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Firm Responses to the EU's Data Privacy Requirements

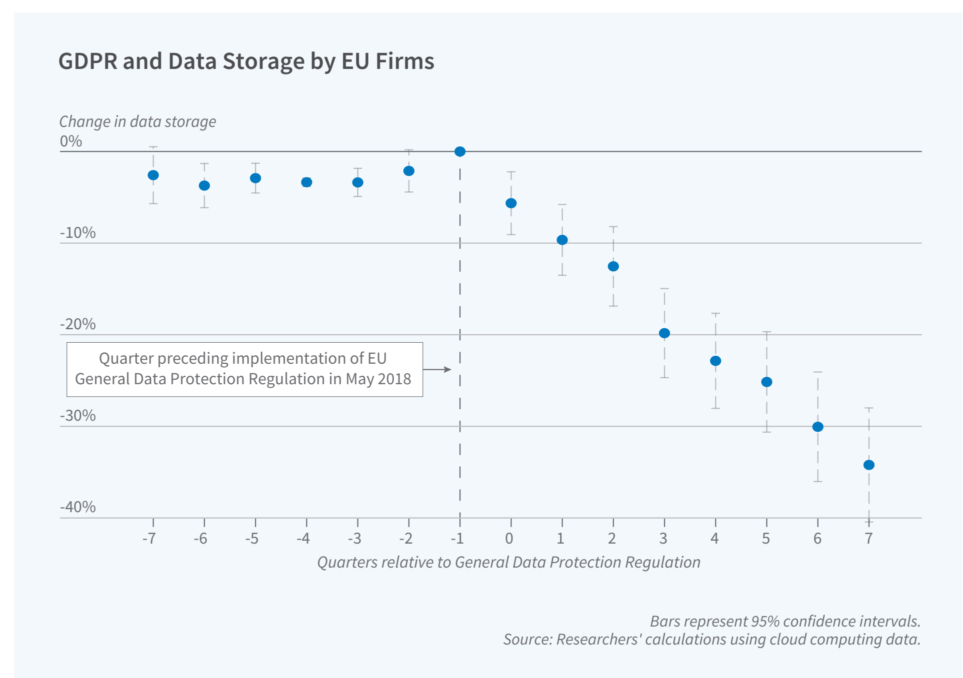
Data analytics have become a key element of the production of goods and services in industries ranging from manufacturing to finance. New data privacy laws can affect the cost of acquiring, storing, and analyzing data, and ultimately raise production costs for firms. In Data, Privacy Laws and Firm Production: Evidence from the GDPR (NBER Working Paper 32146), Mert Demirer, Diego J. Jiménez Hernández, Dean Li, and Sida Peng study how the European General Data Protection Regulation (GDPR), one of the most influential privacy policies to date, has affected firm decisions about data storage and analysis.

The researchers use data from a global cloud-computing provider to measure firms' demand for data storage and their use of computational resources before and after the implementation of the GDPR. Their dataset includes monthly information from 2015 to 2021 on storage, computation, the prices firms pay for computing and storage, and the location of the data centers from which firms source the services.

The new privacy requirements affected firms in the European Union (EU) but not those in the United States. The researchers find that the GDPR was associated with a decrease in the rate at which EU firms store and process data relative to their US counterparts. Two years after the GDPR was introduced, EU firms were storing 26 percent less data, on average, than comparable US firms. The level of computation performed by EU firms also declined, by about 15 percent, over these two years, suggesting that regulated firms became less data intensive.

The researchers study how much it costs companies to comply with the GDPR by estimating a production function that includes stored data and computation as key inputs. The two are highly complementary, which means that when the cost of data rises, firms cannot easily switch to using more computational resources to make up for more expensive data resources. The researchers estimate that the GDPR increased the cost of data storage by around 20 percent, with substantial variation both within and across industries. Firms in the software industry, which may be more exposed to the GDPR than those in manufacturing, and smaller firms, which may find compliance more costly, experienced significantly higher cost increases. These increases in firms' data costs translate into roughly 4 percent increases in information production costs.

