Assignment-1 Econ-615

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In this essay I will compare and contrast two recent papers in labor economics using two different estimation strategies. The two papers though differ in terms of the research questions asked but more importantly they differ in the approach of the researchers on how to successfully find the correct answers using the data at hand. The papers I would be analyzing are "Explaining Charter School Effectiveness" by Joshua D. Angrist, Parag A. Pathak and Christopher R. Walters (henceforth Angrist et al) and "Matching, Sorting and Wages" by Jeremy Lise, Costas Meghir and Jean-Marc Robin (henceforth Robin et al). I will first discuss the paper by Angrist et al focusing on their motivation for the paper including the research question, empirical strategy and then the main results. Later I would do a similar analysis for the paper by Robin et al but would also compare and contrast the research strategies of the two papers at the same time. In the last section of this essay I would try to summarize my own thoughts about the two empirical approaches and give a brief account of the pros and cons of both sides.

1 Explaining Charter School Effectiveness -Angrist et al (2012)

Motivation and research Questions

The authors use data from Massachusetts school system and try to find the differences in achievement gains for students going to urban charter schools and non-urban charter schools. Previous studies had suggested that charter schools in urban areas record impressive gains as compared to non-urban charters. In this paper the authors try to uncover the causes of this heterogeneity in charter schools. The two most obvious causes of this heterogeneity are differences in students and differences in school philosophies and practices. The empirical analysis has important policy implications. Many states in the U.S. are pushing for caps on charter schools, however the U.S. Department of Education is against these caps and is trying to provide incentives to "successful charter school operators" to open up more schools. Angrist et al in their empirical analysis show that measuring the success of a charter school is a much more complex issue than simply looking at how the students score in standardized tests and it

involves sophisticated and clever estimation techniques. The research methodology in this paper can be used to evaluate the success of future charter schools while at the same time the results from Angrist et al can be used to establish charter schools with certain philosophies, like the no excuses practice, which the authors find to be more successful than others.

Estimation Strategy and main results

The authors basically employ a reduced form approach to uncover the causes of heterogeneity in charter schools. By reduced form I mean that there is no theoretical model in the paper that would predict that urban charters do better than non-urban charters. This is in stark contrast with the approach taken in Robin et al who first specify a rich theoretical model to capture the facts observed in data. The empirical strategy of Angrist et al thus relies heavily on instrumental variable estimation and is two fold. First using lottery data on admissions to charter schools the authors try to identify the gains from attending charter schools in urban and non-urban areas. The main source of identification comes from the lottery data which is used by the authors as an IV to explain attendance in charter schools. The main finding is that charter schools do better that public schools but when the same procedure is used on sub-samples involving only urban and non-urban charters they find that urban charters do significantly better than non-urban charters and the results are robust when the estimation is done for subgroups based on student demographics.

These results prompt the authors to the second stage of their analysis; what is driving this heterogeneity in charter schools. Two main sources are considered, differences in student demographics and differences in school philosophies. To identify differences in student demographics the authors use the potential outcomes framework developed in Imbens and Angrist (1994, Econometrica). A crucial assumption for this analysis is the Conditional Independence Assumption (CIA) and the authors are able to identify a local treatment effect or more specifically the treatment effect for students whose behavior was influenced by the lottery. This local treatment effect between urban and non-urban charters is then further decomposed into 3 different categories and the main findings of the authors are that urban charters push the scores of their students from a lower base to a point comparable with students from non-urban charters while at the same time non-urban charters reduce the scores of their students from a higher base. Finally using a Blinder-Oaxaca style decomposition they conclude that this effect would persist if the urban charters had a student mix similar to non-urban charters and vice versa. In the last section of the paper the authors use matching techniques to attribute the impressive gains in urban charters to their adherence to the "no excuses philosophy" which is not practiced in non-urban charters at all.

2 Matching, Sorting and Wages-Robin et al (2012)

Motivation and Research Question

The main motivation of the authors is to develop and estimate a labor market search-matching equilibrium model which can help understand the impact of labor market regulations. The most obvious policy implications are that using this model the authors can analyze different labor market interventions and calculate their welfare impacts. This is an important contribution to the theoretical literature of labor market search and matching models while the estimation part provides a novel approach to estimating structural models which cannot be estimated using maximum likelihood. The main challenge is that the theoretical model that the authors develop should be able to match key facts in the data, like unemployment hazard rates and wage dynamics. The ability of the model to capture such empirical facts is the main validity of the theoretical model and once it is achieved the authors can make interesting policy simulations from the estimated model.

Research Methodology and main results

The authors first develop a theoretically rich model of the labor market with heterogeneous agents and productivity shocks for the firms. It is an extension of the famous Diamond, Mortensen and Pissarides (DMP) model with heterogeneity on both sides of the market and complementarity between workers and firms so that there is sorting in the equilibrium. The changes made to the basic DMP model are intended so that the model is able to replicate the real world data. Still the theoretical models are limited in their replication of real world phenomenon and so one can argue that the assumptions made in the model are not realistic enough. However as I mentioned before the real test of the validity of the theoretical model is how well it captures empirical facts and not how many assumptions are made or how realistic they are.

