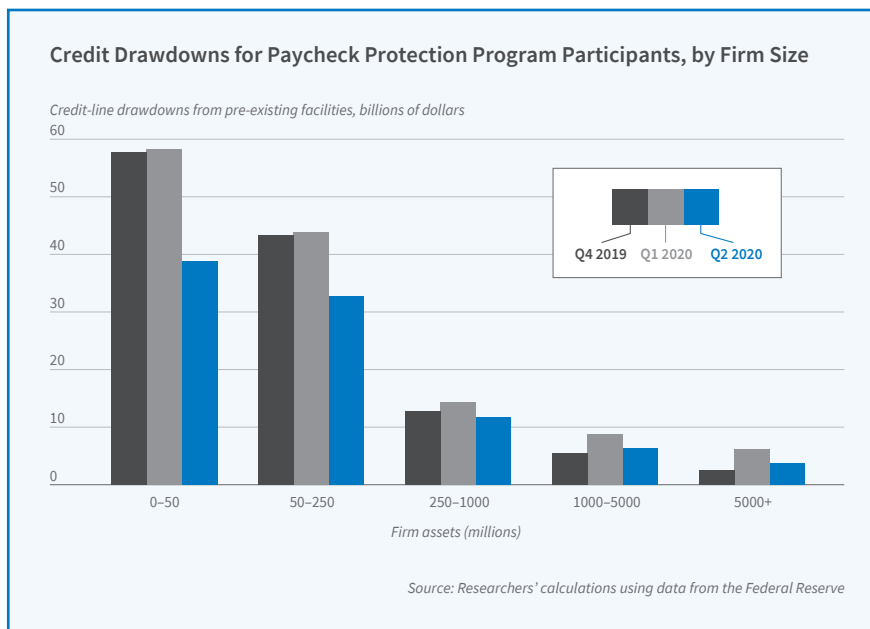
In normal times, small firms used more of their credit lines, one-third of which had utilization rates above 70 percent. The largest firms used less of their credit, with three-quarters having utilization rates below 10 percent. This was not the case during the first

two quarters of 2020, when the COVID-19 pandemic placed extraordinary strains on corporate cash. While small firms did not change their credit usage in 2020:Q1, the largest firms increased it by 43 percent, with the largest increases at firms in hard-hit industries such as retail, the performing arts, and spectator sports.

In 2020:Q2, credit use by smaller firms contracted by \$21.9 billion. Firms that received loans under the Paycheck Protection Program accounted for 79 percent

of the credit decline. The researchers conclude that government lending programs can “substantially if not totally” overcome private credit constraints, but at a cost.

—Linda Gorman



Yet, small firms paid interest rates that averaged 100 basis points more than those paid by large firms. An 80 basis point differential persisted even after adding controls for firm financial condition, industry, lender rating, and lever-

Searching for the Origins of Redlining of Black Neighborhoods

Depression-era federal maps that classified areas of major US cities on the basis of credit risk did not create racially segregated neighborhoods, but rather locked in already existing patterns, according to research by [Price V. Fishback](#), [Jessica LaVoie](#), [Allison Shertzer](#), and [Randall Walsh](#) that is presented in **Race, Risk, and the Emergence of Federal Redlining** (NBER Working Paper 28146).

The federal government became a major player in the housing market as part of the New Deal response to mortgage market distress in the 1930s. By 1936, the Home Owners' Loan Corporation (HOLC) had purchased one-tenth of all non-farm US mortgages, relieving a burden on banks and offering favorable refinancing terms to homeowners.

To better manage its sprawling portfolio, the HOLC commissioned a survey of the riskiness of housing assets in neighborhoods of the more than 200 cities where it had refinanced loans. It graded neighborhoods on a scale from A through D, mapping them with the corresponding colors of green, blue, yellow, and red. The red areas on the maps identified locations where contemporary lenders said they were least likely to make loans. Although many believe the term "redlining" originated with these maps, the HOLC did not release the maps or neighborhood information to private lenders.

The researchers stress that the maps were created after the HOLC finished its refinancing efforts. Black households accounted for about 4.5 percent of the HOLC's loans at a time when they

accounted for only about 2.5 percent of mortgages from private lenders, suggesting that the HOLC exhibited less racial bias than other lenders of the day.

Black households were concentrated in distressed areas of Northern cities years before the federal government created color-coded maps to indicate investment risk.