—Abigail Hiller



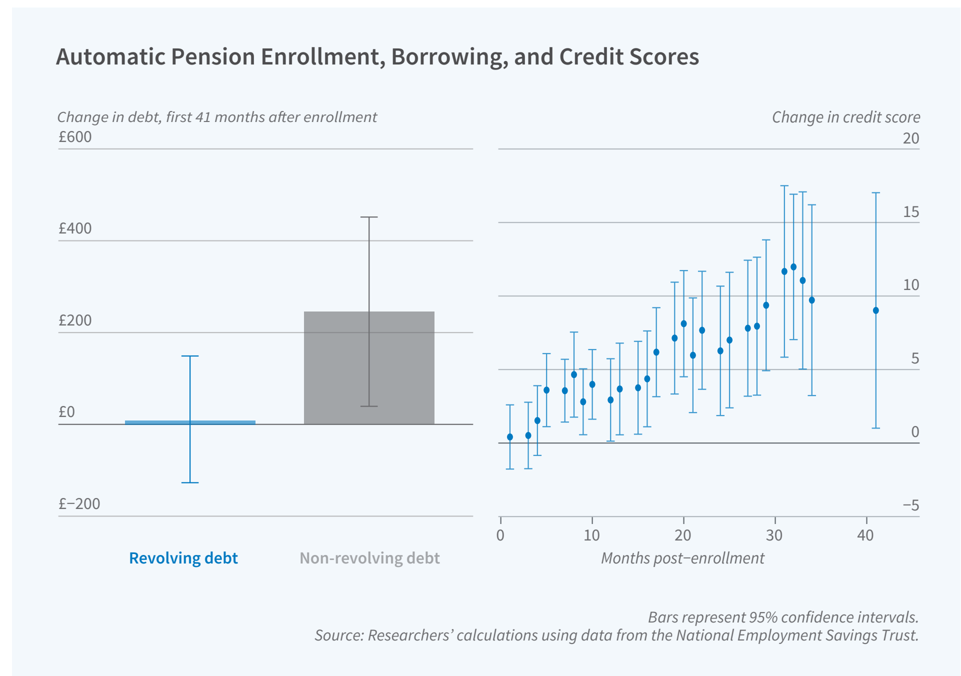
Workers Auto-enrolled in Pensions Save, but also Borrow, More

Many countries require employers to enroll their workers in retirement savings plans that deposit a regular percentage of their paycheck in a retirement account unless the worker opts out. These automatic enrollment programs are meant to address concerns that the employees, left to their own devices, might save too little for retirement. Previous research has documented that automatic enrollment in a savings plan significantly increases participation and contribution rates.

Automatic enrollment plans may, however, have unintended consequences. For example, reducing employees' take-home pay might increase their borrowing, which could offset the benefits of increased retirement saving. The inertia harnessed by automatic enrollment, which helps induce high participation rates, might also lead workers to tap debt rather than reduce their spending to fund their additional pension contributions. Most studies of automatic enrollment have focused exclusively on the amount of money saved in workers' retirement accounts because of data limitations. Researchers partnering with savings plan providers can observe inflows to retirement accounts, but they do not have any information on other financial flows or balances.

In Does Pension Automatic Enrollment Increase Debt? Evidence from a Large-Scale Natural Experiment (NBER Working Paper 32100), John Beshears, Matthew Blakstad, James J. Choi, Christopher Firth, John Gathergood, David Laibson, Richard Notley, Jesal D. Sheth, Will Sandbrook, and Neil Stewart study data from the National Employment Savings Trust (Nest) in the United Kingdom. The UK Pensions Act 2008 required all firms to offer pensions with an automatic

The average worker in the UK's largest auto-enrollment plan saves an additional £32–38 per month, has an additional £7 of unsecured debt, and is more likely to have a mortgage.



Bars represent 95% confidence intervals.
Source: Researchers' calculations using data from the National Employment Savings Trust.

enrollment feature. Nest was created to support this pension rollout, and a large number of firms chose to create pensions through Nest. The researchers exploit randomized variation in the mandated automatic enrollment implementation date to investigate the effects of the policy. They link Nest pension accounts to workers' credit reports, which allows them to study both saving and borrowing.

