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equilibrium



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Dear Readers,

Berkeley Economic Review has the pleasure to present the inaugural issue of our staff-run magazine, Equilibrium. Following the BER mission statement, this magazine represents a continuation of our efforts to promote undergraduate writing on economics from diverse perspectives. Within these pages you will find the best of our semester-long works, as well as the product of many Slack chats and long nights at Evans Hall. We hope you enjoy.

— BER Staff

The Economics of Child Marriage

by Parmita Das

Economic Analysis of the Phenomenon of Child Marriage

Child marriage is defined as marriage taking place before the age of 18. It is deeply entrenched in many communities, so much so that 41,000 girls are married off every day.

According to Human Rights Watch, global data shows that girls from the poorest 20 percent of families are twice as likely to marry before the age of 18 as girls from the richest 20 percent of families. This stems from the traditional perception that girls are financial burdens rather than potential wage earners. Families living in poverty with several children use child marriage as a way to reduce their economic burden. To them, one fewer daughter means one fewer person to feed, clothe, and educate. Families often use child marriage as a strategy to evade food insecurity. Girls are even used as a substitute for money to offset debts and settle conflicts. In cultures where the bride's family is expected to pay a dowry, early marriage equates to a lower bride price. In cultures where the groom's family pays the dowry in exchange for the bride, younger girls fetch a higher price. The families that cannot afford to raise their daughters may perceive child marriage as the next best alternative and a source of income.



Poverty cements the practice of child marriage. More than half the girls from the poorest families in developing countries are married as children. Families, and often the girls themselves, view marriage as a means to secure their future. The incidence of child marriage increases after humanitarian crises like wars and natural disasters, as families faced with poverty and violence use the practice as a coping mechanism. In fact, nine out of the ten countries with the highest rates of child marriage can be classified as fragile states—developing countries with weak state capacities that are unable to protect their vulnerable citizens.

Peter Leeson and Paola Suarez's paper "Child Brides" in the *Journal of Economic Behavior & Organization* attributes the creation of the conditions that perpetuate child marriage in impoverished societies to parental preference for sons over daughters. Due to a son preference, couples invest fewer resources in caring for their young daughters, so more

males survive to traditional marriage age than females. Additionally, to afford to care for the sons they want, some parents dispose of their undesired daughters by marrying them off prematurely. This leads to a sex ratio imbalance, causing some men to turn to younger girls to find a bride. The article analyzes data from India to support its theory.

Economic Impacts of Child Marriage

Child marriage disproportionately affects girls; it is a leading cause of school dropouts for adolescent girls. Every year of marriage before 18 reduces the likelihood of completion of secondary school by 4 to 6 percentage points. Child marriage and the associated school dropout rates hamper the girls' chances of earning better wages by 9 percent over their lifetimes. Female victims often live in poverty, hold jobs less frequently, and are less productive. Child marriage reduces their ability to acquire economic resources and perpetuates their oppression. They have less decision-making and bargaining power in their households and face a higher risk of domestic and intimate partner violence. A direct consequence of child marriage is early childbirths, which contributes to high maternal mortality. Male victims of child marriage may drop out of school early and accept low-paying jobs to support the newly-formed family.

Child marriage engenders high fertility, which yields large costs for families and reduces their standard of living. Having more children reduces a household's ability to pay for food, education, and healthcare. The alternative to child marriage is having an education, so the opportunity cost deprives households of a potential source of income.

Child marriage is estimated to cost economies at least 1.7 percent of their GDP. It increases total fertility of women by 17 percent, which hurts developing countries battling high population growth. The elevated fertility rates pose significant costs to national economies through demands for basic services by ever-increasing populations. It delays the demographic dividend that can come from reduced fertility and investments in education. The associated cost to the global economy is trillions of dollars in purchasing power parity between now and 2030. Child marriage disrupts the accumulation of human capital due to its associated school dropouts, withdrawal from labor



“Families often use child marriage as a strategy to evade food insecurity. Girls are even used as a substitute for money to offset debts and settle conflicts.”



markets, and adverse effects on the health of young girls. It perpetuates extreme poverty and hinders efforts to achieve economic growth and equity.

funding by donors and governments towards delaying the age of marriage.

Economic Case for Ending Child Marriage

Ending the practice of child marriage would lead to better prospects for young girls: improved educational attainment, fewer children, increased lifetime expected earnings, improved household incomes, reduced incidence of intimate partner violence, and more decision-making power.

Allowing girls access to higher education changes the prospects of households and the economy for the better. Enabling girls to receive more education increases the likelihood that their children will be educated, thereby improving the human capital of the future labor force of the economy.

Curbing high population growth rates in developing countries would boost economic growth and contribute towards economic stability, saving the global economy \$566 billion dollars by 2030. Governments would enjoy budget savings by foregoing the cost of providing basic education, healthcare, and other social services to a rising population. Lower population growth would save governments 5 percent or more of their education budget by 2030. The benefits would be felt strongly by poorer segments of the population and lead to an alleviation of poverty. A 10 percent decrease in child marriages would result in a 76 percent decrease in the maternal mortality rate. The estimated annual benefits for lower under-five mortality and malnutrition is \$98 billion by 2030.

The World Bank and International Center for Research on Women (ICRW) carried out a three-year research project titled “The Economic Impacts of Child Marriage,” which concluded that ending the practice could save the global economy trillions of dollars by 2030. They believe that understanding the economic benefits would increase the

Economic Approaches to Ending Child Marriage

Bangladeshi international development organization BRAC tackles the practice of child marriage by introducing economic incentives. The NGO teaches financial literacy, entrepreneurship, and banking practices to girls, which allows them to contribute to their households and increase their agency.

The University of Kent developed an overlapping generational model of the marriage market in developing countries by mapping a desirable female attribute whose value decreases with time spent on the marriage market, such that age signals quality. This model demonstrates that, in the absence of intervention, young potential brides have an incentive to accept an offer of marriage sooner than later. Using their model, they showed how large-scale interventions like providing parents incentives to delay their child’s marriage, providing girls new opportunities to acquire skills, and providing alternatives to the traditional path of early marriage can be effective. Some adolescent girls can then turn down marriage to pursue other opportunities or utilize their higher bargaining power to negotiate more favorable marriage offers so it becomes more difficult for men to prey on young, uneducated brides.

