



The Long-Run Effects of Disruptive Peers

There's a great deal of research on how classmates can affect test scores and discipline in school, but what about later in life? In *PERC's Working Paper 1605*, *PERC's* Rex Grey Professor of Economics Mark Hoekstra, Scott E. Carrell of UC Davis, and Elira Kuka of Southern Methodist University, look at the long-term impact of childhood peers, particularly with respect to labor market outcomes in adulthood.

The authors document the existence of long-term peer effects by estimating the effects of elementary school peers on later test scores, college degree attainment, and earnings in adulthood. They do so by linking administrative and public records data on elementary school students from Alachua County, Florida, to long-term educational and earnings records. These data identify children whose families are characterized by domestic violence, which has been shown to be a particularly good proxy for a disruptive peer. In previous research, Carrell

and Hoekstra (2010, 2012) found that exposure to these peers significantly disrupts contemporaneous achievement and behavior, reduc-

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ing achievement by one-fortieth of a standard deviation, and increasing disciplinary infractions by 17 percent. These findings are consistent with a large body of literature documenting children exposed to domestic violence are associated with a number of emotional and behavioral problems. Specifically, boys from

these families are most disruptive to contemporaneous peer achievement because they are significantly more likely to exhibit externalizing behaviors.

This study measures disruptive peers in three ways: proportion of peers exposed to domestic violence, male peers exposed to domestic violence, and peers from families with as-yet-reported domestic violence. The students linked to domestic violence are excluded from the measured achievement data in order to measure *other* students' achievements in cohorts with more disruptive peers. The authors focus on three sets of outcomes. First, the impact of disruptive peers on test scores during elementary school. Then, they ask whether the impacts of those disruptive peers are evident in middle and high school test scores, college attendance and degree attainment, and labor market earnings as adults ages 24 to 28.

Results show that exposure to disruptive peers in childhood has

important long-run consequences for both educational attainment and subsequent earnings in adulthood. Exposure to a disruptive peer in a class of 25 during elementary school reduces earnings at age 26 by 3 to 4 percent. Just one year reduces the present discounted value of classmates' future earnings by an estimated \$80,000, suggesting large efficiency losses due to disruptive students.

In addition, the uneven distribution of disruptive peers by children from lower, relative to higher, income households explains around 5 percent of the rich-poor earnings gap in adulthood. This has significant implications for explaining socioeconomic disparities in earnings. For example, adults from this sample who grew up in low-income households (as identified by subsidized lunch status) earn roughly 70 percent of what adults from high-

er-income households earn, though they are exposed to about 50 percent more disruptive peers as identified by this paper.

Overall, these findings illustrate

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the importance of peer composition in determining long-run educational attainment and labor market outcomes. This is significant,

because while a large existing literature has shown that peers impact contemporaneous learning, it was unclear whether the effects persisted for years afterward. If peers in early childhood impact outcomes in adulthood, then that underscores the importance of concerns regarding changes in peer composition in the classroom.

By documenting the long-term impacts of disruptive peers, the results demonstrate the potential of policies that could attenuate the impact of disruptive peers, suggesting that the social benefits of a reasonably effective policy are likely to be substantial. Other recent studies have highlighted the importance of addressing teacher quality as a way of improving long-run productivity and earnings. Results in this study emphasize the importance of overcoming disruptive peers as a way of improving long-term outcomes.

Vehicle Miles (Not) Traveled: Fuel Economy Requirements, Vehicle Characteristics, and Household Driving

Simply put, the less Americans drive, the less gas they use. More driving, more gas. The negative effects of gasoline consumption are well-documented, ranging from local effects of automobile pollution on individuals' health to the global impact of vehicle emissions on climate change. So what makes households drive less? In *Working Paper 1607*, *PERC's* Rex Grey Professor Mark Hoekstra, *PERC's* Professor of Free Enterprise Steven L. Puller, UC Santa Cruz's Jeremy West, and Texas A&M University's Jonathan Meer, examine the effects of drivers' behaviors on gasoline consumption.