The researchers find that the average automatically enrolled worker saves an additional £32–£38 per month in the Nest pension, of which £13–£15 are contributions by the employee and the remainder are employer contributions and tax credits. But the average worker also takes on an additional £7 of unsecured debt. By four years after auto-enrollment began, enrolled workers were 1.9 percentage points more likely to have a mortgage. Although they took on more debt, enrolled workers experienced a 0.07 standard deviation increase in their credit score and a decline in the probability of defaulting on debt.

The researchers note that because automatic enrollees receive employer contributions and tax credits, taking on more debt may be a rational response to this injection of outside wealth, but it could also be the result of passively maintaining their pre-enrollment level of spending.

—Shakked Noy

Childcare Subsidies and Parental Earnings

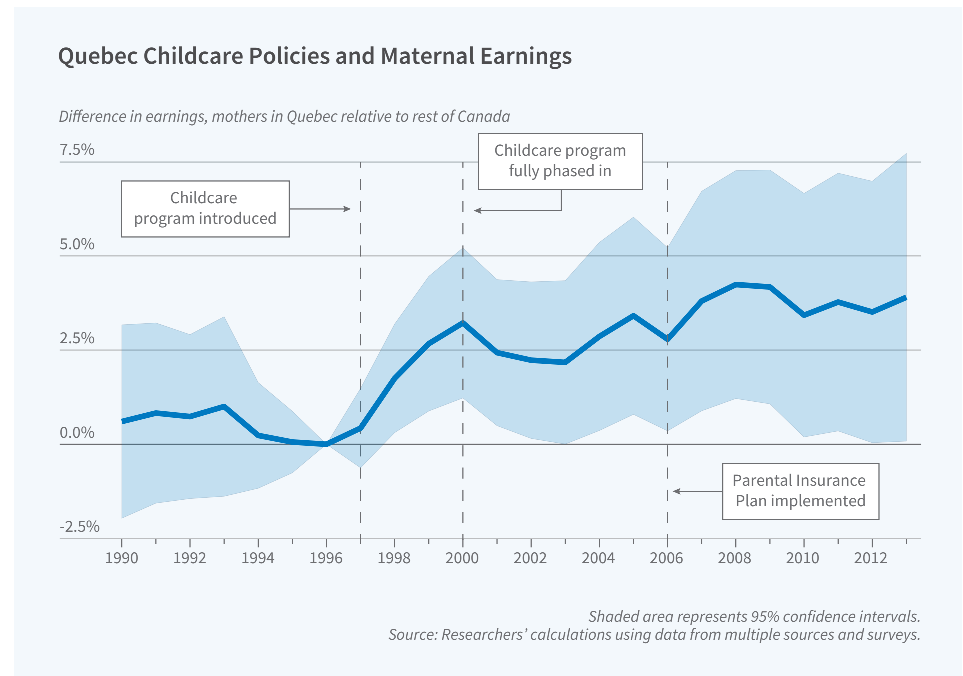
In Canada, the earnings decline following first childbirths is larger for mothers than for fathers, but formal childcare subsidies in Quebec attenuate this disparity.

In the decade after their first child's birth, Canadian mothers' earnings decline by 25 percent relative to the earnings of fathers, Sencer Karademir, Jean-William P. Laliberté, and Stefan Staubli estimate. The unequal distribution of childcare responsibilities is a likely contributor to this gap, with 38 percent of women aged 24–35 providing over 30 hours of unpaid childcare per week compared to 11 percent of men.

In The Multigenerational Impact of Children and Childcare Policies (NBER Working Paper 32204), the researchers examine how formal childcare subsidies affect the labor market effects of childbirth. Using data from the Intergenerational Income Database, they consider new parents who were born between 1963 and 1985, as well as potential grandparents who were between the ages of 40 and 85 between the years 1981 and 2016. They find that the arrival of a child raises the likelihood that parents and grandparents live in the same area, consistent with families valuing grandparental proximity for informal childcare. The birth of a grandchild leads to an 8 percent reduction in employment and a 16 percent decline in earnings for grandmothers, and a 6 percent reduction in employment and a 15 percent drop in earnings for grandfathers after 10 years.