Conclusion

The eradication of child marriage has been recognized as a priority by its inclusion in the Sustainable Development Goals. Child marriage perpetuates the cycle of poverty by cutting short girls’ education and limiting their opportunities for employment. It is an example of how a social problem is propagated by financial concerns and, as such, interventions should aim to establish the economic benefits of ending the practice. ■

Growth and Currency in Argentina

It's Complicated

by Seth Bertolucci

There's almost no place that baffles economists more than Argentina. The South American nation began the 20th century among the wealthiest in the world, growing hugely prosperous from their commodities trade with Europe. Yet, since then, the nation has suffered a near constant decline. It is the lone wealthy nation from the turn of the 20th century that is not still comparatively wealthy today.

One big reason for Argentina's decline is currency instability. Since 1973 alone, there have been three national currencies: the peso, the austral, and then a reconstituted peso. Poor fiscal policies have often stoked massive inflation that has placed serious downward pressure on Argentine currency. These currency depreciations in turn make foreign debt near impossible to repay, causing further devaluations which can ultimately result in economic collapse. Currency crises like this occurred in 1982 and 2001, and both have resulted in severe economic depressions.

Since Argentina's mass currency depreciations have historically preceded economic crises, one wonders if perhaps changes in the value of the currency positively correlates with GDP growth—if the currency goes up, then does GDP also go up? This turns out to be a complicated question.

If you're still reading at this point you must be an econ geek, and you might think, "But wait! Economic orthodoxy says that when the currency depreciates, GDP will increase. Cheaper

currency means more competitive exports, which will boost output." Exactly. This is what we want to test.

For some more recent historical context, Argentina over the past 10 years has continued to struggle with foreign debt and currency volatility. After the worst economic crisis in the nation's history from 1998 to 2002, Argentina began to prosper again during the first few years of President Nestor Kirchner's administration. Since the country defaulted on its debt in 2001, Argentina has had to borrow at relatively high interest rates. Adding to the mix, expensive government subsidies and other spending instituted under Kirchner and later his wife, President Cristina Kirchner, caused government debt to increase again around 2010. Since the 2015 election of President Mauricio Macri, the debt has only continued to increase. The US dollar has also strengthened as the Federal Reserve raises rates. As a result, Argentina's dollar-denominated loans have become almost impossible to repay. Just months ago, the IMF stepped in and loaned Argentina \$50 billion to help repay its most pressing debts. To make matters worse, the nation is currently in yet another severe recession.

All this raises the question: is there a positive relationship between changes in the country's currency and GDP growth? Or does economic orthodoxy hold?

To answer this, we use daily currency data on the Argentine peso from the Central Bank of Argentina and data on GDP



Source: Federal Reserve Economic Data (FRED), St. Louis Federal Reserve

**Percent Increase in Quarterly GDP in Argentina
Associated with One Unit Increase In...**

	(1)		(2)		(3)
Average Percent Change in Daily Argentine Peso from the Quarter Prior	-5.840**	Average Value of Argentine Peso Over the Previous Quarter (in 2015 Pesos)	0.019	Currency Volatility (Std. Dev.) Percent Change from the Prior Quarter	0.079
Average Percent Change in Daily Argentine Peso from Two Quarters Prior	-5.700**	Average Value of Currency Over the Previous Two Quarters (in 2015 pesos)	-0.010	Currency Volatility (Std. Dev.) Percent Change from the Previous Two Quarters	-0.035
# Observations	43	# Observations	43	# Observations	43
R ²	0.676	R ²	0.600	R ²	0.594

Note: All coefficients are obtained using OLS (ordinary least-squares) controlling for GDP growth in the previous and two quarters prior in Brazil, the U.S., and the E.U., as well as GDP in Argentina over the previous quarter. Observations taken from 2007Q2 to 2007Q4.

** indicates statistical significance at the 5% confidence level



growth from the World Bank. We also use a common econometric technique designed to extract correlations between different variables while controlling for others—the ordinary least squares (OLS) regression, taught in all introductory econometric courses.

We first regress Argentine quarterly GDP growth from 2007 to 2017 on the average daily change in the Argentine peso during the two prior quarters. We also account for quarterly GDP growth in the United States, European Union, and Brazil during the same quarter, as well as GDP growth in Argentina, the US, EU and Brazil in the prior quarter. We find that the coefficients for the average change in the currency over the previous two quarters (quarters t-1 and t-2) are strongly negative, and statistically significant at the 5% level. This means that a one percent positive shift in the average daily change of the currency a few months prior is associated with a negative (approximately 1–9%) change in quarterly GDP growth.

This result is actually a bit misleading. If every day the Argentine peso appreciated by 1% for a whole quarter, then according to our model, GDP growth would be 1–9% lower than if the currency had stayed the same. That would be a massive change in GDP over one quarter. An average daily change of 1% in the currency value would mean the currency increased by roughly a factor of 2 over the entire quarter, but this never happened in any of the periods we observed. As far as the real world is concerned, smaller average daily changes in the value of the currency over the prior quarter (think maybe 0.2% at most) would indicate a roughly 0.2%–1.8% change in quarterly GDP growth in the following quarter. So we wouldn't really expect Argentinian quarterly GDP growth to decline by more than 2% from an increase in currency value, since the currency can only fluctuate so much over a small period of time. Furthermore, this is only according to our model. As any statistician will always remind us, correlation is *not* causation.

If you found the prior paragraph a little too technical, it basically just says that an appreciation of the peso correlates with a decrease in GDP growth. This is just a correlation, and doesn't mean for sure that an appreciation of the peso actually causes declines in GDP.

On the surface, the results appear to obey the logic of traditional economic theory. The old fashioned rules from textbooks say that an increase in currency should result in a negative change in GDP since exports become less competitive.

In reality, we should be cautious in rushing to conclusions. First, our data set involves 43 observations over a 10 year period. This period does not include the most recent IMF bailout in Argentina, which began in 2018. While Argentina was not macroeconomically stable over this time frame, the nation sustained average positive growth and avoided any catastrophic downturns like those of the 1980's or early 2000's.

