Final Report

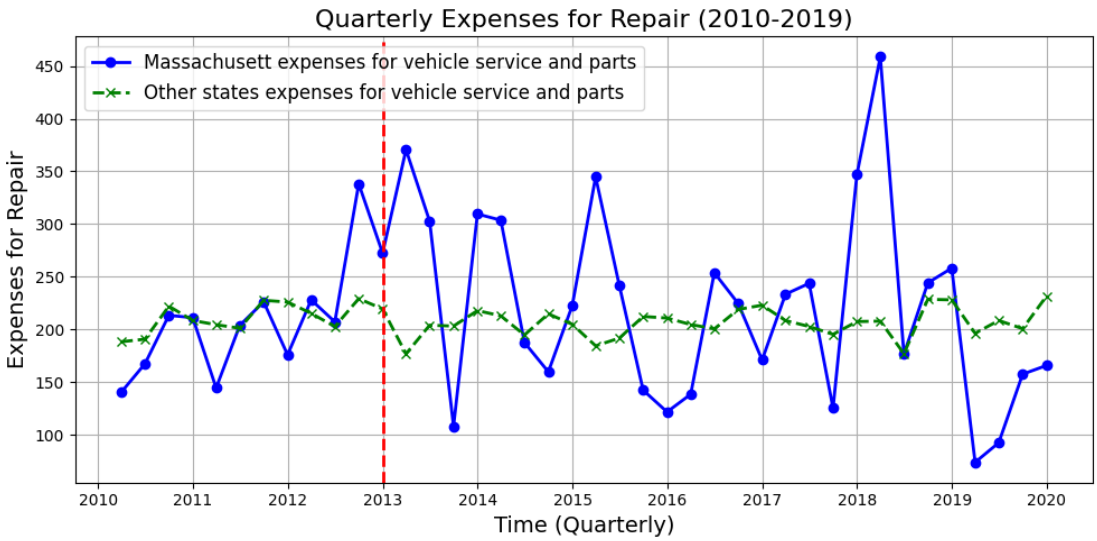
In this year of URAP program, I was assigned to investigate the effects of right to repair law in Massachusetts under a DID framework. The results are fruitful and support some of our hypothesis.

To conclude the results in the first place: my works discovered that the right to repair law did have some effects on the vehicle market in terms of the expenses for car services and parts. At the year the law passed, the households in Massachusetts incurred more expenses on vehicle services and parts. After that, there is a downward trend of the expenses for vehicle repair of Massachusetts households compared to the combination of the households who are from all other states. This difference is due to the effects of right to repair law on the vehicles markets. To further investigate, we found the driving force of the decline of the repair expenses is the decreasing costs of the repair. Observing this, we speculate that, the right to repair law allows the households to go to the third-party shops for car repair and maintenance. The third-party shops being introduced to the markets makes the market more competitive and therefore drive the costs of repair down. As such, households in Massachusetts experience lower costs of repair and maintenance of their vehicles by going to the third-party shops.

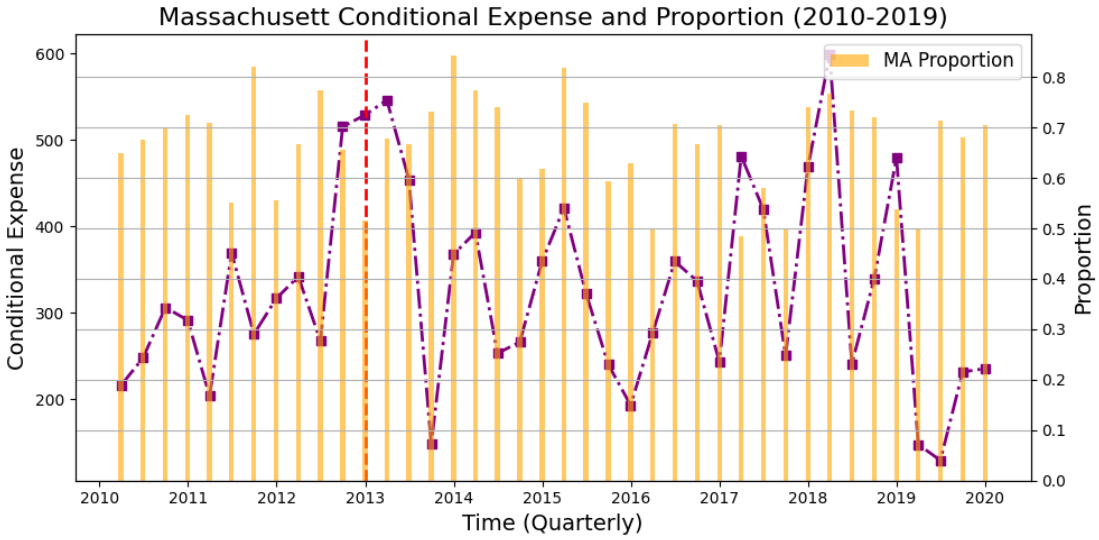
The full investigation process was done in Jupyter Notebook. I explain every detail in the markdown. The source codes are also attached.