The earnings effect of first children is negatively correlated between mothers and grandmothers. A 6 percent larger decline in the earnings of a grandmother is associated with a 9 percent reduction in the earnings decline (a smaller decline) for the mother, suggesting that parental and grandparental care are substitutes.

Areas with greater formal childcare usage have smaller motherhood penalties. Doubling the share of families claiming childcare expenses from 25 percent to 50 percent is associated with an 11 percent smaller reduction in earnings and a 7 percent smaller drop in employment.



To estimate the impact of childcare subsidies, the researchers leverage the introduction of Quebec's universal childcare program in September 1997, which limited parental childcare expenses to $5 a day. The program was phased in to cover all children who were under the age of five by September 2000. Using National Longitudinal Survey of Children and Youth data, the researchers estimate that between 14 and 20 percent of families switched from parental or grandparental care to formal care due to the Quebec childcare program. The share of families mainly relying on a relative for childcare decreased by between 3 and 4 percentage points.

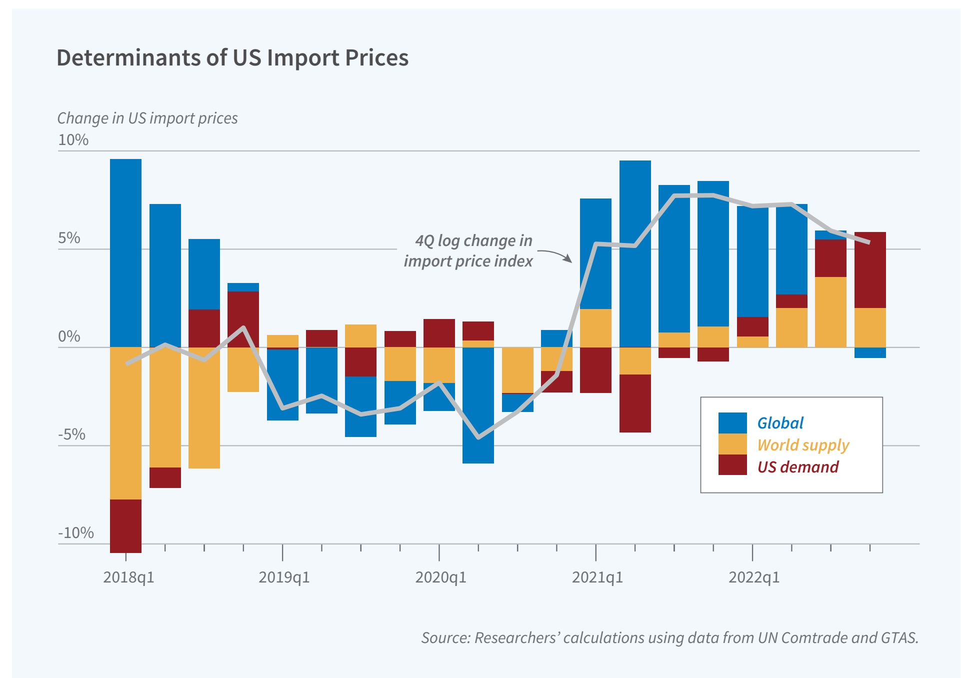
Between 2000 and 2005, maternal earnings and employment increased by 2.5 percent in Quebec relative to the rest of Canada. Relative to mothers in Quebec during the 1982–1996 period, mothers covered by this program displayed a 4 percentage point higher employment rate a decade after childbirth. Earnings increased by 3.3 percent. Grandmothers' employment increased by about 2 percent but grandmothers' average earnings declined, consistent with formal childcare substituting for intensive informal care provided by relatives while complementing low-intensity care.

