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## Sales Taxes and Internet Commerce

States across the country are exploring new strategies to collect sales taxes on Internet retail transactions. Currently, many online purchases from out-of-state retailers go untaxed. In **Sales Taxes and Internet Commerce** (NBER Working Paper No. 18018) co-authors **Liran Einav**, **Dan Knoepfle**, **Jonathan Levin**, and **Neel Sundaesan** estimate the effect of sales tax policy on online purchasing patterns. They find that under the current policy regime, a one percentage point increase in a state's sales tax rate increases total (mostly untaxed) online purchases of state consumers by just under 2 percent. It also shifts 3–4 percent of *online* purchases from in-state retailers toward out-of-state retailers.

The authors analyze search histories and retail transactions from the online eBay marketplace. They exploit that fact that on eBay

They also use more aggregate data on cross-state trade flows and total online purchases on eBay as alternative ways to esti-

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“A one percentage point increase in a state's sales tax rate increases ... online purchases by just under 2 percent.”

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consumers initially don't know the location of sellers when they shop for items and compare prices. Only when they express interest in a specific item and click on a listing do they learn of a seller's location and the effective sales tax rate. The authors use data from millions of these tax “surprises” to estimate demand elasticities with respect to tax-inclusive prices, as well as to track “substitution patterns” of consumers after they learn about the total cost of an item.

mate tax sensitivity. A number of intriguing findings emerge from this analysis, including a strong “home-state preference” in which consumers are about 10 percent more likely to buy if the seller is located in their state. In turn, that favorable home-state bias, or loyalty, is challenged and diminished when consumers are confronted with a “negative tax surprise.”

—Jay Fitzgerald

## Learning by Doing: Evidence from an Automobile Assembly Plant

Economists believe that “learning-by-doing” helps to shape

and drive productivity growth, increasing the returns to human

capital. Yet, to date, it has been difficult to understand the

mechanisms behind that sort of "on the job training" because of a lack of data.

In **Toward an Understanding of Learning by Doing: Evidence from an Automobile Assembly Plant** (NBER Working Paper No. 18017), co-authors **Steven Levitt, John List, and Chad Syverson** analyze data from a major automobile manufacturer's assembly plant, which produces nearly 200,000 cars annually with several hundred different operations occurring along its assembly line. They find that product quality improves over time, with high defect rates at the beginning of the production process that decline quickly as plant operations begin. The overall relationship between defect rates and cumulative production

implies that each ten-fold increase in cumulative production halves average defect rates.

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"Each ten-fold increase in cumulative production halves average defect rates."

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The authors also find that the learning process is not restarted when the plant's second shift begins operations. Instead, the shift actually begins at average defect rates that are below the first shift's rates. This suggests that not all learning-by-doing knowledge gains are embodied in the plant's workers. In fact, the researchers find that worker absenteeism affects defect rates, but not very much, which highlights instead the importance of the plant's physical and organizational capital as

depositories of learning-by-doing know-how.

Furthermore, the authors

find that the most defect-prone of the hundreds of processes involved in assembling a car have defect rates that are highly correlated across shifts within the same time period, even though different workers are completing these tasks. Together, these results indicate that much of what is learned in the plant becomes embodied very quickly in the physical or broader organizational capital of the plant, rather than remaining only with workers.

— Lester Picker

## Debt Overhangs: Past and Present

Public indebtedness in advanced economies is historically high and rising after the recent financial crisis. In **Debt Overhangs: Past and Present** (NBER Working Paper No. 18015), co-authors **Carmen Reinhart, Vincent Reinhart, and Kenneth Rogoff** address some of the potential economic consequences of high debt loads. Specifically, they use cross-country historical data on public debt

levels to examine the long-term growth consequences of prolonged periods of exceptionally high public debt.

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"Debt levels above 90 percent are associated with growth that is 1.2 percent lower than in other periods."

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The authors define "public debt overhang episodes" as periods when public debt-to-GDP ratios exceeded 90 percent for more than five years. That five-

year minimum was chosen to exclude normal business-cycle-frequency slowdowns, although in fact there turn out to be only

a handful of such short episodes in this two-century dataset. The 90 percent threshold is based on a growing body of research, including work by the authors,

demonstrating that there may be significant nonlinearities in the relationship between debt and growth — so that the effect of an increase in the debt-to-GDP ratio from 60 to 70 percent may differ from the effect of an increase from 90 to 100 percent. The three authors find 26 such episodes in 22 advanced economies since 1800. This does not include the unfolding post-crisis cases in Belgium, Iceland, Ireland, Portugal, and the United States, which do not yet meet the five-year minimum criterion, although it seems nearly certain they will ultimately do so. Ongoing debt overhangs in Greece, Italy, and Japan started before the financial crisis, have already cleared the five-year mark, and are included.