Furthermore, our model does not account for two potentially important variables: inflation and net exports. Unfortunately, Argentina inflation statistics are notoriously inaccurate and have been subject to government meddling, especially under the Kirchner administrations. On top of that, inflation might be a "transmission mechanism," a term economists use to describe a thing that affects another thing. So, when the currency falls, foreign goods become more expensive and inflation rises. This could cause the Argentine Central Bank to raise rates (since chronically high inflation is a recurrent problem) and thereby cause lowered GDP growth. Net exports is also a transmission mechanism since changes in the currency affect export and import levels and thus the overall economy. So while we didn't account for inflation and net exports in our model, accounting for them may cause greater issues, since it would likely hide the true effect of currency changes on GDP growth by removing the process of how those changes affect GDP. ■

Rethinking Microfinance

by Vassilisa Rubtsova



In October of 1983, Muhammad Yunus founded the Grameen Bank and pioneered the microfinance and microcredit movement. Grameen Bank served the impoverished population in Bangladesh by offering small loans to small businesses. The microfinance model was hailed a success and Yunus, along with Grameen Bank, received the Nobel Peace Prize in 2006 for his work in reducing poverty and stimulating economic growth. Since then, the microfinance model has become a widely popular solution to stimulating growth in developing countries and has been implemented in hundreds of developing countries and even in some developed countries.

Microfinancing has simply reinvented the wheel. Typically, the poor in developing countries and some developed countries have no way to receive formal loans or credit from big banks because they are deemed too risky. As a result, the poor will borrow from informal lenders, receive loans from informal organizations, and engage in an informal economy. Microfinance serves as a means to formalize these transactions for the poor and include them in the formal economy, comprised of the established economic institutions and markets regulated by the governments of their countries. This is meant to do two things: bring people out of poverty by investing

in their businesses, building their credit, and making them self sufficient; and strengthen the overall economy of the country. In theory, microfinance could produce tangible results because it invests in an impoverished region. However, as the model of microfinance is being implemented throughout the world, many drawbacks continue to be overlooked and consequently hinder the success of microfinance and the poor populations it seeks to serve.

Microfinance is not the cure-all for worldwide poverty that international organizations, financial institutions, and countries have claimed it to be. Microfinance is not designed to end the cycle of poverty. The microfinance system is rooted in the idea that, by funding a plethora of impoverished entrepreneurs, within a few years borrowers will create large businesses that stimulate the economy and help their communities rise out of poverty. Unfortunately it does not always work that way. Not everyone seeking microloans and credit has the next big idea that will drive their country into becoming a major global player, which means that with most microloans, the returns will not be significant on a global scale. Even if the focus is shifted on just borrowers' villages or communities, the borrower is likely part of an oversaturated industry in their

village and community. Thus financing the borrower and their neighbor just perpetuates unprofitable competition in an industry that already does not yield immense profits.

As microfinance institutions grow in size and capacity, microfinance institutions and the international community ought to reconsider the microfinance model. In the status quo, the microfinance system has failed to deliver large scale results. While over 500 million people have engaged in the microfinance system in its decades-long existence, it has yet to revitalize any country's economy. Even in Bangladesh, where microfinance and microcredit have largely been recognized as successful means to reduce poverty, it is still a prevailing problem decades later. Naturally, there are other factors that play a role in poverty rates including war, natural disasters, and political turmoil, among other contributors. However, aside from these factors, a number of studies, including that of the United Kingdom's Department for International Development, indicate that there is "no clear evidence" of the positive impacts of microfinance. This means that microfinance has not only failed to deliver significant reduction of poverty and economic growth but it has also produced negative impacts on the poor.

Studying microfinance in countries such as Mexico, South Africa and Bangladesh, it is evident that microfinance has not lived up to expectations. Although microfinance is intended to be a viable financial opportunity for the poor, the interest rates create a very significant problem for achieving financial prosperity. First, there is no standard for interest rates for the poor. There is no enforced system that ensures that microfinance institutions have low interest rates in place that do not create an even greater burden on the poor, creating a cycle of debt and unpaid loans. Microfinance institutions are often private companies, which means that their incentives are not based on alleviating poverty, but rather are profit driven. Hence, their interest rates are not aimed towards helping borrowers. Some microfinance institutions have annual interest rates ranging between 2% and 4%, while other have rates between 30% and 60%. In one extreme case, the

Banco Compartamos in Mexico, the Center for Global Development calculates annual interest rates to be almost 200%. Microfinance institutions' adoption of credit and loan practices as they are done in the formal economy does not help the poor. It simply further perpetuates poverty. Many microloan and credit recipients are not likely to be able to pay off the loan in a timely manner, so they find themselves in an even worse place when their interest accumulates. In the case of South Africa, people often do not use microloans to finance businesses, but rather they use them to simply make ends meet. In fact, Jason Hickel of the London School of Economics points out that in South Africa, microfinance has failed because 94% of the loans people receive are used to pay for basic needs rather than generate a profit to pay off the loans and sustain themselves. Looking at Bangladesh, studies point to serious problems with overborrowing and lack of repayment. Rather than microfinance stimulating independence and economic prosperity, it has created a culture of dependence, which has only increased people's debt and made class mobility a real challenge.

Microfinance can only become the silver bullet the international community hoped it would be if microfinance is re-examined, re-evaluated, and revised. This could include changing what the system looks like and possibly partnering the system with other practices of poverty reduction. These practices could include direct cash transfers, implemented in countries such as Namibia, Indonesia, and South Africa, or creating jobs through expanding sectors such as the services, technology, and agriculture sector. These alternatives have proven effective in combating poverty and protecting labor rights in countries such as India and China.

Microfinance is just Band-Aid solution because it does not challenge the players in power and institutions that create conditions of extreme poverty in the first place. It arguably offers small-scale relief but fails to create long lasting change because it simply regurgitates a formal economy with all of its drawbacks that is palatable for the poor, where their personal economic growth and wellbeing are limited and conditional. ■



THE EXPLOSIVE GROWTH OF E-SPORTS

by Joseph Ng

“Fortnite tutors are a thing,” the headline from *USA Today* reads. “And yes, parents are paying them.”

Esports, already boasting millions of fans and almost a billion dollars in revenue, only promise to keep growing. The term refers to organized, competitive video game playing, featuring the likes of Dota 2, Counter-Strike: Global Offensive, Fortnite, League of Legends, and Overwatch. And it is no longer just a fringe hobby, as it might once have seemed. Esports are projected to reach an audience of over 380 million viewers by the end of this year, generating an industry-wide \$1.4 billion by 2020.

Where does this money go? Esports, like traditional sports, have fans as well as other stakeholders: players, teams, and the game developers themselves. In this article, we take a look at how each of these parties makes money—and what the future might hold.

The Players.

First, the players. Their most high-profile sources of income are tournaments, in which they compete for a cash prize—and the numbers are enormous. Kuro Salehi Takhasomi, a German professional Dota 2 player, has raked in over \$4 million in tournament prizes, with over \$2 million from a single tournament in 2017. That year, \$112 million of prize money was awarded, and for the 2018–19 season, video game maker Epic Games has promised \$100 million in prize money for Fortnite tournaments alone.

