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Fluctuation of Monthly Birth Number, By Chance or By Intention

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Abstract

There are different number of births per month in South Korea. In general, there are more births in January and fewer births in December comparing to the average monthly births of the year. Does it happen by chance or by intention? This study raises three hypotheses for it – 1) random fluctuation, 2) parents' seasonal preference, and 3) parents' educational purpose. From the analysis of vital registration data from 1997 to 2018, the most appealing hypothesis was the parents' educational purpose. The author argues that the opportunity preference was stronger until early 2000 and the path dependency preference after the mid-2000s. Reflecting the rule change of elementary entrance age, the both theories support why January births are preferred by parents. The number of births from other than hospital also imply that there were intentional fabrications of birth registration. But these intentional changes become weaker recently. Especially after the abolition of guarantee of the neighborhood system at the end of 2016, the monthly birth number become stable and looks changing by chance.

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I. Introduction

In many years, the number of births on January is the bigger than any other months in South Korea. Does it come from random fluctuation or intentional choice? At this study, we will explore why particular months have more child births than other months. I suggest three hypotheses. 1) random fluctuation; It may come from different size of the month. If there is adjustment of it, the most monthly fluctuation will disappear. 2) Seasonal choices. Parents' seasonal preference – at marriage and for postpartum care may affect the number of monthly births. 3) Educational purpose. Parents may prefer specific month for their child birth date for educational purpose. I will test these three hypotheses using the raw data from vital statistics, 1997 to 2018 in South Korea, which has the information of all the registered births.

II. Random Fluctuation?

Figure 1 shows that the number of births by month from 1997 to 2018 in South Korea from the data of vital statistics which has the information of all the registered births. The more recent year is drawn in darker line. The thick black line means the most recent year – 2018. The blue oval dot comes from the year of 2009.

It clearly shows that there is fluctuation of the number of births by month. There were three peaks which were January, March and October. In 1997, 60,734 was born in January which was the biggest in the year, whereas the smallest number, 50,422 was born in June. The low points were February, June and December. Recently the line becomes straight and show less fluctuation.

Figure 1. The Number of Monthly Births, 1997-2018, South Korea
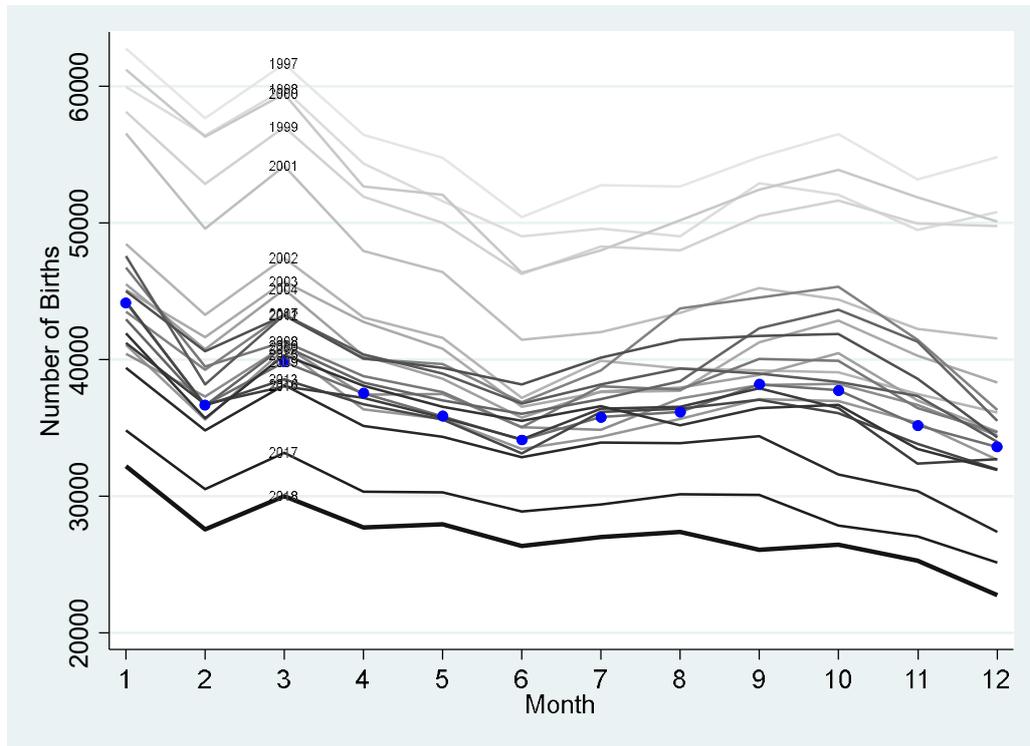
Even though the number of births per day is the same, the number per month can be different simply because the numbers of days per month are different. For example, February has only 28-29 days. It can be the reason why the number of births in February is smaller than that in January or March. At Figure 2 the number of days per month is set to 30. It shows less fluctuation.