Around the same time the Federal Housing Administration (FHA) began insuring mortgage loans, primarily for new construction. The FHA developed its own mapping program and risk assessment grades, while continuing to insure mort-

were home to nearly 18 million people, and to 38 percent of urban Blacks living outside the former Confederacy.

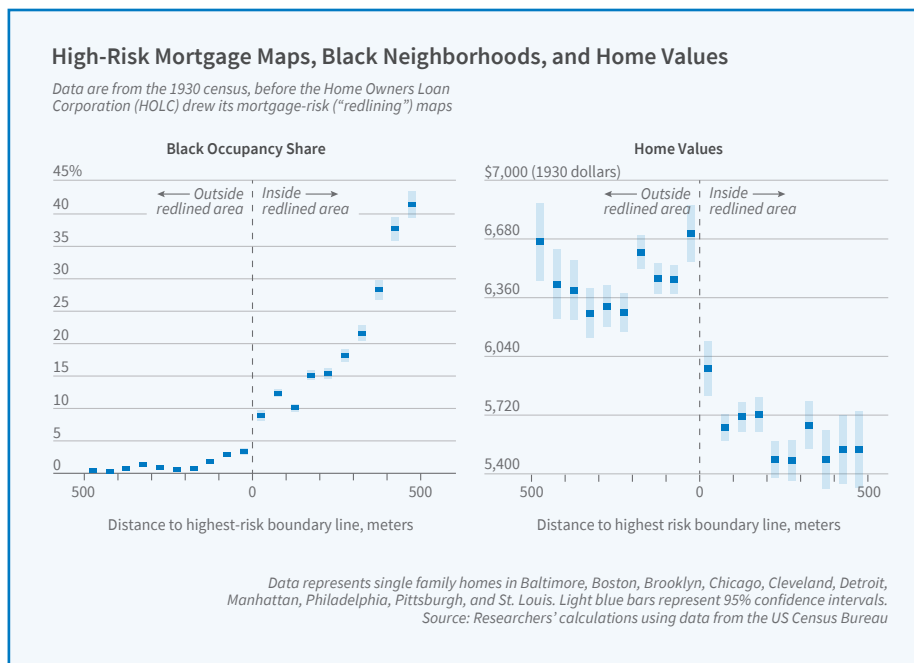
The study shows that Whites

accounted for about 85 percent of households in the redlined neighborhoods, which encompassed about half of the households in the cities. The redlined predominantly White neighborhoods had better census economic characteristics on average than redlined neighborhoods with above average shares of Black residents, the opposite of what would be expected if Black neighborhoods had been targeted for the lowest security grade because of race.

Data from the 1930 census show that Black households were already concentrated in distressed areas years before the HOLC assessment. "More than 80 percent and quite possibly more than 95 percent [of Black households] were red-

lined in the process of HOLC map-making because they had few choices outside Northern cities' most economically disadvantaged neighborhoods," the researchers write. "As a result, the HOLC maps are best viewed as providing clear evidence of how decades of unequal treatment effectively limited where Black households could live in the 1930s rather than reflecting racial bias in the construction of the maps themselves."

— Steve Maas



gages to the present day. It is unclear how much the FHA relied upon the HOLC maps when determining their own neighborhood risk assessments because, to date, a complete set of FHA redlining maps have not been located by researchers.

The researchers analyze the HOLC maps and data gleaned from the 1930 and 1940 censuses. They construct a dataset covering individual households and neighborhoods for nine of the 10 largest US cities at that time. All are located in the North. They

Target Date Funds and Stock Market Dynamics

Retail investors who hold mutual funds often chase performance, investing more in funds that outperform their counterparts and in stock funds in general after periods of strong stock market returns. Target date funds (TDFs), in contrast, follow a rigid rule for the share of their assets that is invested in stocks and bonds. When stocks rise, these funds must liquidate part of their equity position to restore their stock-bond balance. In contrast to some investors' trend-following behavior, these funds display just the opposite dynamic. The rapid growth of TDFs may therefore be exerting a mean-reverting pressure on equity prices.

In **Retail Financial Innovation and Stock Market Dynamics: The Case of Target Date Funds** (NBER Working Paper 28028), Jonathan A. Parker, Antoinette Schoar, and Yang Sun find that following a stock market rise of 10 percent in one quarter, the typical equity mutual fund sees an extra inflow of about 2.5 percent of its asset holdings. This inflow is smaller, however, only about 2 percent, for equity funds that are partly owned by TDFs.