But while winning tournaments might be the most glamorous way to earn money, it is not a particularly consistent revenue source. Instead, many players have turned to an online platform called Twitch to livestream their games. Viewers can subscribe to a stream for only \$4.99 a month, and the streamer gets half of that. With only 4,000 subscribers, that is about \$120,000 a year—and the

top streamers make much more. Some are reported to earn over \$100,000 a month.

It is an enormous sum of money, but it is not all. Streamers can upload their recorded streams to YouTube, generating more revenue through views on that platform. Many streamers also have loyal fans who are willing to simply donate money; for top streamers, that brings in up to \$5,000 a day. On top of all this, streamers can also partner with various brands to promote their products on their channels—sharing links to certain products on Amazon, for example.

The best esports players are signed to teams, much like professional football or basketball players, and that represent yet another source of income. According to Forbes, “The average starting North America League of Legends Championship Series (NALCS) player salary is now over \$320,000” (comparable to Major League Soccer athletes!). Teams are even starting to offer other benefits like health insurance and 401(k)s.

The Teams.

To understand how esports teams make money, it is easiest to contrast them with traditional sports teams—and the differences are easy to see. While traditional sports teams have massive stadiums and (generally) regional fanbases, esports are streamed online, so fanbases are not as localized. As a result, while traditional sports teams can generate revenue by selling tickets and concessions to fans coming to their home stadiums, esports teams generally cannot tap into that revenue stream.

Similarly, traditional sports teams frequently own broadcasting rights to their games, while esports teams largely do not enjoy that luxury. For instance, in 2011, the Los Angeles Lakers (a professional basketball team) signed a 20-year contract with Time Warner Cable for local

JAEUN
PARK



television rights; the deal totaled \$4 billion—an average of \$200 million a year. Meanwhile, in esports, teams have far less leverage. In 2016, Riot Games (the developer for League of Legends) declined the petition of a number of esports teams for revenue sharing and broadcasting rights.

Instead, esports teams generate the vast majority of their money through sponsorship deals; estimates vary from 40% to around 95% of team revenue. Research firm Newzoo estimates that in 2018, \$353.3 million was generated in the esports industry through sponsorship deals (with the caveat that not all of this necessarily went to teams). One problem with such one-sided revenue is that esports is such a rapidly changing industry. Games and teams can easily fade from popularity, causing their value to sponsoring companies to decrease—along with any associated sponsorship deals.

The future for esports teams, however, looks bright, as the rising trend of esports viewership has attracted millions in capital. Merchandise such as branded shirts and mouse pads already bring in revenue for teams, and new opportunities keep opening up. Team-customized digital skins (different visual appearances for on-screen characters), for instance, pose a potential source of revenue. So do esports-specific arenas, which could drive ticket sales, sponsorships, and ad revenue. Some of these arenas are already in the works.

All this potential for future growth, on top of the sheer amount of capital already invested in the industry, has given esports teams sky-high valuations. Many have estimated valuations of \$100–\$200 million—and that number is likely to rise.

The Players.

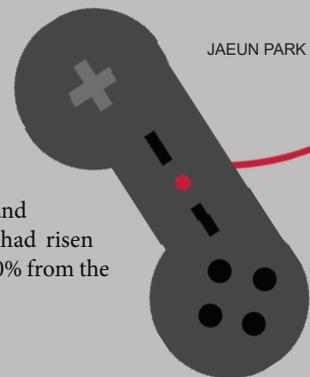
As noted earlier, some of the biggest game developers hold tournaments for their games, with a cash prize paid to the winner. Though expensive to host, these tournaments generate publicity for the games, and at least some of the costs can be offset via ticket sales, sponsorships, and advertisements.

Plus, the game developers own broadcasting rights; especially for larger tournaments, these rights can be worth a significant amount. In 2016, BAMTech (a streaming company owned by Major League Baseball and Disney) inked a deal with Riot Games for streaming rights through 2023, worth at least \$300 million. Similarly, in 2018, Activision Blizzard (maker of Overwatch) sold broadcasting and streaming rights for its second season of

the Overwatch League to three well-established companies (ESPN, ABC, and Disney), indicating esports' growing mainstream appeal.

Perhaps the most interesting feature of game revenue for these developers is the rise of microtransactions (small in-game purchases), such as skins. Take Fortnite for example. As a free-to-play game, all its revenue is made through in-game transactions. In February 2018, the game brought in \$126 million, mostly through in-app visual effect items. In April, it generated \$296 million, and in May, monthly revenue hit \$318 million. As of July, annual revenue was on track to hit \$2 billion.

One interesting point to note is that, like pharmaceutical companies, game developers have enormous research and development costs. Much like the few drugs that pass regulatory approval and make it to market, very few games actually explode in popularity. Game developers must create a number of games and hope that at least one can hit it big, bringing in enough revenue to generate a profit after subtracting the costs for developing the others. Unfortunately for developers, the cost of making games is growing. Electronic Arts, for example, noted in its 10-K filing for fiscal year 2018 that research and development costs had risen to \$1.3 billion, up 10% from the previous year.



The Takeaway.

It is clear that esports has a promising future, both in the US and abroad.

Game developers are investing more and more money into trying to create the next big hit. Media broadcasters are willing to spend big to secure streaming and broadcasting rights. Gamers are generating billions through in-game purchases, and players and teams are earning millions.

Esports is a growing trend, and it should not be ignored. Who knows? It might even become the next Olympic sport.

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PROFESSOR INTERVIEWS

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Dmitry Taubinsky

Assistant Professor
Department of Economics

Interviewer: What open questions are there in public economics and behavioral economics?



Taubinsky: Well, the really big challenge in this area is, how do we figure out how socially beneficial a policy really is, once we get away from the assumption that people's choices reveal what they really want? ... If you assume that people always choose what they want, then you have a very immediate link from a data set of people's choices to what's actually good for them, and therefore to the social welfare effects of various policies. Unfortunately, people's choices don't always reveal what they really want. For example, a very basic and real psychological consideration is that people might get confused by taxes that are complex ... or people might over-consume unhealthy foods because of limited self-control or incorrect beliefs.

Interviewer: Do you see some analogies, or some fundamental differences between a soda tax and carbon tax?

