Homework 5

Devashish C. Thakar

26 Oct 2019

Part I: Description of the problem

Over the last 20 years, Mobile Network Operators (MNOs) having been launching value added services such as mobile payment platforms to tap into the market of unmet financial inclusion of a large number of people in the emerging economies. Despite an unmet market demand (financil inclusion) meeting an innovative product (payment service), the entire process is fraught with challenges for MNOs. In this document, I focus on just one- **whether pioneering a launch in a market (emerging country) provides higher returns to the MNO or not** .This aspect is important becasue many of the emerging markets have weak financial regulatory environemnts. MNO's wanting to introduce a product such as payment platform have to negotiate many such regulatory hurdles. If they do, then they can enjoy a *First Mover Advantage* (FMA). Or they could wait for another MNO to launch their product, observe their performance in the hope that the regulatory environment will sort itself out (e.g., federal banks making regulatory provisions for use of such products and the resultant reduction in regulatory uncertainty). But subsequent launchers will not accrue the FMA.

A second related question motivated by the literature, is **whether having prior experience of launching similar products in other markets has any implication on performance post launch in the focal market**. The results are a little surprising- for pioneer launches in the focal market, MNO's with expereince fare poorly post-launch, but for non-pioneer launches in a focal market, MNO's with experience fare better. My short hypothesis sans any theoretical justification is that experienced MNO's impose their past product into a new market (pioneer launch), which is not suitable for the idiosyncracies of that market. But for non-pioneer launches, MNO's with experience utilize their experience and also observe the first mover to build a differentiated product.

Part II: Exploratory Data Anlysis

I use two datasets in this problem:

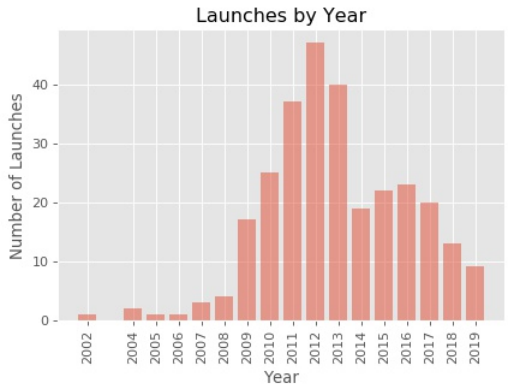
- Service launch information which provides a list and details of value-added services lauched across the world from the year 2000.This is a list of 284 services launched globally, with details of the MNO, launch quarter, country where the service is launched etc.
- Proprietary database of quarterly MNO performance from last 20 years. This includes close to 200 country level files and the MNO performance in each of these countries. I converted

this data in python from long to short, so that I have a panel dataset of MNO performance over the years. Then I combined the panel dataset for each country to and added a new column to indicate the country as well.

The above daatasets were combined using on 'MNO-Country-Year-Quarter' combination. Some cleaning of MNO and country names was required in both files, as well as matching of similar MNO names. I leave out the details of how I did all of this for the current assignment. In the end, I end up with a panel of ≈5000 observations spread across ≈30 MNO's and ≈100 countries. The n sizes in the econometric estimation presented later is much smaller, since I consider only 15 quarters prior launch and 15 quarters post launch $t = [-15, 15]$

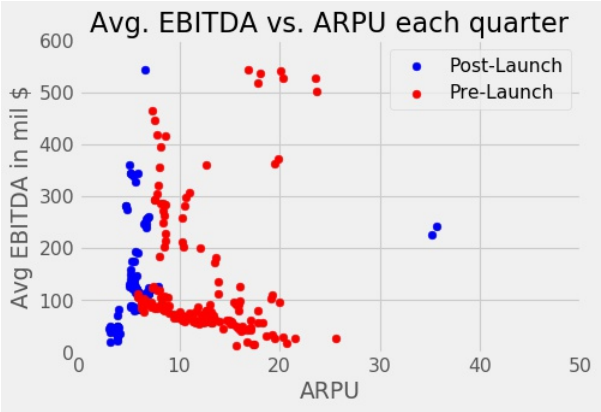
Using the services launch information, I try to look at the yearly disribution of services. I do so to ensure that my MNO performance data overlaps at least to some degree with services launched so that I have good sample sizes of the combined dataset.The distribution is as follows:

FIGURE 1: **Services launch yearly distribution**



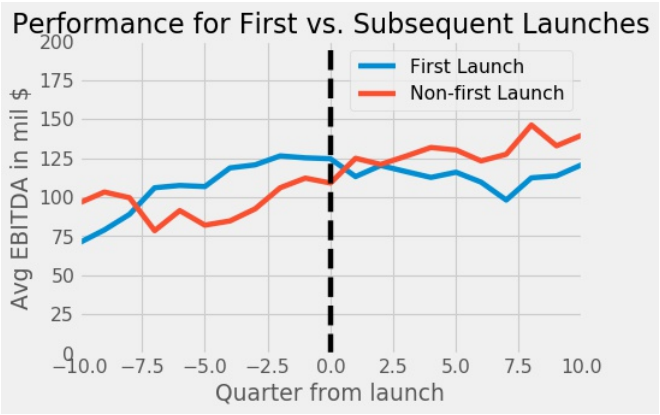
I start delving deeper into the econometric problem a little by using the combined dataset and seeing if MNO performance (measured as EBITDA) versus MNO revenue generating efficiency (measured by Average Revenue Per User), differs pre and post launch of services