Now, we walk through the 8 nice graphs sequentially to see what we get from the investigation:

1.

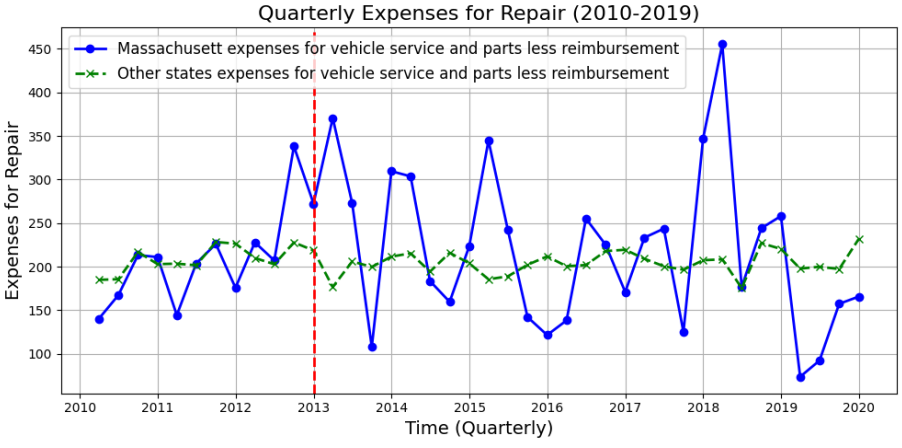


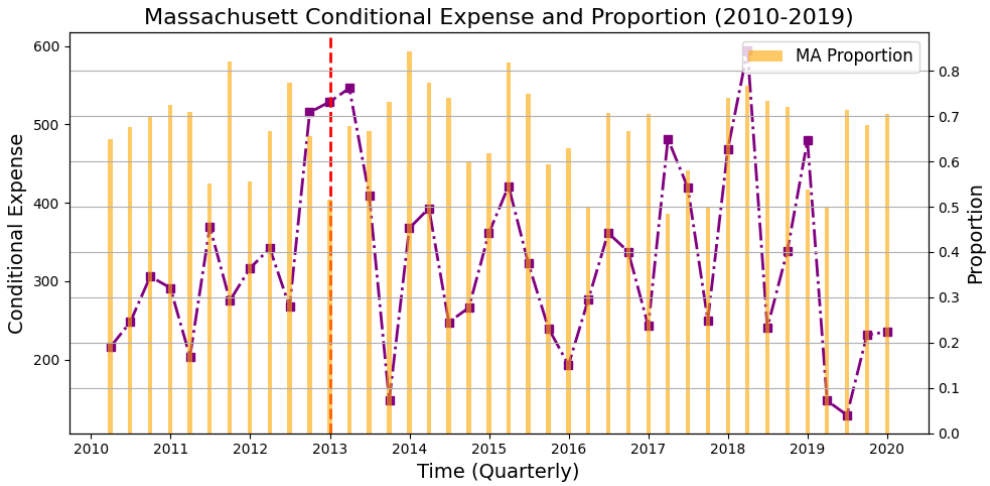
This is the graphs for the quarterly average expenses for vehicle service and parts and the quarterly average conditional expenses for vehicle service and parts. Quarter average expenses for repair give us a simple taste of the parallel trend and the DID effects. We could see from the graph that the parallel trend between Massachusetts and other states before 2013 is quite strong. After that, there is a peak in 2013 which is exactly the time when the law passed. We speculate that this is because of the "now or never" effects. The official repair shops would like to grasp the last chance to make money or otherwise their customers would go to the third-party for repair. After the law passed, the DID is not obvious since the expenses are really volatile. This is because valid observations are very limited. We will talk about how to fix this later.