Taubinsky: That core principle of trying to bring demand more in line with what is socially optimal through taxation runs through all of these kinds of studies. Carbon taxes is one example; soda taxes is another example... People might be under-purchasing energy-efficient appliances as compared to less energy-efficient appliances if people don't take into account the benefits of using something that's energy-efficient, if they don't fully internalize the impact on the environment. ... The complexity of these kinds of policies is that many of these taxes or subsidies end up being regressive. They affect low-income people and higher-income people in different ways, so you have to pit that Pigouvian principle against other types of considerations, like collecting tax revenue in a fair way that doesn't overburden lower-income families.

Assistant Professor
Goldman School of Public Policy

Daniel Acland

Acland: If you study behavioral economics, you can't escape the suspicion that people are making mistakes that are making them less happy. If you study public health, you know for sure that people are making mistakes that make them less happy. That puts you straight into the domain of trying to figure out what policy interventions would actually change people's behavior, which turns out to be incredibly hard. ... Most of the policy proposed in order to change public behavior does not work, and if they work in the short term they do not have persistent effects. ... in the domain of public health, and in the domain of consumer finance ... Most of what's left in terms of the big policy changes is people's behavior. We've got all the science we need on HIV—what we need is for people to get tested and wear condoms. And they don't. And the same percentage of them don't year after year after year.

Cihan Tugal

Professor
Department of Sociology

Interviewer: What trajectory do you see neoliberalism taking in the United States during Trump's presidency and after?

Tugal: We think the [neoliberal] crisis is over but the effects are everywhere. The 2008 crisis effects are still here ... If you look at [wealth] inequality, if you look at people who are not looking for work versus the bare rate of unemployment then we're still in the middle of the crisis. It is neoliberalism that brought us this crisis so you can't carry on these [neoliberal] policies without destroying the country. This is what both parties are sort of aware of but they have no alternative ... They don't know what to replace neoliberalism with ... That's where I think both economics as a discipline and economics of sociology will have to weigh in to map out new versions of what a post neoliberal and post New Deal economy would look like.

Full interviews available at econreview.berkeley.edu

JOBLESSNESS

The Effects of Technology on U.S. Jobs

by Katherine Bliesie

The United States's history has been emblemized by powerful people preaching the importance of working hard and staying busy. Our late president Theodore Roosevelt once remarked that he'd rather risk wearing out than rusting out. Yet millions of people today find themselves at odds with this once uncompromised ideal of a steady, nine-to-five job that, for the baby-boomer generation, was all but guaranteed. The numbers speak for themselves, especially data from the manufacturing industry, a sector of the economy that is particularly useful to analyze because of the huge chunk that it has, historically, taken up of the U.S.'s economic pie. In the past 20 years, the number of manufacturing jobs in the United States has dropped by almost 30%. Between 2000 and 2017 employment in manufacturing fell by 5.5 million jobs. Perhaps more surprisingly, the percentage of prime-age men who have no job and aren't looking for a job has doubled since the 1970s—a statistic that suggests that our employment crisis is not just material in nature but psychological, as well.

Most economists agree that one of the top leading propagators of this loss of U.S. jobs is the exponential growth of the use of technology in industry to increase efficiency and output. Economists have been nervous about technology's effect on jobs for years—almost 100 years ago, in 1929, John Keynes warned that rapid technological change would reduce the demand for labor and lead to astounding rates of unemployment. Increasingly we see jobs that were once performed by humans being done by machines—cashiers have become “self-checkouts,” factory workers have been replaced in some cases by robots, and cars have begun to drive themselves. It's true that technology makes jobs too—yet perhaps not at the rate that proponents of automation have advertised. About 90 per cent of workers today are employed in jobs that existed 100 years ago, and only 5 percent of the jobs created in the 20-year period between 1993 and 2013 came from high tech sectors. Researchers at Oxford University have predicted that, twenty years from now, machines may be able to perform half of all American jobs. But the repercussions that America faces as a result of the decline in manufacturing run deeper than just unemployment—in many of the areas that were once

hubs of industry we now observe a surge of opioid use and opioid-related deaths.

But technology isn't the only threat impinging on U.S. employment. In the realm of manufacturing, recent economic analysis has shown that trade deficits might actually shoulder much of the blame for manufacturing job loss. The Census Bureau reported in 2015 that the U.S. has run a goods trade deficit in every year since 1974, and with more than 75% of U.S. traded goods being manufactured goods, it's manufacturing jobs that are taking the hit.

An interesting sub-group of scholars and economists has surfaced in the past ten years, which argues that the ends of jobs, for lack of a better phrase, might not actually be a bad thing. One such thinker, Peter Frase, says that we are conflating the way in which we earn income with the activities that give our life meaning. Frase, along with a select few, actually encourage the end of labor. Benjamin Hunnicutt, a historian at the University of Iowa, believes that America has an irrational belief in work for work's sake. “Purpose, meaning, identity, fulfillment, creativity, autonomy—all these things that positive psychology has shown us to be necessary for well-being are absent in the average job.” This may all very well be true—but people need to eat, don't they? Most jobless people today aren't relishing in their newfound freedom to do meaningful, creative things—they are worrying about where their next meal will come from, and how they will their bills. Automation poses serious risks towards the livelihood of many of millions of American workers (and workers worldwide). The four most common jobs in America today—salespersons, cashiers, office clerks, and food servers—are all jobs that are at risk of being replaced completely by automation. McKinsey Global Briefing, in a 2017 executive briefing, proposed several potential steps to take in our increasingly digitized and automated world. These include a universal basic income, an evolved education system to improve STEM learning in young children, and policy changes aimed at incentivizing corporations to treat human capital like they would any other capital. ■

AMERICA's Trade Frustrations: Could the Trump Presidency be

You've heard it before—economists all over the world have lambasted the President's tariff initiatives. In fact, out of 60 economists surveyed by Reuters, not one believed that the tariffs would benefit the U.S. economy in the long run. The negative impacts of the tariffs have already begun to impact the country. By analyzing how the tariffs interplay with macroeconomic conditions—inflation and wage growth—we can make some conjectures as to the effect of the tariffs on the Trump constituency and therefore on President Trump's 2020 presidential run.

Let's examine Mid-Continent Nail, the largest steel nail manufacturer in the country. While its blue-collar employees are based in Missouri—deep in the heart of Trump territory—Mid-Continent operates under Mexican ownership and imports its steel from Mexico. Therefore, its production material is subject to Trump's 25% steel tariff. As a result, Mid-Continent's input costs have risen dramatically, and the company's prospects—including the job security of its American workers—are shaky.