TDFs allocate a fixed percentage of their investors' money to stocks and bonds, typically investing through stock and bond mutual funds. The mix is determined by the approximate retirement date of the investors for whom the fund is designed. TDFs marketed to young investors, such as a "target date 2060 fund," adopt an investment mix that is heavily tilted toward equities, often with 80 to 90 percent of their

assets in stock funds and the rest allocated to bond funds. As years pass and the target date of retirement draws nearer, the fund manager slowly decreases the TDF's

In response to stock market moves, target date funds rebalance their portfolios to achieve a preset mix of stocks and bonds, thereby creating a force that may dampen market swings.

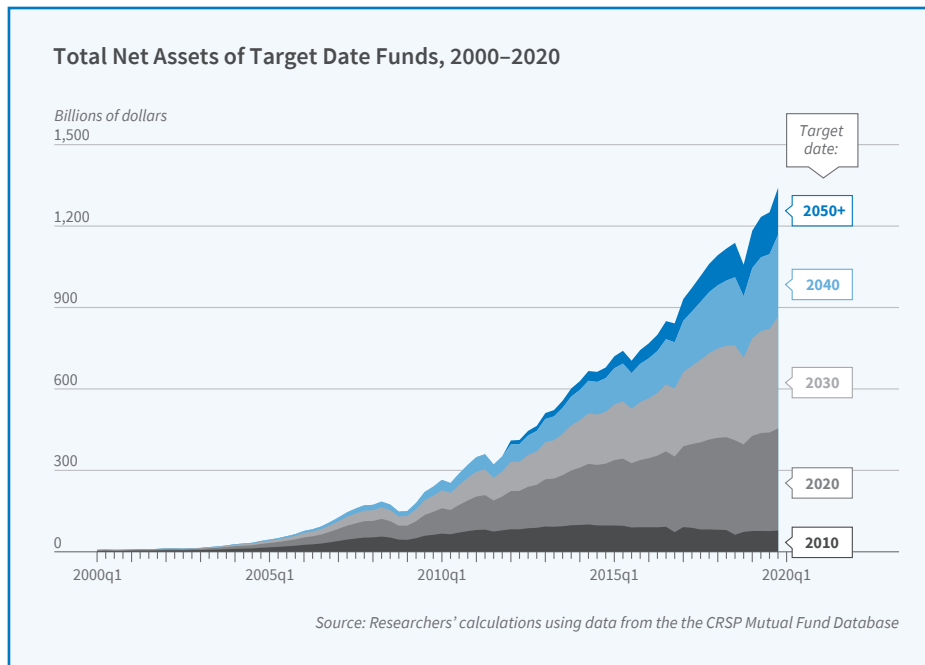
share in equities to reduce the risk of a sharp drop in the fund's market value as the investors approach retirement. By a decade after the fund's target date, when the intended investors are well into retirement, the average TDF has between 30 and 40 percent of its portfolio in stocks.

As a result, after large movements in

balance of stocks and bonds halfway back to its desired mix in the same quarter. In the following quarter, the TDFs trade to eliminate almost all the remaining gap.

The impact of TDFs on market dynamics has grown with the popularity of these funds. In 2000, less than \$8 billion was under TDF management; by 2019, there was over \$2.3 trillion, slightly more than 10 percent of the roughly \$21 trillion mutual fund market.

The researchers find that individual stocks that have high TDF exposure through mutual funds tend to have lower returns in the quarter after they outperform the market. When the stock market goes up by 10 percent in a quarter, an increase of 0.6 percent (one standard deviation) in the fraction of a stock that is held by TDFs is associated with a decrease of 0.24 percent in that stock's return in the next quarter. This appears to be due to the behavior



either bond or stock prices, different TDFs should rebalance their portfolios by different amounts depending on their desired mix of stocks and bonds. And indeed they behave as predicted. From 2008 to 2018, in quarters when stock funds outperformed bond funds, the average TDF sold equity funds and bought bond funds. For every dollar of excess return on the stock market in a quarter, the typical fund sold stocks and bought bonds to bring its

of TDFs, not to their selection of stocks. Stocks that are included in the S&P 500 have a higher share of TDF ownership than similar stocks that are not part of that index, and they exhibit above-average mean reversion in their price movements. The researchers speculate that the rise of TDFs not only affects the returns on individual stocks, but may also impact the stock market as a whole.