FIGURE 2: **EBITDA vs. ARPU**



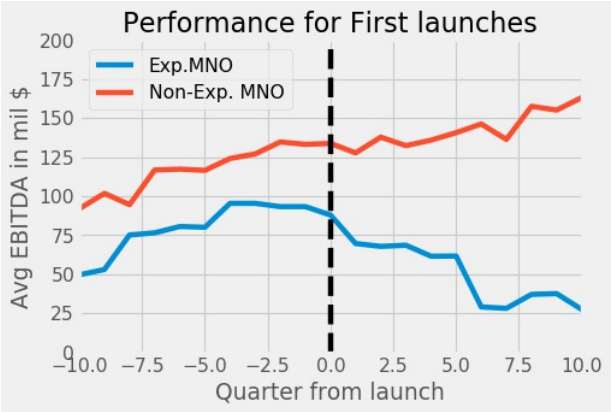
Indeed, it seems like average EBITDA shoots up without too much strain on ARPU. Next, I start looking at some analysis that will lead me to a difference-in-difference framework. I look at the combined panel dataset from above and check how MNO's with first launches vs.MNO's with subsequent launches perform relative to each other

FIGURE 3: **Performance for first vs. subsequent launches**



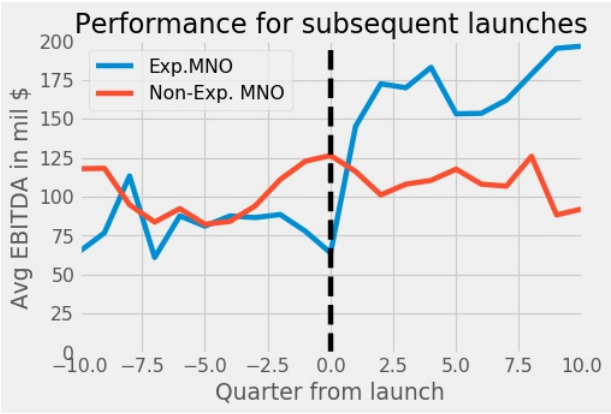
It does not seem like there is a difference in MNOs pioneering a launch vs. MNO's launching subsequently.This means that my first hypothesis stated above may not be true! Notwithstanding, I try to test this relationship in model 1 in next section. However, it gets interesting if I look at first and non-first lauches seperately, and how each interacts with MNO's prior launch experience. The data set is split by first launches and non-first (or subsequent) launches:

FIGURE 4: **MNO performance for first launches**



Experienced MNOs fare poorly in first launches. I test this relationship in model 2 in the next section. I also look at the same relationship for subsequent launches:

FIGURE 5: **MNO performance for subsequent launches**



MNOs with experience do perform better than inexperienced MNOs in subsequent lauches. I test this relationship in model 3 in the next section

Part III: Econometric Estimation

- Relative difference in performance for first launches vs. subsequent launches is estimated using the following difference-in-difference regression:

$$EBITDA_{ijt} = \beta_0 + \beta_1 After_t + \beta_2 FirstLaunch_{ijt} + \beta_3 After_t.FirstLaunch_{ijt} + \delta Z_{jt} + \tau_y + \alpha_i + \epsilon_{ijt} \quad (1)$$

- Relative performance for experienced and inexperienced MNO's for fist launches and sbsequent launches takes a similar econometric form:

$$EBITDA_{ijt} = \beta_0 + \beta_1 After_t + \beta_2 PriorExpereince_{it} + \beta_3 After_t.PriorExperience_{it} + \delta Z_{jt} + \tau_y + \alpha_i + \epsilon_{ijt} \quad (2)$$

where:

Subscript i denotes MNO,j denotes market, and t denotes time
$After_t$= Is a binary indicator denoting post launch quarter (time t)
$FirstLaunch_{ijt}$=Is a binary indicator denoting firm i has a first launch in market j at time t
$PriorExpereince_{it}$=Is a binary indicator denoting firm i has a prior launch experience at time t
Z_{jt}=Vector of market j's characteristics at time t such as population and HHI
τ_y=Year Fixed Effects
α_i=Firm Fixed Effects

- Analysis of the results: The coefficient of interest is the interaction term for all models (β_3).

  From model 1 below, β_3=5.297 (p>0.1) indicates that there is no significant difference between first launching and subsequent launching MNOs in their EBITDA performance post launch.

  From model 2 below, β_3= -56.94 (p<0.01) indicates that first launchers with prior experience in other markets fare poorly in EBITDA terms when compared to first launchers without prior experience.

  From model 3 below, β_3=26.731 (p<0.01) indicates that subsequent launchers with prior experience in other markets fare better in EBITDA terms when compared to subsequent launchers without prior experience

Table 1: Regression Results

	Dependent variable:EBITDA		
	Overall	First Launch	Non-First Launch
	(1)	(2)	(3)
After	9.201	9.246	12.047*
	(8.022)	(13.925)	(6.521)
First Launch	−14.224		
	(9.100)		
Prior Experience		30.427	16.352
		(21.941)	(10.448)
Population	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)
HHI	0.010***	0.016***	0.013***
	(0.003)	(0.006)	(0.003)
After*First Launch	5.297		
	(8.614)		
After*Prior Experience		−56.937***	26.731***
		(19.578)	(9.214)
Constant	−69.967	−149.243*	−133.260***
	(66.279)	(89.684)	(45.642)
MNO FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	921	458	463
R^2	0.965	0.970	0.944
Adjusted R^2	0.963	0.967	0.939
Residual Std. Error	59.317	74.132	34.853
	(df = 859)	(df = 418)	(df = 421)
F Statistic	394.089***	346.411***	173.760***
	(df = 61; 859)	(df = 39; 418)	(df = 41; 421)
Note:	*p<0.1; **p<0.05; ***p<0.01		