To combat the negative effects of consumption, the U.S. could increase taxes on gasoline, but this is a policy solution typically met with much political resistance. Rather, U.S. transportation policy primarily addresses these negative effects by regulating the fuel efficiency of new vehicles via Corporate Average Fuel Economy (CAFE) Requirements. The government has set ambitious new targets for fuel economy, projecting the average fleet-wide fuel economy of new light-duty vehicles to be 46.2 miles per gallon by 2025. In the absence of behavioral changes, these

projections amount to substantial reduction in gasoline consumption.

However, policy analysts argue that increasing the fuel economy of the vehicle fleet will not necessarily lead to a proportionate reduction in fuel consumption. The intuition underlying this concern is straightforward: because vehicles with higher fuel economy travel farther per gallon of fuel, the cost of driving each mile is lower in fuel-efficient vehicles. This lower cost-per-mile may increase the quantity of miles traveled. This has been called the “rebound effect.” In fact, the government has assumed a rebound



effect of 10% when calibrating the new CAFE standards.

There are several reasons that this rebound effect might be overstated. First, in contrast to fuel prices, fuel economy is highly—and typically negatively—correlated with other desirable vehicle attributes, such as horsepower and safety. Thus, while both gas prices and fuel economy alter the cost per mile of driving, fuel economy restrictions may also affect the benefit per mile traveled.

In this study, Hoekstra, Puller, West, and Meer seek to quantify this effect where previous researchers have struggled. They use Texas household data from “Cash for Clunkers,” a two month long economic stimulus program in 2009 that encouraged households to buy more fuel-efficient vehicles. Households that owned a “clunker” with an EPA-rated fuel economy of 18 MPG or less were eligible for a subsidy towards a new vehicle with more fuel efficiency.

The authors compare the fuel economy of vehicle purchases and subsequent miles traveled of barely eligible households to those households that were barely ineligible. They find that the program’s fuel economy restrictions lead consumers to buy cars with lower cost-per-mile—increasing driving, but they also bought smaller and lower performing cars, which lead to less driving. Their finding, of no rebound effect, is directly relevant for policies such as CAFE given that auto manufacturers are likely to “downsize” the new vehicle fleet by selling smaller cars than they otherwise would, in order to comply with the new set of CAFE standards.

These results have implications for evaluating the welfare comparisons frequently made between price-based policies such as a gasoline tax, and quantity-based regulations like CAFE. This paper makes an important point: extensive margin policies can have countervailing effects on intensive marginal utilization decisions. One effect of increasing fuel economy is captured by a price elasticity of driving—altering the fuel efficiency of the fleet reduces the price-per-mile of driving. A second effect is a vehicle-attribute elasticity

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of driving—shifting households to fuel efficient cars with less desirable characteristics can reduce the utility-per-mile of driving and thus the amount of driving. Both of these effects must be captured by a complete welfare analysis to compare a particular policy to first-best.

If future fuel economy standards require households to down size vehicles, then the standard rebound effect is likely to be mitigated due to attribute-based adjustments in driving. Using rebound estimates that hold vehicle characteristics constant can overstate the driving response to fuel economy standards. The

“policy-relevant rebound effect” includes not only how households respond to a lower price-per-mile but also the response to less desirable vehicle attributes.

Thus, the critical issue for policymakers is to assess the extent to which technological innovation will relax the tradeoff between fuel economy and desirable attributes without substantially increasing vehicle price. Historically there has been a tradeoff between improvements in fuel economy and characteristics such as horsepower, size, and weight. The question is whether this tradeoff will be strong in the future, in which case policymakers need to account for the attribute-based adjustments when making assumptions about rebound.

On the other hand, if fuel economy can be increased without large attribute sacrifices, then these adjustments are likely to be small. That being said, it is important to note that if the tradeoff is only relaxed at high prices that are outside the range of most household budgets, then many households may still face the tradeoff and choose to downsize. While it is beyond the scope of this paper to assess likely future tradeoffs, the policy upshot is clear: the assumed rebound effect that should be built into fuel economy standards needs to account for a vehicle-attribute response in driving with a realistic assessment of expected future technological tradeoffs.





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Winter 2017

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