—Laurent Belsie

Allocating Donor Kidneys to Maximize Years of Life Saved

The process by which kidneys from deceased donors are allocated among potential recipients is an example of a resource allocation problem that does not rely on prices but that has attracted substantial interest from economists. About 100,000 patients in the United States currently are suffering from kidney failure and awaiting life-saving transplants. In a typical year, only about one-fifth of those in need receive such transplants.

In **Choices and Outcomes in Assignment Mechanisms: The Allocation of Deceased Donor Kidneys** (NBER Working Paper 28064), [Nikhil Agarwal](#), [Charles Hodgson](#), and [Paulo Somaini](#) investigate the survival outcomes associated with the mechanism for allocating deceased donor kidneys and compare it with two alternative allocation rules. One alternative is a random assignment process, essentially a lottery in which all patients on the waiting list have an equal chance of receiving an available kidney. It provides a lower bound for the number of years that could be added to patients' lives through transplantation. The other alternative is an algorithm that maximizes the number of additional years of life from kidney transplants.

The researchers compare the outcomes of these three allocation procedures by studying the choices patients and their doctors make when offered an available kidney. Because patients and available kidneys differ on a number of dimensions, the match between the potential recipient and the available kidney matters. Many potential recipients, in consultation with their doctors, turn down available kidneys, opting instead to remain on the waiting list in

the hope that a better match will be forthcoming. The researchers also model the number of years potential recipients are likely to survive without a transplant, and the post-transplant years of survival that

The current deceased donor kidney allocation system prolongs recipients' lives by an average of 8.8 years. Alternative allocation rules could raise this substantially.

are likely to result from accepting a given available kidney.

The researchers estimate that if kidneys were allocated randomly to potential recipients, the average recipient would experience

The researchers also ask what would happen if kidneys were allocated to potential recipients based only on the criterion of maximizing the number of additional years of life expectancy. Their calculations suggest

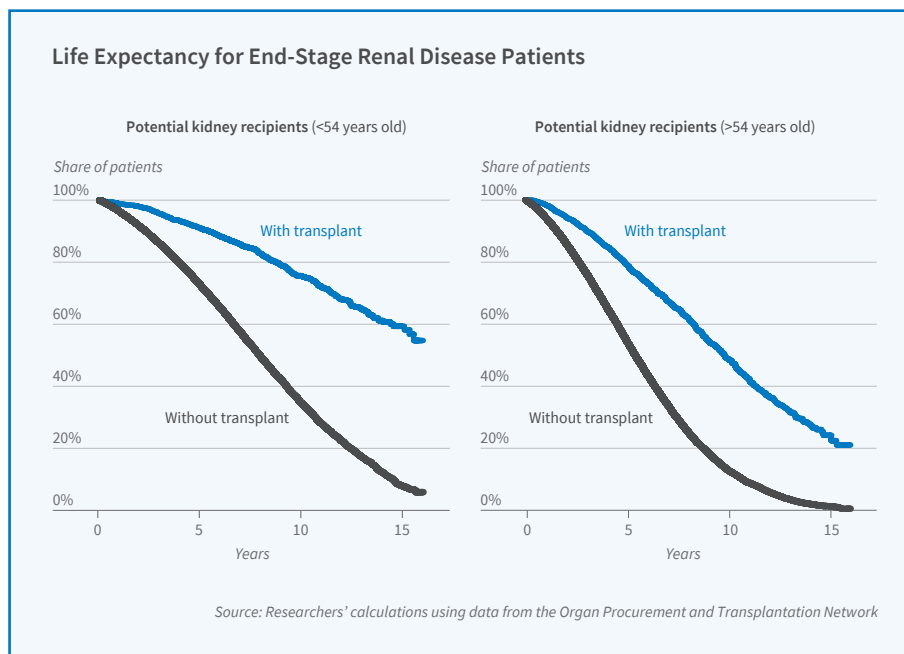
that it would be possible to achieve an average life extension per kidney recipient of up to 13.8 years, but that doing so would involve significant changes from current procedures. Maximizing the life expectancy gains

requires assigning transplants to patients who are relatively healthy and who would live longer without a transplant than many other potential recipients on the kidney wait-list. This highlights a key tradeoff in the kidney allocation process: maximizing survival benefits requires restricting the availability of transplants for sicker patients because those patients are expected to live fewer years after receiving a transplant.

The researchers point out that increasing

the expected longevity of the roughly 13,000 annual deceased donor kidney recipients in the US can create substantial value. If a statistical life year is valued at \$300,000, the gains from the current system relative to random assignment are worth approximately \$3.5 billion per year. This calculation does not include the cost saving from reduced dialysis. Modifying the assignment process in a way that generates another year of life extension, on average, would be worth nearly \$4 billion per year.