There is something to be said about the short-run costs faced by the losers of free trade, many of whom are blue-collar workers and largely turn out for the GOP during elections. By making



foreign imports relatively more expensive compared to American goods, tariffs can help prevent the decline of industries harmed by trade. While supporters of free trade may argue that the former employees of declining industries will hopefully be retrained and readapted to different industries in the long run, the pain felt from trade in the short-run cannot be denied.

As it turns out, the tariff issue is not as black-and-white as economists may make it seem. Yes, particularly on a macro-level, tariffs tend to do more harm than good in the long run as complete specialization will not occur, causing the economy to be less efficient than it could be under free trade. There is another significant effect of tariffs that does not seem to be covered enough, and is instead left in the shadows of eye-catching headlines like that of Mid-Continent Nail.

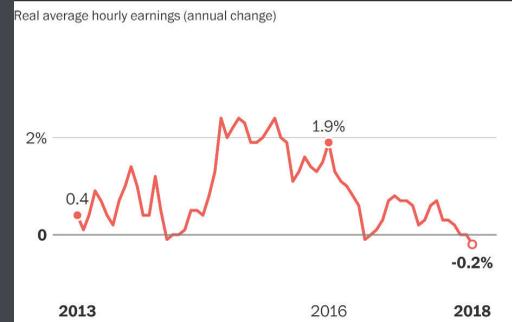
Adam Smith, a graduate student in the Economics department at UC Berkeley, explains: "Everyone seems to know what inflation is, but few people actually know how it happens, how to handle it, and how it can have both positive and negative effects on the economy and wages... Unemployment is at one of its lowest points in recent history. Because the supply of unemployed workers is so low, firms must offer increasingly higher wages to their employees. Now, these workers have more money to spend, bidding up the prices of goods and therefore adding to the inflationary pressure caused by the tariffs. We should also take into account the recent tax reform. It is my hope that it will incentivize businesses to spend more on investment goods, putting upward pressure on wages for blue-collar workers in the short-run, and expanding the potential of our economy to produce goods and services in the long-run."

Now, here comes the big question: in the short run—before our economy has the chance to expand significantly and before the end of the 2020 election—will the rise in wages of workers be eroded by the rise in prices from tariffs? In other words, will wage growth be wiped out by inflation?

The future is daunting. This past summer, inflation hit a six-year-high, partially attributed to a jump in the cost of energy. Overall, a 2.9% cost of living increase outpaced a 2.7% in wages for the year; the growth of

Nailed By Its Own Steel Tariffs?

by Arsh Vishen



Source: The Washington Post

real average hourly earnings (accounting for inflation) was in fact negative recently. As the Bureau of Labor Statistics reported, people are paying more for housing, healthcare, and automobile insurance. With new tariffs potentially on the way, the cost of living may increase even further.

We must wait and see how the economic future will affect the Trump constituency and, come 2020, his presidency. Having promised middle America and manufacturing workers higher wages during his 2016 campaign, inflationary pressure from his own policies could make keeping his promises more difficult. Even more dangerous for the Trump presidency, if a significant number of U.S. manufacturers are in the same situation as Mid-Continent Nail, many blue-collar workers will be hurt by Trump's policy through potential layoffs. America's "forgotten" may remember how, despite constantly seeing news about the booming economy and falling unemployment rates, their manufacturing jobs vanished. ■

THE CLEAN ENERGY CONUNDRUM



How Brown's Goal for a Renewable California by 2045 Comes at a Cost

by Odysseus Pyrinis

Just as the Trump administration and the EPA are relaxing environmental regulations, California, under the leadership of Governor Jerry Brown, is actively pursuing a policy aiming for cleaner energy. In a bold move in defiance of the Trump administration, Governor Brown signed a bill in September 2018 that set the goal for California to be sustained solely on renewable energy by 2045. According to this bill, California should be generating 60% of its energy using wind, solar and other renewable energy resources by 2030. While this is not a mandate, and thus there is no penalty if this goal is not reached by the specified dates, the goal of this bill is for California to achieve carbon neutrality by 2045. However, the feasibility of this new environmental initiative along with its cost implications are the underlying topics that will either support or undermine this goal.

Opponents to Governor Brown's position of radically altering California's energy sources raise economically centered concerns regarding the price of electricity. If California were to accomplish its goal of solely relying on renewable energy sources, the price of electricity in the state will skyrocket. This negative effect was cautioned by Bill Brough, a Republican assemblyman from Orange County—"One fact you cannot dispute: this does increase the cost ... You cannot dispute that this is going to be passed on to the ratepayers." It is not difficult to understand why a price increase in the electricity rate paid by consumers would be a side-effect of generating all of the state's electricity from renewable energy sources. But let us first consider the positive outcomes associated with Governor Brown's goal.

Given this political climate, political figures such as Governor Brown see it only necessary that states individually take matters into their own hands and continue the push towards greater renewable energy source reliance. Should the Governor's goal be realized and California is capable of producing all of its energy from renewable sources by 2045, the annual output of carbon dioxide in the United States would be significantly decreased. Demonstrated in the diagram below, California is the second highest emitter of carbon dioxide behind Texas at around 360 million metric

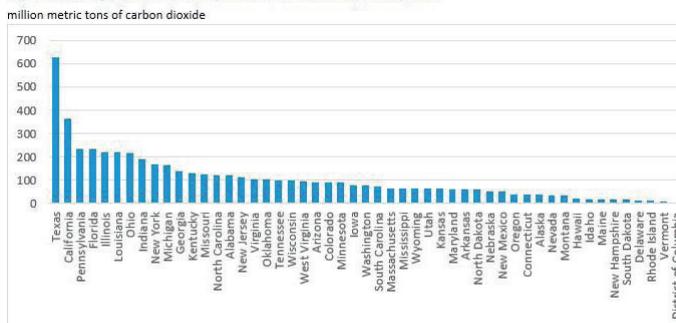
tons in 2015. Most of the carbon dioxide emissions from California are from petroleum, 64% or 234 million metric tons of carbon dioxide, rather than coal, which accounts for only 1% or 3 million metric tons of California's emissions.

Given the best-case scenario in which California is able to switch all of their electricity generation to renewable sources, California would no longer be contributing to the emissions of energy-related carbon dioxide. This would result in a reduction of approximately 370 million metric tons of carbon dioxide emissions. Though in appearance this best case scenario appears as a significant amount, its large-scale effect is negligible considering that in 2017, the total US energy-related carbon dioxide emissions was estimated at 5.14 billion metric tons.