The authors find that on average, debt levels above 90 percent are associated with growth that is 1.2 percent lower than in other periods (2.3 percent versus 3.5 percent). Importantly, 20 of the 26 episodes lasted more than a decade, and the average duration of debt overhang episodes in the sample is 23 years.

The authors explain that the consequences of this long duration are two-fold. First, it suggests that the association of debt and growth is not just a cyclical phenomenon, which contradicts the view that the correlation is caused mainly by debt build-ups during recessions. Second, it implies that the cumulative shortfall in output from debt overhang is potentially large. By the end of the median episode, the level of output is nearly a quarter below that predicted by the trend in lower-debt periods.

The researchers also explore the association between high public debt and real interest rates. A little over half the episodes are associated with high real interest rates and indeed, many pre-World War II debt overhangs ended in restructurings. However, the evidence suggests that the growth-reducing effects of high public debt are not transmitted exclusively through high real interest rates. Indeed, in 11 of the 26 debt overhang cases, real interest rates were either lower or about the same as during the lower

debt/GDP years, yet growth was impaired as in the other cases. Therefore, the growth effects are significant, even in the many episodes where debtor countries were able to secure continual access to capital markets at relatively low real interest rates. Why might growth be lower even absent an outright debt crisis? The authors note that even with pro-active fiscal adjustment and high credibility, countries with large debt burdens must ultimately choose some mix of higher distorting taxes, lower government spending, or greater financial repression, all of which reduce growth.

The authors caution that the causal relationship between debt and growth is still an open research question. They note, however, that most studies find relatively little correlation between debt levels and growth rates at debt-to-GDP levels significantly below 90 percent, which is difficult to explain if the link between debt and growth is solely due to slower growth causing high deficits.

— Claire Brunel

## Evidence on the Long-Run Effects of Mergers

A major obstacle in the evaluation of mergers is obtaining unbiased estimates of the

value they create or destroy. In particular, it is difficult to determine how the acquirer

would have performed had the merger not taken place. Estimates based on announce-

ment returns may be biased because of price pressure around mergers, information revealed in the merger bid, or market inefficiencies. Estimates based on long-run abnormal returns may be skewed by unobserved differences between the firms that merge and the comparison firms that do not merge. And, because the returns to mergers are revealed only over time, it is hard to measure what portion of the long-run returns may be attributable to the merger rather than to other corporate events or market movements.

In **Winning by Losing: Evidence on the Long-Run Effects of Mergers** (NBER Working Paper No. 18024), co-authors **Ulrike Malmendier**, **Enrico Moretti**, and **Florian Peters** analyze numerous close bidding contests for public companies. This sample of mergers

allows the researchers to use the loser's post-merger performance to construct a counter-

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“Losers [in contested takeover contests] outperform winners over the three years following the merger.”

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factual performance of the winner had that firm not won the contest. They find that bidder returns are closely aligned in the years before the contest, but diverge afterwards. In fact, winners significantly underperform losers over the three years following the merger.

Malmendier, Moretti, and Peters use data from 1985 to 2009 on all U.S. mergers with concurrent bids of at least two potential acquirers. Comparing winners' and losers' performance prior to the merger contest, the authors find that their abnormal returns closely track each other during the 20 months

before the merger announcement. The market appears to have similar expectations about

the future profitability of winners and losers. Yet losers outperform winners over the three years following the merger. At the same time, winners accumulate significantly higher leverage ratios than losers, which the market may view as potentially harmful to the long-term health of the company.

The researchers caution that their estimates are based on contested mergers only, which are not representative of all mergers. While a certain number of mergers are contested, the size and even the direction of the effect is unlikely to generalize to all mergers.

— Matt Nesvisky

## The Challenge of Macro-Prudential Regulation

Under proposed global banking rules known as Basel III, regulators will vary banks' capital requirements over time to try to smooth the credit cycle. When lending grows too sharply, regulators can raise the amount of capital banks must hold in reserve. When it's too anemic, they can lower the capital requirements. But to be effective, such macro-

prudential capital regulation must affect the loan supply of regulated banks — and not be completely offset by unregulated sources of credit.