—Lauri Scherer



7.9 years of life extension. They also estimate that the assignment mechanism results in an average life expectancy gain of 8.8 years. This is because, relative to random allocation, the process matches patients who will benefit more from the transplant of a particular kidney to such a well-suited donation. Most of this gain in life extension, relative to random allocation, comes from allowing patient choice. Assignment to patients based on existing priority rules without allowing for patient choice would only generate an average of 8.0 years of life extension.

Do Leaders Matter? The Historical Impact of European Monarchs

The role of national leaders in accelerating or hindering their nation's economic growth is a subject of long debate. In **History's Masters: The Effect of European Monarchs on State Performance** (NBER Working Paper 28297), Sebastian Ottinger and Nico Voigtländer offer new empirical evidence on this question. They analyze the reigns of 331 monarchs in 13 European states over the period 990–1800, and construct a measure of monarchical ability based on historical records. To gauge a causal relationship, the researchers exploit quasi-random variation in ruler ability due to inbreeding of dynasties. They find that a one standard deviation increase in a summary measure of ruler ability led to a 0.7 standard deviation increase in a subjective measure of state performance, and a 10 percent increase in the land area of the monarch's domain.

The study utilizes estimates of each monarch's intellectual ability constructed over a century ago by the historian F. A. Woods. His analysis was based on extensive review of biographical records about each ruler. This coding is subject to concerns of endogeneity bias—for example, if a state's performance affected how historians assessed the corresponding ruler's ability. To address this issue, the researchers exploit a combination of two historical features: rulers were appointed

according to primogeniture, independent of their ability, and ability, in turn, varied due to widespread inbreeding among the ruling dynasties of Europe. Using crowdsourced

A ruler's talents mattered more to national economic success in the absence of parliamentary constraints.

online genealogy of European noble families, the researchers find that greater inbreeding is associated with lower assessments of ruler ability. This relationship holds even when exploiting only "hidden" variation in inbreeding that had built over previous generations and was unknown to monarchs when they made decisions about marriage.

The relationship between monarchical ability and state performance is only observed when the ruler's autonomy was not constrained

by other governing bodies, such as parliaments. In northern Europe in particular, the increasing power of parliaments from the 17th century onward came at the expense of monarchs, and

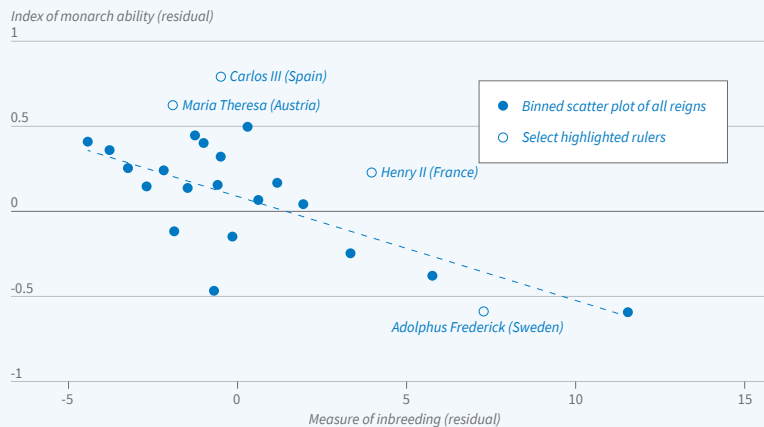
coincided with declining strength of the relationship between a ruler's ability and national outcomes. The researchers suggest that the increasing influence of parliaments may have shielded northern European states from the potential negative effects of their increasingly inbred rulers.

England is offered as an illustration of the relevance of constraints. Prior to 1600, when England's monarchs were relatively unconstrained, the relationship between monarchical

ability and state performance is similar to that in other Western European nations. During the 1600s, civil conflict and the Glorious Revolution led to substantial constraints on the powers of the crown. After this point, there is no link between monarchical ability and measures of England's performance. The association between the ruler's ability and national performance is strongest in Prussia, a state with few institutional constraints on the monarch.

—Dylan Parry

European Monarchs' Abilities and Inbreeding, 990–1800



Source: Researchers' calculations using data from Frederick Adam Woods' 1913 publication "The Influence of Monarchs" and from genealogical records of European rulers

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