Using the data from 1915 to 1939, Lleras-Muney claims that the change in laws regarding child education and employment influenced the education level. During this period, there was a big increase in secondary schooling. For example, the percentage of young adults with high school degrees increased by a factor of five from 1910 to 1940. There could be many factors that may have affected this phenomenon. One of them is the change in laws that forced children to attend school until some ages and for several years.

There are three laws that affected education. Compulsory attendance laws specified a required entrance age, a minimum dropout age, and also the minimum period of attendance. Child labor laws prohibited children of young age from working. Actually there was discrepancy between these two laws, so some states established continuation school laws which enforced children at work to attend school on a part-time basis. She defines some new variables. Two important such variables are childlaw and comlaw. The former is defined as the difference between the entrance age and the age at which children can start working. The latter denotes the difference between the entrance age and the dropout age.

She sets up an econometric model that explains the education level with legal restriction and other variables.

\[ ED_{ics} = \beta X_{ics} + \delta CL_{ics} + \mu Z_{ics} + \alpha_c + \gamma_s + R_{rc} + \varepsilon_{ics} \]

CL is a change in laws, and consists of several variables of interest. Other variables include individual and state characteristics, and cohort and state dummies. The regression of
education on \textit{childlaw} and \textit{continuation laws} dummy variable shows that the coefficient of \textit{childlaw} is significant. The model is also meaningful against the hypothesis that the change in laws did not have any effect on the education.

She tests some more models such as one with \textit{comlaw} instead of \textit{childlaw}, and one with decomposed two variables of \textit{childlaw}. \textit{Comlaw} is not significant, while both the entrance age and the dropout age are significant. Some specification checks are provided. One uses only the data of the years when laws data were available. Another tests the model only with the data of people who did not move to other states. All of these provide consistent results with the main model.

However, it is also possible that high education level facilitated the laws to be passed. So it is not clear whether the change in laws indeed increased the education. To prove causality of this effect, she uses three methods. First, based on the reverse causality assumption, she runs a regression of a change in laws on education and other variables. The result is that the coefficient of education is significant, and thus it is hard to say that high education level did not make the laws passed easily.

Secondly, she looks at the change in distribution of education. Running a regression of quantiles of years of education on a change in laws and other variables, she argues that the change in laws moved the distribution of education, especially more in the lower quantiles. This result also supports that the educational inequality decreased as a result of the change in laws. Finally, she runs a regression of education on a future change in laws. In most cases, the future change in laws is not significant, which implies that laws did not change as a result of an increase in education. There is an exception of the results, and it can be explained by existence of recording errors.

The conclusion of this paper is appealing. She uses appropriate data to analyze the effect of a change in education policies on educational attainment. The data focus on the years in
which secondary schooling increased by far. Education policies during this period usually aimed at an increase in the number of children who go to high school. According to this paper, the policies were successful from 1915 to 1939.

However, it is questionable how successful they were. Although the coefficient of childlaw is significant, it is not so much meaningful. The estimate is 0.05, which means that one year increase in requirement of schooling raised the educational attainment by 18 days on average. Given the fact that secondary schooling increased much, this result tells us that laws were relatively ineffective on education. There should have been factors more important than the change in laws that induced the education level to increase. She does not mention anything about it in the paper.

Data interpolation used in the paper may have biased the result. Laws data were not available for all years in the sample. She obtained only 8 years of laws data, so interpolates missing data in laws using the data of the previous year. The interpolated data are possibly different from the true data, which may cause a significant bias. It is not even consistent with linear interpolation method she uses for the other variables. She does not provide any reasonable explanation why such an interpolation method is justified for laws.

For this reason, she performs a specification test which uses only the data of the years when laws data were available. This test shows that the coefficient on laws is still significant, but its standard error is bigger compared to the original one, and $F$-statistic on laws decreases by far. This implies that the interpolated data exaggerate the effect of laws on education. Even more primitive problem is that this test may not overcome bias problem. When there are missing data, it may lead to an incorrect result even if there is no selection problem of the sample.

The econometric model used in the paper might be misleading. First, the model is linear. It is not very reasonable that laws affect education only in a linear way. Since the sample
size is large, she could have used a nonlinear model to compare with the linear model. It is also recommended to include some interaction terms of laws and some other variables.

Second, she uses too many insignificant explanatory variables. She uses 4 individual characteristics, 9 state characteristics and approximately 150 dummy variables in addition to law variables of interest. The coefficients of dummy variables are not reported in the paper. While all the coefficients of individual characteristics are significant, only 2 or 3 coefficients of state characteristics are significant. Actually, she always uses a dummy variable which represents whether the state has *continuation school laws*, but this is insignificant in every test performed in the paper.

*F*-statistic of the whole model is not reported anywhere, but it would be low when there are many insignificant variables. Reasonably, some of the insignificant variables should be excluded. It is not easy to say what result would be obtained when some variables are excluded from the model. As is well known, exclusion of only one variable can dramatically change the result. If the result does not change in this experiment, her claim would be more appealing.

The biggest weakness of this paper lies in the methods she uses to prove causality. Actually she uses econometric models in all the analyses. But econometric models are derived from the underlying theory. If the theory is correct, corresponding econometric models are also correct, but this does not mean that the theory is correct when the models are statistically significant. In other words, statistical insignificance of the models implies that the theory does not explain the real world, but statistical significance does not guarantee that the theory is correct.

She asks if the causality assumption is correct. This question is necessary to ponder on since causality might be opposite to what the model specifies, even though the coefficient of laws is significant. Out of three methods she uses, two are not appropriate. The first method
is to estimate the converse model where education affects laws. If she obtained the result that the coefficient of education is not significant, this would have supported her claim. This method fails to prove that education did not affect laws, as it is significant. I do not see why she explains too much about this method.

It is worth to mention that the coefficient of education in the converse model is likely to be positive, when the coefficient of laws in the original model is positive. It is because the models are linear and one is analytically the same with the other, although different assumptions are made on correlatedness between variables. One more interesting experiment here would be to use a simultaneous equation model where education and laws affect each other. A simultaneous equation model is not symmetric to the original model. So it is not likely to give the same result as the converse model. If it is found that the coefficient of education is not significant in the simultaneous equation model, it would also support her claim.

The second method is to look at the change in distribution of education. Although this method explains that the educational inequality decreased, it does not help explain why education is not a factor to change laws. She asserts that if laws affect education, the distribution shifts much in the lower quantiles, but a little in the upper quantiles. The human capital theory, signalling theory of education, and optional value theory support this. She argues that, in contrast, if education affects laws, the distribution shifts parallel without a change in the shape of the distribution. It is this argument that is hard to agree to.

The only thing we can say is that if the distribution shifts without a change in its shape, it would not be because of a change in laws. When it is true that education affects laws, however, the distribution of education can change to any other form. Actually the distributional shape is also likely to change in this case. She does not provide any theory that supports her argument. Considering this, it is hard to conclude that education does not seem to affect laws, from the result that there was a change in distributional shape.
Finally, she analyzes timing of changes in education and laws. Running a regression of education on a future change in laws, the coefficient is not significant. So there seems to be little relationship between the education level and the future change in laws. We can conclude that the passage of laws did not depend on whether the education level is already high. This method successfully supports her claim that causality is only from laws to education. One thing to notice here is that she could have used the opposite regression. In other words, if she set up a model where future laws depend on education and other variables, and obtained insignificance of the education coefficient, it would have supported more strongly noncausality of education to future laws.