The conditional & proportion decomposition support our hypothesis: the proportion of the households didn't change much. Instead, it's the increasing in expenses for repair drive the averaging expenses up.

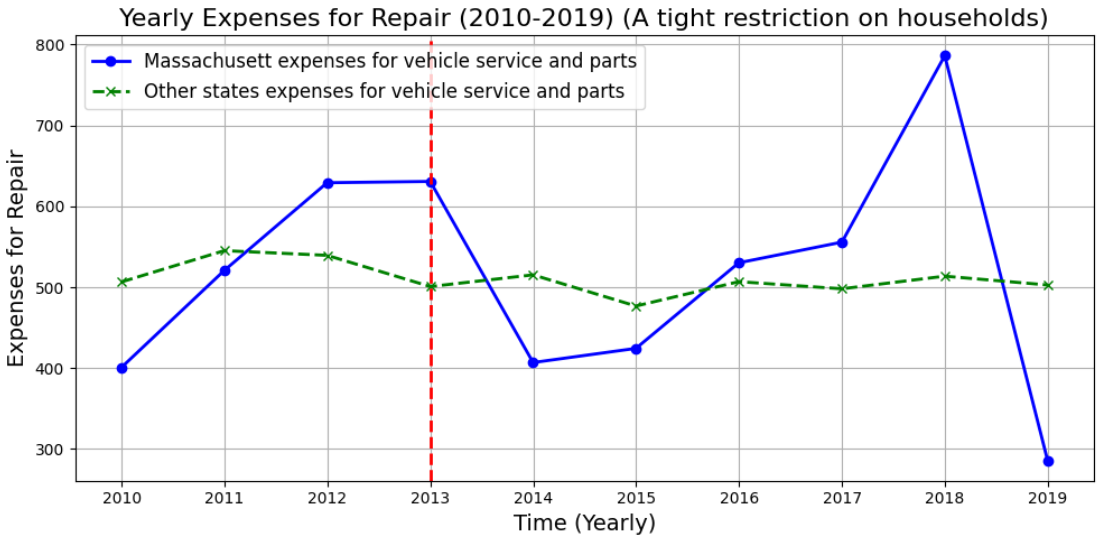
2.

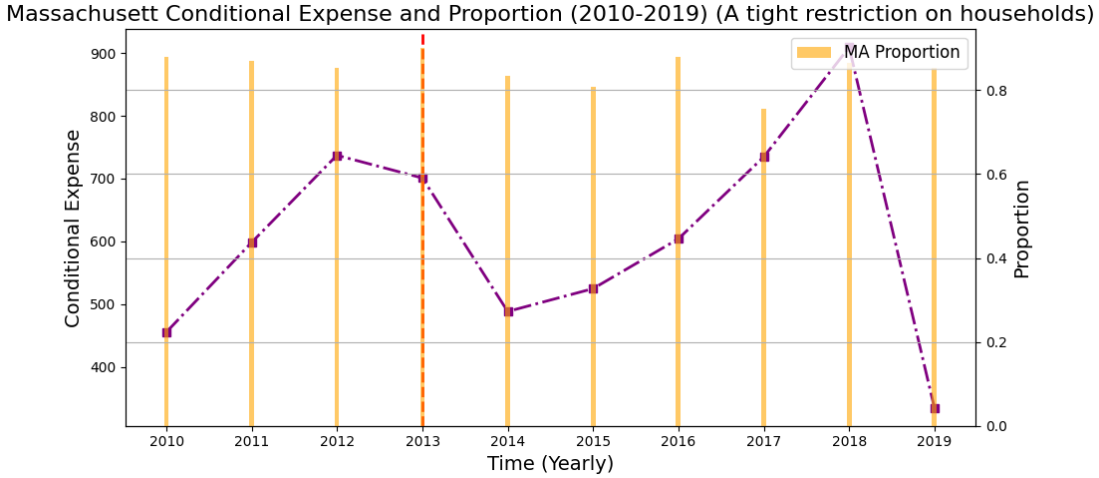




To see whether the above analysis is stable, we did the same procedures on another variable: the expenses for car services and parts less reimbursement. Theoretically, the pattern should not be too different from the above one. And the graph confirms that: it's almost the same!