—Leonardo Vasquez

US Import Price Inflation during the COVID-19 Pandemic

Increases in the prices of imported goods contributed to the overall rise in the US inflation rate during the COVID-19 pandemic. Mary Amiti, Oleg Itskhoki, and David Weinstein investigate the source of import price inflation, distinguishing global shocks from US-specific demand increases, in What Drives US Import Price Inflation? (NBER Working Paper 32133).

The inflation rate for US imports rose during the pandemic and remained elevated longer than the global average due to US-specific demand shocks.



The researchers find that US import price inflation tracked worldwide trends from early 2020 until the middle of 2022. US import inflation peaked at 8.1 percent in the second quarter of 2021, when the global component of US imported goods inflation was 7.8 percent. US import inflation remained high for longer than the world average, plateauing at just over 5 percent by the fourth quarter of 2022, when the contribution of the global component of US import inflation was close to zero. This was due to US-specific demand shocks and some supply shocks in specific high-volume exporting countries.

The researchers analyze UN Comtrade data, in particular the monthly 6-digit Harmonized System (HS) bilateral trade data for 52 countries for 2017–23. The countries include the top 50 exporters to the US in 2017 and all EU member states, accounting for over 92 percent of total US import value. Data from S&P Global or Global Trade Analytics Suite (GTAS) were used to supplement missing data points where possible.

The researchers calculate year-on-year changes in the prices of goods in each industry for each trade route — exporting country to importing country — each quarter. Regressing bilateral import growth in each industry on exporter and importer fixed effects enables them to decompose the growth in trade into import demand and export supply shocks. They define the global price trend component as the median of the exporter and importer effects and the quarter-specific demand and supply shocks as the weighted sum of the fixed effects coefficients for individual exporter or importer countries. This procedure isolates shocks for each product specific to a given exporter or importer, such as Chinese semiconductor exports or US imports of semiconductors.

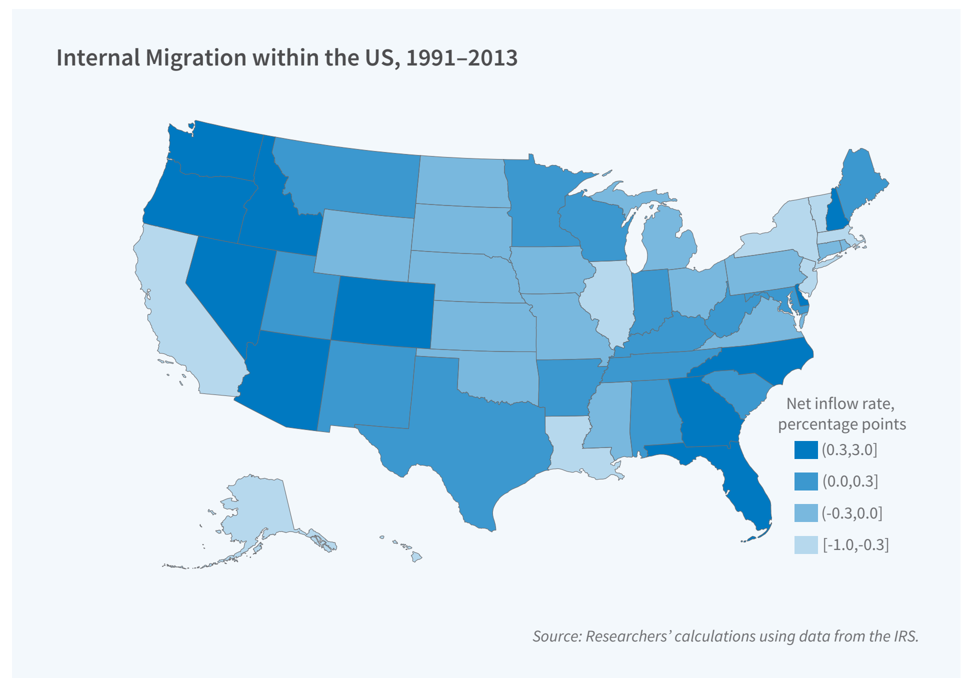
When the researchers disaggregated their analysis to focus on the type of good traded, they found that for US imports, inflation for fuel, food, and industrial supplies closely tracked global price trends. Capital goods prices were affected primarily by idiosyncratic world supply shocks, while consumer goods prices were mainly affected by idiosyncratic US demand shocks. At the end of 2022, goods that were notably affected by US-specific demand shocks included LED displays, mobile phones, pharmaceuticals, video games, diamonds, lighting, and motorcycles. In contrast, those affected by country-specific supply shocks included data processing machines, LED and electric machines, communication apparatus from China, Hong Kong, Korea, Mexico, and Thailand, and air conditioners from Mexico. The researchers suggest that many of these supply shocks may be linked to shortages of semiconductors, a key input.