After solving the theoretical model, characterizing the equilibrium and specifying functional forms for production and matching functions the authors use longitudinal data from 1979 to 2002 to estimate the parameters of the model. Most of the labor market equilibrium models are estimated using maximum likelihood estimation but for the model of Robin et al constructing likelihood functions is intractable. As a consequence the authors have to use Simulated Method of Moments. Before estimation they also have to introduce measurement error into the wages because wages are reported retrospectively and are likely to contain measurement error.

The issue of identification is very important in structural estimation and although the authors do not provide a concrete proof of identification, they do provide some simulations which show that the model is over-identified. Having estimated the model there is considerable discussion in the paper about how well the model fits the data to provide validation. Judging the validity of a model is a truly subjective criterion. Some critics might say that the authors

did not use statistical tests and if statistical tests were used the model would fail to be the true data generating process. At the same time one can argue that models are simplified versions of real world situations and can never be as dense as the true underlying data generating process. Given the evidence presented in the paper, I personally think that the model fits the data very well. It matches the hazard rates from different states in the empirical data while also capturing some of the wage dynamics documented in other empirical studies. At certain points the authors do admit that their model falls short, for example the model underestimates within job wage growth which is because the authors do not include human capital accumulation into their model. Nevertheless such shortcomings can be addressed in future research and theoretical models can be refined over time.

After estimating the parameters the authors find that there is significant sorting in all the labor markets except the one for unskilled workers. This implies that except for the unskilled workers, mismatch and search frictions lead to efficiency loses which can be overcome using different policies. Using the estimated model the authors are able do a very exhaustive welfare analysis. This is another major contribution of this paper because most of the literature on structural labor search models is unable to predict the impact of changes in labor market regulations on the distribution of wages and profits. Robin et al's framework allows for such an analysis and they are able to show the winners and losers from labor market policies such as introducing firing costs and increasing minimum wages. They find that the impact of minimum wage on improving efficiency is minimal and that the optimal minimum wage for the lowest skilled group is zero. Finally they also find that eliminating search frictions for the highest skilled group would lead to a 50% gain in welfare, which means that there is a need to improve matching technologies in the real world.

3 Conclusions

The paper of Angrist et al does well in trying to answer the questions it set out to explore and provides a very detailed and intensive empirical analysis in the process. As mentioned before these results do have important policy implications when considering how to expand the charter school system effectively. One can however question the assumptions made during the estimation process. More specifically the authors using this reduced form approach implicitly assume that all the explanatory variables enter linearly in this model and that there are no second order effects. Moreover in doing the LATE analysis they are only able to capture the treatment effect for compliers in the sample and one can question the role of non-compliers in driving the overall result in favor of urban charters, which is not captured. Furthermore although the authors find that urban charter schools do better than no-urban charters the quantitative impact of the estimates cannot be fully uncovered without a more structural model behind this analysis. However one can argue that this is not what the authors set out to achieve in the first place and that their only concern was to

establish that there is significant heterogeneity within charter schools and to figure out the channels of this heterogeneity and to that end they do achieve their goals.

In contrast the paper of Robin et al is highly structural. The estimation from data is guided by a very detailed theoretical model of labor search and matching with heterogeneous agents. Compared to Angrist et al the structural model of this paper allows for a very thorough welfare analysis which has significant implications for labor market regulations. In such a model the assumptions are generally questioned, but as long as the estimated model is consistent with the real world data the debate about these assumptions is not so compelling. The paper also does a good job in achieving the goals set by the authors and contributes in a very important way to both the theoretical literature on labor search models and microeconometric estimation techniques. Finally in stark contrast to Angrist et al, the parameters estimated in this paper have easy interpretations coming directly from the theory. For example the estimate of β is the bargaining power of workers in the data.

Having learned reduced form techniques for empirical analysis throughout my undergraduate studies, graduate school economics has exposed me to structural estimation for the first time, particularly in the context of labor market models. I find a compelling case for structural methods in labor economics where it is hard to find natural or quasi experiments which can help us identify the effect of labor market policies. As the analysis of Robin et al shows, one can unearth these effects using a good structural model. At the same time structural models are now also used in predicting the effects of randomized experiments and good structural models are able to match the effect of the treatment. The biggest advantage of structural estimation is that one can do out of sample predictions, something which reduced form models are not able to achieve as effectively. As my discussion throughout the essay portrays, there are pros and cons of both approaches but the correct method to use depends greatly on the availability of the data and the research questions asked. I personally feel that having a good theoretical model makes the estimation process more informed compared to a reduced form approach and can lead to more interesting insights into the data at hand.

References

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