Despite the decrease in carbon emissions that would result should California succeed in generating all of its electricity from renewable energy sources by 2045, there are opponents to this goal who highlight the downsides of pursuing such a large-scale makeover of California's power grid. In 2015, California produced approximately 44% of its electricity using coal, oil and natural gas. Additionally, another 30% of California's electricity consumption in 2015 was from out-of-state sources. The proportion of electricity that California imports from other states has only increased. In 2010, California imported 25% of the energy it consumed. In 2017, California imported 33% of the energy it consumed. To achieve 100% renewable energy reliance, California would have to reverse this trend of increasingly importing electricity from surrounding states and become fully self-sustained in terms of electricity production and consumption. This goal is more easily said than done, especially considering that current renewable energy sources and the technology that taps into these renewable reservoirs of energy cannot achieve the energy production density or consistency of fossil fuel power stations.

What are the implications of building up the renewable energy power sources and abandoning almost half of the state's current electrical generation infrastructure? It follows the argument used by Bill Brough and his warning about increasing electricity rates that consumers will face. The Energy Information Administration (EIA) has published data estimating the overnight capital cost and operational cost for different power plants. The overnight cost represents the cost of building that powerplant overnight. As of November 2016, onshore wind farms had an overnight capital cost of \$1,877 per kilowatt (kW) and solar farms had an overnight capital cost of around \$2,600 per kW. Likewise, onshore wind farms had an operational cost of \$39.70 per kW-yr and solar farms had an operational

Figure 1. Energy-related carbon dioxide emissions by state, 2015



Source: EIA, State Energy Data System and EIA calculations made for this analysis.

cost of approximately \$23.40 per kW-yr. In 2017, California produced approximately 206.3 TWh of electricity, from which approximately 90 TWh was generated using fossil fuels, mainly natural gas. In that same year, only 12.9 TWh was generated from wind and 24.3 TWh from solar. Renewable energy sources produce approximately half of the output produced from fossil fuels. This demonstrates a significant infrastructure gap that must be developed by 2045, imposing significant initial capital costs to construct these new power generation facilities. Consequently, with increased expenditure of the firms producing electricity in California to meet the 2045 goal, it follows that the price for electricity will also increase, the primary argument used by opponents to Governor Brown's approval of the 2045 goal.

As demonstrated by the figure below, the initial capital investment of these new renewable technologies will be the largest barrier to entry, a barrier that consumers are likely to pay. For instance, coupled with this new push for renewable energy reliance by 2045, an initiative was passed that required all newly constructed residential homes in California to be equipped with solar panels—an additional cost that will surely increase the initial market cost of housing sales, thus creating a larger barrier to entry for consumers wishing to purchase housing. In this way, the brunt of this initiative will be faced, not by those who can afford it, but by those who cannot.

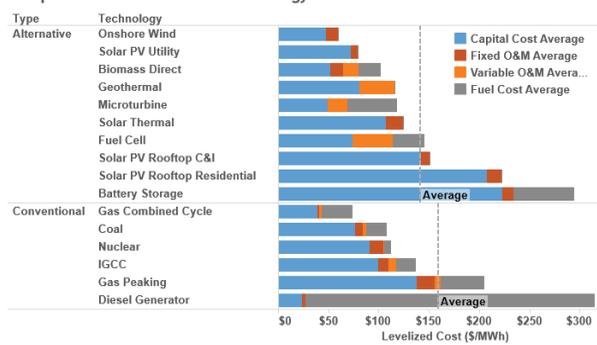
It is not difficult to understand why the consumers will bear the burden of the cost to build more renewable energy power stations. Electricity is an inelastic good. Factories will still need electricity to run, businesses will still need their computers working, and civilians at home need electricity for everyday necessities such as keeping the refrigerator running, regardless of the price of electricity. Thus, to cover the cost of developing this new infrastructure, electricity firms will pass most of the burden to the consumers, increasing electricity rates. Depending on the severity of this increase, there could be a significant impact on private industry. If the cost of electricity is significantly raised, the operational costs of factories and businesses will also increase, cutting into their profit margins. Consequently,

businesses would be less inclined to hire more employees that would in turn utilize more electricity in the office. The cycle is circular until a new equilibrium is reached.

Nevertheless, some proponents for the Governor's plan have suggested that a means of controlling the rise of electricity prices is to create a regional power grid in which neighboring states would be able to more easily share their electricity with California and likewise, California share their electricity with regional states. Governor Brown is pushing hard for such a plan to be realized; however, even the Governor faces opposition from his own side. Environmentalists supporting the switch to renewable energy sources away from fossil fuels are not supportive of the idea for a regional power grid. They do not believe it is right for California to freely use electricity from other states that was generated using fossil fuels. However, even Governor Brown recognizes the danger of not pushing forward with this plan, stating that "those who don't want it are going to be foisting very high prices on California, and I think there will be resistance to that ..."

The plan to regionalize California's power stems from the idea of creating a single authority that will manage most, or all, of the Western states' power grids. Currently, California's power grid is managed by the California Independent System Operator which oversees the market in which companies buy and sell power. It is estimated that California moving under a single regional manager would save consumers as much as \$1.5 billion a year. The regional manager would lead to greater efficiency in managing the sources of electricity in the western grids. Under the current system, lacking a single regional manager, California has to pay other states to use its electricity during times when wind or solar farms produce too much electricity and risk causing a blackout. Under the single regional manager, the sharing of electricity across states would be more efficiently managed and would not incur an extra cost for California. Governor Brown has been attempting to push a bill through the state legislature to approve a central regional manager for California's power grid; however, the Governor has been continually faced with opposition, simply because state legislators believe that such a system would encourage the use of fossil fuels rather than continue the transition to greater dependence on renewable energy sources. Should the regionalized power system not be implemented, but California continues to pursue the 2045 goal of 100% energy reliance on renewable energy sources, it can be expected that the consumers of electricity in California will be seeing larger bills. In the end, since the goal set by Governor Brown is not a hard mandate and there are no consequences for failing to reach it, it is entirely possible that California will not achieve its dream of significantly greater reliance on renewable energy sources as individual energy firms fail to build the necessary infrastructure to initiate the transition. ■

Components of levelized cost of energy



Source: Lazard's Levelized Cost of Energy Analysis—Version 8.0, September 2014
<http://www.lazard.com/PDF/Levelized%20Cost%20of%20Energy%20-%20Version%208.0.pdf>



Standing on the Shoulders of Children

The Economic Case Against Child Labor

by Ariana Jessa

Child labour is often a term we see smeared across a sensational news piece, denouncing governments for infringing on human rights. Yet, despite the moral objections, it is still common practice in many countries today. Some argue that the practice enhances economic growth. If society chooses to stand on the shoulders of children in the name of economic growth, there must be overwhelming material benefits for the wider society. However, this is not the case, as child labour actively detracts from economic development. This, compounded with human rights concerns, makes it clear that child labor must be abolished.