—Emma Salomon

House Prices and Declining Internal Migration in the United States

In recent decades, the United States has experienced a decline in internal migration rates. This development stands in contrast to historically high levels of domestic mobility. William W. Olney and Owen Thompson investigate this phenomenon in The Determinants of Declining Internal Migration (NBER Working Paper 32123). They focus on the role of wages and housing prices in determining migration decisions. Findings show that the overall decline in mobility is primarily due to households becoming less willing to move from high to low home price locations.

Declining US internal migration rates are primarily due to the decreasing responsiveness of households, particularly older ones, to locational disparities in housing prices.



Source: Researchers' calculations using data from the IRS.

The researchers analyze Internal Revenue Service data on bilateral migration flows between every commuting zone (CZ) in the United States from 1991 to 2013. They study how wage and home price differences between origin and destination CZs influence individuals' decisions to move. Consistent with theoretical prediction, they find that migration increases with the wage gap and decreases with the housing price gap between the destination and origin CZ. These findings suggest that individuals are more likely to move to areas with higher wages but are deterred by higher housing prices.

To better understand the importance of "push" versus "pull" factors, the researchers then separately estimate the effects of wages and home prices in the origin and destination CZ. They find that a 10 percent wage increase in the origin CZ reduces migration by 3.5 percent, while a 10 percent wage increase in the destination CZ induces a 7.8 percent increase in migration. For home values, a 10 percent price increase in the origin CZ is linked to a 1.4 percent increase in out-migration, while a similar increase in the destination CZ reduces migration by 2.6 percent. Overall, these findings suggest that both labor and housing market conditions significantly influence internal mobility, that origin and destination characteristics must be considered simultaneously when analyzing migration decisions, and that migration push and pull factors are asymmetric.

The researchers also analyze why migration rates have declined over time, and find that housing-related factors are the primary driver. They estimate that changes in housing-related factors led to a 3.3 percentage point decrease in migration over time, while changes in wage-related factors actually led to a 2.6 percentage point increase in migration.