Using bank-specific data from the United Kingdom, **Shekhar Aiyar**, **Charles Calomiris**, and **Tomasz Wieladek** find that capital requirements can be a powerful tool for regulating credit, but

that unregulated sources of offset significantly complicate the implementation of macro-prudential policy. In **Does Macro-Pru Leak? Evidence from a U.K. Policy Experiment** (NBER Working Paper No. 17822), they find that UK-regulated banks did indeed lend less when regulators increased their capital requirements, but foreign-regu-

lated institutions operating in the United Kingdom boosted lending during such times, a “leakage” that substantially reduced the impact of the policy.

“The problem of ‘leakages’ involving local intermediaries is particularly acute for an economy like the [United Kingdom], which is a global financial centre,” write the authors. British capital requirement rules don’t apply to resident foreign bank branches located in-country but with headquarters abroad. The result: nearly a third of the tightening by regulated banks was offset by the increased lending of foreign-regulated banks.

From 1997 to 2007, the UK’s Financial Services Authority (FSA) used “trigger ratios” to vary a bank’s minimum requirements for risk-based capital. Depending on regulators’ perceptions of operational and interest rate risk (which are correlated with bank size, reliance on retail deposits, and sector concentration of its loans), the capital requirement could vary anywhere from a minimum 8 percent to 23 percent.

By looking at 104 regulated banks and 172 foreign-regulated branches in the United Kingdom,

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“Nearly a third of the tightening by regulated banks was offset by the increased lending of foreign-regulated banks.”

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the authors find that when UK regulators increased the capital requirements for regulated banks, the growth in their lending decreased. For each single percentage point increase in a bank’s minimum capital requirements, the growth in its lending fell an average 6.5 to 7.2 percentage points.

Among foreign-regulated branches, however, the story was different. For every one percent reduction in lending by UK-regulated lenders, the foreign-regulated entities increased their lending by 2.67 percent. Although these foreign-regulated entities, which are branches of foreign banks, on average are about 1/15th the size of a UK-regulated bank, they are more numerous than the UK-regulated banks. Thus, the cumulative impact of the increased lending by these entities was substantial,

amounting to roughly 30 percent of the reduction in lending by UK-regulated banks. The

authors view this estimate as a lower bound for the actual leakage, since more expensive methods of loaning money, through cross-border lending or through the capital markets, could also fill the lending gaps.

Basel III could well eliminate much of this leakage, since it includes reciprocal requirements between financial regulators aimed at eliminating such distortions between banks regulated by different authorities. “[T]he effect of capital requirements on aggregate lending may become stronger once the reciprocity agreement embedded in Basel III becomes enforced and the branch leakage documented in this paper is eliminated,” the authors conclude.

— Laurent Belsie

## Comparing Real Wages

**I**n **Comparing Real Wages** (NBER Working Paper No. 18006), **Orley Ashenfelter** notes that real wage rates are important indicators of both liv-

ing standards and labor productivity, but are difficult to measure accurately. He then reports on the results of a decade-long project designed to estimate real

wages by studying the hourly worker wages at McDonald’s restaurants in over 60 countries. The findings suggest that workers in India, China, Latin America, and

the Middle East earn 10 to 15 percent of what workers earn in the developed countries. Workers in Russia, Eastern Europe, and South Africa face wage rates that are 25 to 35 percent of those in developed countries. These differences are attributable to national economic organization, not to differences in skill or human capital.

Defining the wage of a crew member at McDonald's in each country as the "McWage", Ashenfelter calculates a rather unconventional measure of real wages by dividing the McWage by the price of a Big Mac—in other words, the Big Macs per Hours Worked (BMPH) estimate

of real wage rates. These estimates range from 3.09 in Japan

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"Real wages [measured as]... Big Macs per Hours Worked (BMPH)... range from 3.09 in Japan to 0.35 in Latin America and India."

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to 0.35 in Latin America and India. The developed countries, the United States, Canada, Japan, and Western Europe have similar BMPH real wage rates: workers earn between two and three Big Macs per hour.

Between 2000 and 2007, the BMPH real wage declined slightly in the United States and Canada, but remained constant in Japan, grew by over 50 percent in China and India, and rose by over

150 percent in Russia, which was recovering from a severe financial

crisis in the late 1990s.

In most countries, BMPH real wage growth stalled between 2007 and 2011. BMPH real wages fell in the United States, Canada, South Africa, India, and Japan, and remained constant or grew slightly in Eastern Europe, the Middle East, and Latin America. BMPH real wages only grew in China, Russia, and Eastern Europe during those years.

— Linda Gorman

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