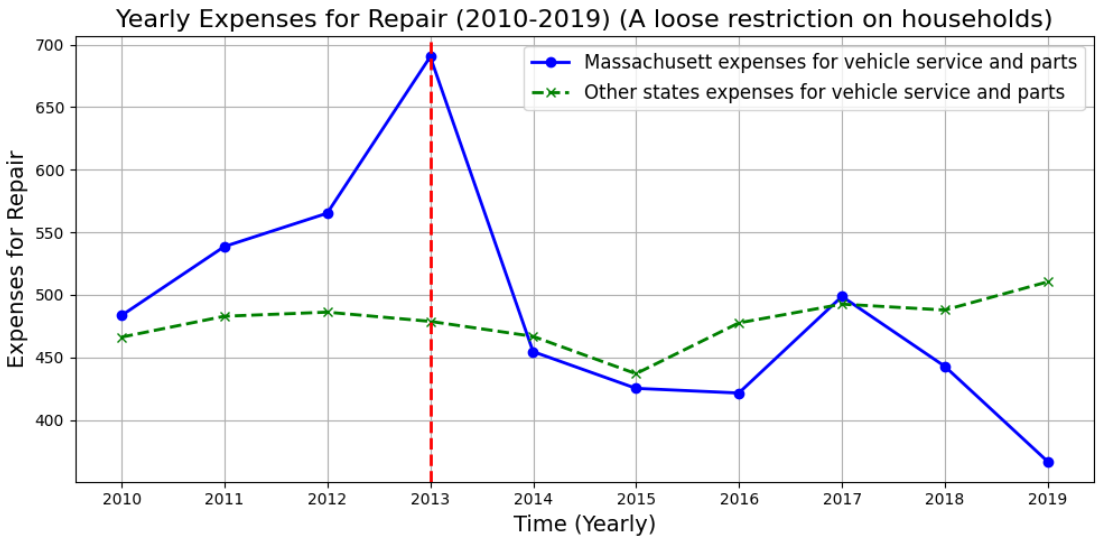
3.

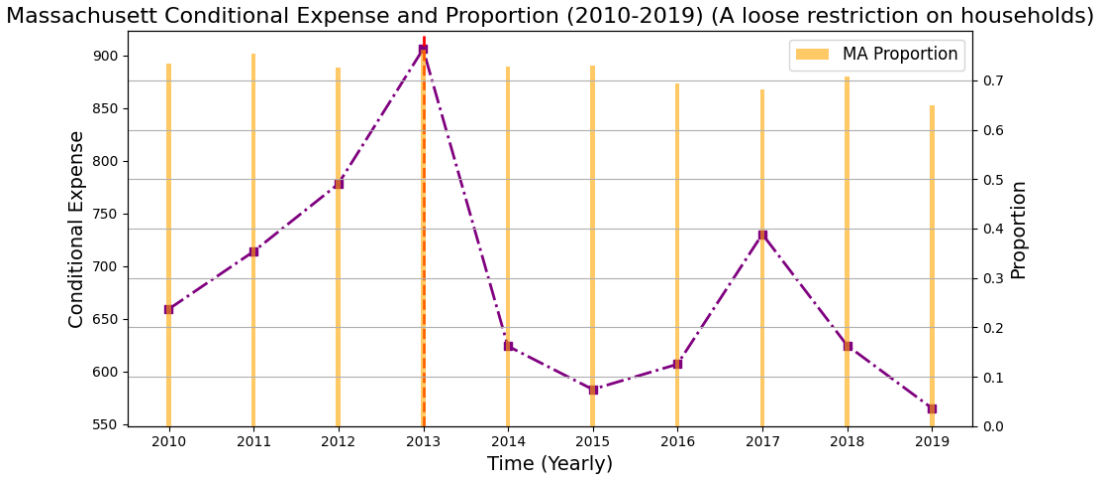




If we look the pattern in an annual level, the graphs will smoother. In this section, we pose a tight restriction on households for them to be “similar” in principle. However, the DID trend is still not clear. We could still see a peak at the time when the law passed, but there seems to be another peak in 2018 due to unknown reasons.

4.





Finally, we come to the most exciting part! If I make the restrictions on households loose, magically, the DID pattern appears very clearly. There is a clear peak in 2013, for which the reason we have discussed in part 1. Afterwards, we can see a downward trend for the average expenses for repair of the Massachusetts households, which we believe it’s the effects of the law.