Child labour is defined by the International Labour Organization (ILO) as the work of an individual under the age of 14 that detracts or acts as a substitute for education. In practice this looks like children working in factories, likely in low-skilled manufacturing jobs. The main arguments for child labour in developing economies try to spin the practice as an opportunity for children to “grow.” This is backed by the theory that it allows younger individuals to support their families and gain work experience before they transition into the workforce. In theory, this makes society at a production level more effective, while also breaking the poverty cycle. However, this is far from reality. In fact, child labour inhibits skill development and limits the expansion of local labour markets, effectively stunting economic growth. In Egypt, for example, researcher Jackline Wahba shows that the children of child laborers are likelier to become child laborers themselves. This already demonstrates that in the long term, child labour does not bring people out of poverty; it reinforces it.

“The work the child does, given the scarcity of their time and energy, inevitably ends up stifling both their physical and intellectual development.”

The work the child does, given the scarcity of their time and energy, inevitably ends up stifling both their physical and

intellectual development. This limits the child’s ability to cultivate skills that will help them get a higher paying job with better working conditions. What this inevitably leads to is a lack of social mobility that comes only with education and skills training, which perpetuates intergenerational child labour. This has implications beyond the child’s future family, as a large demographic of low-skilled workers in the labour force prevents development of economies that rely on resource and manufacturing industries into one which is more profitable, where higher skilled and more service-based industry is relied upon. This is essential to development, and cannot occur in a system that endorses child labour.

The influx of labor, especially young and impressionable kids, drives wages down, because there are more individuals willing to work at a given wage, and this increased competition for jobs drives down wages. Some children work 12-hour days for 20 cents per day, which is significantly less money than their adult counterparts are paid, and companies will be incentivized to hire youth because of this. This then perpetuates its own cycle: child labour leads to lower wages, which leads to the need of families to get their children employed. Parents who earn wages under the poverty line are most likely to send their children to work. The abundance of unskilled workers creates a society that complements technology that does not require skilled management. This is because low-skilled workers cannot become specialized due to their lack of education, which limits the efficiency needed to create more high-skilled, technologically intensive industries. The more child labour there is, the more unskilled industry is perpetuated in an economy, which results in lower demand for countries to adopt technologies that utilize high-skilled labour. For example, researchers Richard Hornbeck and Suresh Naidu showed that the American South’s reliance on exploited low-skilled labor, largely from African-Americans, delayed agricultural development in the region. This demonstrates that a reliance on low-skilled labour, slows down economic progress. Because of child labour, human capital cannot accumulate, stunting a country’s development.

Developing economies would benefit greatly from strictly regulating the practice of child labour in their country. The ramifications that inhibiting youth development has on intergenerational poverty, and the development of industry, far outweigh marginal benefits that can be gained from child labour. Standing on the shoulders of children is not only an abhorrent practice, but also one that inhibits societal growth and economic development in its totality. ■

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“The Sino-African Relationship: An Empirical Study of the Effect of Chinese Foreign Direct Investment on Illicit Financial Flows in Africa”

Foreign Direct Investment (FDI) in the African continent, particularly Chinese-led investment, has been criticized in recent years for lacking adequate regulatory frameworks and enabling high-level corruption. This is an alarming criticism given that Beijing is today a major provider of FDI capital in Africa, and at the same time, African countries are estimated to collectively lose US\$30 to US\$60 billion to illicit financial flows (IFFs) every year. However, there is little systematic evidence to support these criticisms and determine whether anecdotal evidence reflects the true effect of Beijing's investments. This study aims to address that gap by providing causal estimates of the effect of Chinese FDI on illicit financial flows (IFFs) in recipient African countries. We use an instrumental variable strategy that exploits variation in FDI volumes due to two factors, exogenous variation in Chinese steel production and the cross-sectional variation in a country's likelihood of dealing with Chinese firms. We find that a \$1 increase in Chinese FDI increases the volume of illicit financial flows by \$3.72, a result that is statistically significant. Conversely, we find no evidence of FDI triggering the first onset of illicit financial activity; instead, FDI appears to exacerbate existing volumes of IFFs. Our findings also suggest that the effects of FDI are most pronounced in the year in which it is received.

Fatima Ezzahra Daif, Yale-NUS College Class of 2018

“Time-Discipline and Southern Railroads, Increased Watch Availability Raising Labor Costs”

[...] An analysis of post-Civil War railroad expenses for a railroad operating in the reconstructing American south from 1866 to 1886 indicates that the increased availability of watches raised labor costs for firms due to certain workers developing an innate sense of time-discipline, which enhanced their bargaining power and may have resulted in higher wages. Applying a quasi-experimental design allows for the evaluation of two hypotheses to support this thesis:

- The labor cost to the railroad for employees working with an indirect connection to clock-time increased at positive, statistically significant rate with respect to higher levels of watch availability.
- The labor costs to railroads for employees working with either direct or nonexistent connections to clock-time did not increase at positive, statistically significant rate with respect to higher levels of watch availability.

[...] A corresponding qualitative assessment of primary source documents identified exogenous societal factors that were incorporated into a regression analysis to account for confounding effects. The coefficient results show labor costs increasing in response to technological change[.]

David Abraham, University of Chicago Class of 2018

“Real Exchange Rate Volatility and Economic Growth: A Panel Data Investigation”

The study aims to investigate the impact of Real Effective Exchange Rate (REER) volatility on economic growth for a set of 33 developed and developing economies, using panel dataset ranging from 1970 to 2016. Stemming from a precise measure for exchange rate volatility, results of various Fixed Effects and System GMM models suggest that increased (decreased) REER volatility, controlling for trade and misalignment and contingent on diverse model specifications, leads to a negative (positive) effect on economic growth for developing countries. A relationship cannot be ascertained for developed countries. In addition, a significant impact of the REER level and its interaction with volatility is found, while neither a significant interaction of volatility with trade nor terms of trade shocks is found.

Federico Pessina, University of Warwick Class of 2018

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