**ECOM90003: Applied Microeconometric Modelling – Assignment 1**

1. **[8 marks] What public goods does Martinez-Bravo use as outcomes to evaluate the effect of mass school constructions? What impact (positive, negative, none) do you think/expect the school construction will have on these outcomes? Justify your response.**

Martinez-Bravo uses following public goods to evaluate the effect of mass school constructions, where I also provide my expectations around the impact in the program on them:

Martinez-Bravo uses the public goods listed below to evaluate the effect of mass school constructions. I consider this program to have a positive effect on all of them and justify why below.

* Number of doctors: increasing the education level of a village should increase the supply of students that could continue further education at university to become a doctor. I would assume the main barrier to increasing the number of doctors is the quality of supply in the labour market and not the education of village leaders.
* Presence primary health care centres: increasing the education level of a village should increase the supply of student that could go on to staff primary health care centres. Increasing the quality of education for village leaders may also increase their presence as additional education might expose them to the public health benefits of such centres when town planning.
* Access to safe drinking water: access to this service is likely to be driven by additional education for village leaders, as additional education would likely expose them to the public health benefits of this access.
* Access Garbage disposal: access to this service is likely to be driven by additional education for village leaders, as additional education would likely expose them to the public health benefits of this access.

1. **[3 marks] Explain why comparing the average value of outcomes before and after the first election in areas with a positive amount of INPRES schools may be problematic if the aim is to identify the causal impact of the mass school construction.**

There are two potential problems with this approach. The first is that it assumes those partially educated in INPRES schools don’t have a significant impact on public good provision – it is only those educated exclusively in this program that do. It also assumes that those fully educated become village heads as soon as possible (i.e. from age 25 onwards) when there are likely cultural reasons, such as the perception of inexperience, which prevents their election. While this problem will fade as this cohort ages, if they don’t become village leaders, then you can’t demonstrate the author’s desired causal impact of this program.

1. **[3 marks] Explain why comparing the average outcomes for villages with and without INPRES schools may be problematic if the aim is to identify the causal impact of the mass school construction.**

Because, to derive a causal impact, you would have to assume there are no differences between any of the villages that did have INPRES schools built and those that didn’t. In reality, there are likely to be a range of geographic, cultural of local instutitional factors which could make them more (less) (un)receptive to the INPRES program.

1. **[3 marks] What is the empirical challenge in identifying the causal impact of mass education interventions on local governance?**

A mass education intervention improves the level of education in the entire labour force as well as the education level of village heads. Therefore, the key challenge is disentangling to impact of changes in local governance (village head education levels) from this general labour market augmenting effect.

1. **[6 marks] The author implements a strategy discussed in class using two different specifications (see equations 1 and 2).** 
   1. **Briefly explain the overall strategy and the two empirical specifications used to implement this strategy.**

Martinez-Bravo’s strategy to isolate the impact of changes in local governance from this general labour market augmentation is to combine the intensity of the school construction program with two other sources of variation. The first is the fact that a cohort of students completely educated by the INPRES program does not exist until 1992, and the second is the asynchronous nature of village elections.

Equation 1 seeks to establish of the increase in the public good provision correspond to the timing of the first election post-1992. The purpose of this is to establish a descriptive relationship between the intervention and public good provision before moving onto disentangling causal effects.

Equation 2 the second equation seeks to establish the magnitude of the overall effect of this intervention. The specification of this equation allows Martinez-Bravo to disentangle the causal effect of improving village head education levels from general labour market augmenting effects.

* 1. **What is the main parameter of interest in each?**

In Equation 1: .

In Equation 2: .

* 1. **What is the interpretation of these parameters? What different purposes do they serve? Make sure you address both.**

In Equation 1, measures the relationship between the number of INPRES school constructions for each year (1993, 1996 and 2000) and public good provision.

In Equation 2, measures the relationship between the number of INPRES school constructions after the village has held its first election after 1992 and public good provision.

The difference between their purposes is that the prior seeks to measure if there is a relationship between the school construction intervention and public good provision, whereas the latter seeks to estimate the magnitude of the impact.

1. **[2 marks] What is the key assumption that must be met for this strategy to deliver estimates of causal effects of the school construction program?**

It needs to be shown that the first village election post-1992 and its interaction with the school construction program as quasi-random (i.e. as good as random). She considers this assumption holds given that after testing exogeneity with 50 different pairwise correlations, only 3 of them are significant at the 10 per cent level.

1. **[4 marks] Is the error term in the data likely to be identically and independently distributed (iid)? If not, why not? Is this a problem for inference? How should the standard errors be estimated? Justify your answer (hint: think of the structure of the datasets).**

Yes, given this is panel data set, it is highly unlikely errors will be iid. This is primarily because of the unobserved characteristics in each village independent of the intervention which would impact the provision of public goods over time.

The variable in Equation 2 should sufficiently capture most of these unobserved effects, which means that inference should not be an issue so long as these impacts truly are constant. A common issue is that error variance changes over time in panel data models as it’s heteroskedastic. If this does occur, then it can be controlled for by estimating robust standard errors.