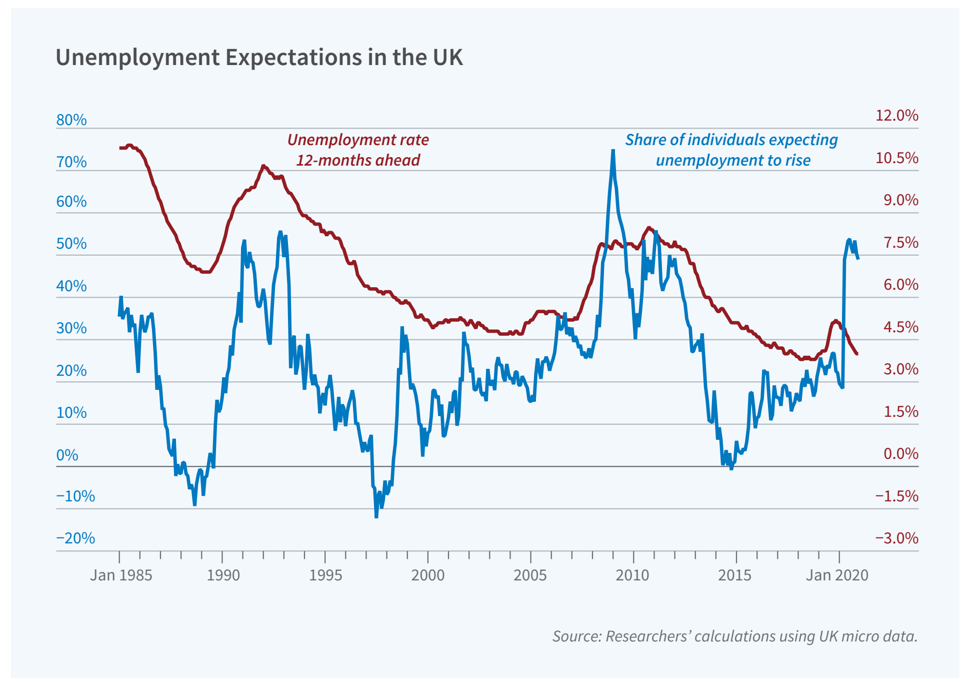
Furthermore, the responsiveness of migrants to wages and home prices is driving the decline in migration rates, rather than changes in the levels or dispersion of wages and home prices. Migrants have become more responsive to the pull of higher wages in potential destinations over time, which would have increased overall migration. However, they are becoming less responsive to high origin housing prices. Rising home prices used to be associated with more out-migration, but this has become less true over time. On balance these results indicate that Americans have become increasingly influenced by wage levels in destination locations but are less swayed by home prices in their current locations, with the overall effect being less migration.

The researchers find that the decline in responsiveness to origin housing prices is particularly evident among certain demographic groups, including homeowners, older households, and those with less than a college degree. Residents, especially of northern or urban states such as California and New York, have become less responsive to rising origin home prices and are less likely to move to more affordable locations, like Sunbelt states, compared to 30 years ago.

—Leonardo Vasquez

Can Consumers' Expectations Predict Downturns?

Economic variables have a mixed record when predicting consumers' self-reported wellbeing. Consumer and firm expectations, however, have substantial predictive power for changes in economic activity. That's the conclusion David G. Blanchflower and Alex Bryson reach in Wellbeing, Expectations and Unemployment in Europe (NBER Working Paper 32006). They find that individuals' fears of becoming unemployed, as tracked in household surveys, rose in the months before both the Great Recession and the COVID-19 recession.



The researchers couple consumer expectations of future employment with firms' expectations of future staffing levels in 29 European countries between 1985 and 2022. Besides foreshadowing the Great Recession and the pandemic-driven downturn, their indicators also show a sharp rise in fear of unemployment in 2022, when Russia invaded Ukraine. The survey data made more accurate predictions than many professional forecasters. The researchers point out that consumers and businesses are close to economic transactions and can possess more timely information than policymakers and statisticians.

The researchers find that various measures of consumer well-being, such as their fear of unemployment, perception of the economic situation, and their household financial situation, rise and fall with economic conditions. The researchers concentrate on consumers' expectations regarding future unemployment as especially useful in predicting downturns ahead of other data. The survey analyzed by the researchers asked individuals to predict the rate of unemployment in 12 months. Between 1985 and the late 1990s, these predictions generally overstated the realized unemployment rate by 1 to 2 percentage points. At the turn of the century, it underpredicted unemployment by 1 percentage point. Starting in 2002, the forecasts were typically accurate to within half a percentage point. Over the full sample period, mean unemployment in Europe was 8.56 percent; expectations surveys predicted 8.88 percent.

Fear of unemployment rose in all 29 of the European nations studied in the first half of 2008, before the Great Recession, but central banks seemed unaware that most of Europe's economies had fallen into recession by the second quarter of that year. Fear rose between 2018 and 2019 in 11 of 17 countries in Western Europe and 6 of 11 in Eastern Europe — before the pandemic. This suggests that even without that pandemic shock, the region might have fallen into recession.

The expectations data are collected monthly, which makes them useful for high-frequency prediction of a nation's future unemployment rate. "In our view," the researchers conclude, "if central banks had been using these methods, they would have spotted the Great Recession many months before they did."

—Laurent Belsie

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