But three things should receive attention. At first, the decline in February was disappeared until early 2000s. The number of births in February became similar to that in January. After mid 2000s, there was less births in February than in January. But it was not as much as dramatic like before the adjustment. Secondly, the smallest birth number can be found in December. The line dives to the bottom in December. Thirdly, the line became straight in recent years. It reflects the decline of yearly number of births. At the year of 2018, the line looks straight except two months – January and December.

Figure2. The Adjusted Number of Monthly Births, 1997-2018, South Korea
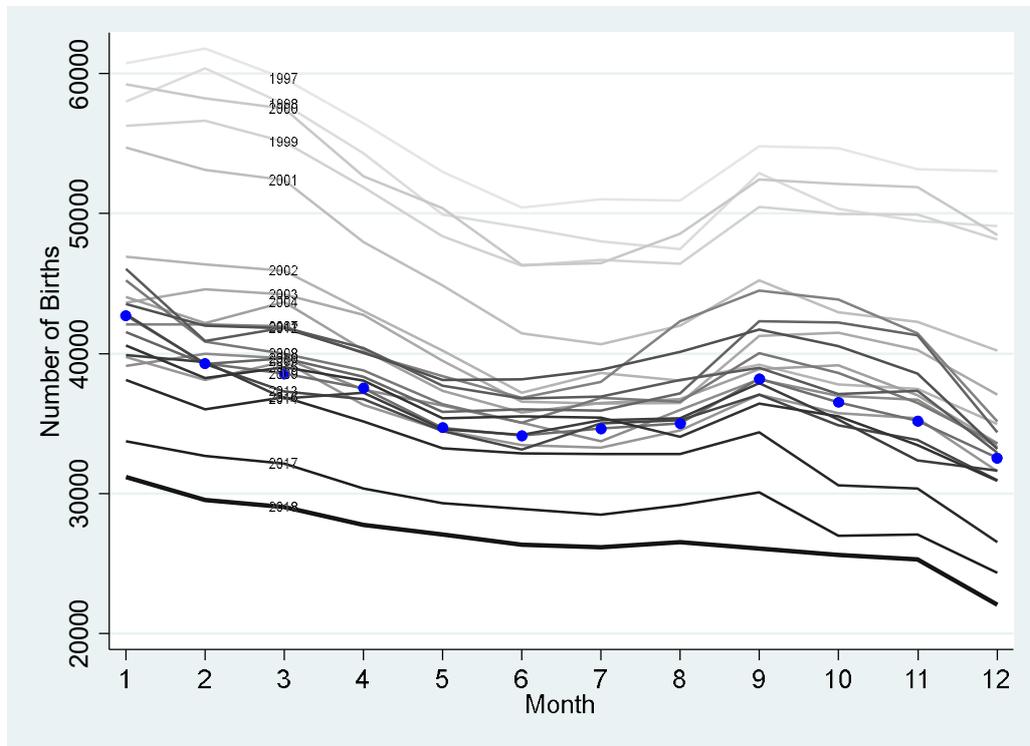
Even after neutralizing the effect of monthly size, we found the changes in monthly birth – especially in January and December. What can determine the fluctuation? At the next chapter we will test tentative answer for this.

III. By Choice: Seasonal Preference for Wedding Season or Postpartum Care

The variation of monthly birth may come from the seasonal preference of birth or precondition of birth. The first is related with Korean tradition of postpartum care. Right after childbearing, mothers need recovery time. Traditionally Korean women are recommended to avoid cold wind, and cold water and maintain their body warm. They stay inside with warm clothes and blankets. The difficulty happens in hot summer. So, if they can choose the birth date, mothers would not choose Summer – June to August. Seasonal variation due to the hot temperature is also observed in other countries (Rojansky, Brzezinski, &

Schenker, 1992; Bronson 1995).

The second is related with the number of marriages. As most of births happen in the wedlock, the number of marriages becomes one of the key indicators of fertility. Park et al(2014) argues that the monthly variation of birth in 2000-2012 was heavily debt on seasonal wedding preference. They argue that the peak of January and February comes from the more marriage at Spring and September and October peak come from more marriage at the end of year.

It is true that there is seasonal preference for wedding. But Park et al.'s argument is not supported empirically and theoretically. At first, they assume that there will be 9 months interval from marriage to childbearing. According to the report of 2018 birth statistics from Statistics Korea, the average year from marriage to the first birth is 2.16 year and to the second birth is 4.61 year. Many young coupes enjoy honeymoon for more than one year before being pregnant.

Secondly, the difficulty of linking intention to a specific birthdate comes from the uncertainty. Bongaarts and Potter(1983) argue that there is a waiting time from the fertility intention to the conception. It is natural to take more than 6 months to be pregnant from the first try. Even though the couple know woman's fertile period exactly, it will take 3-4 months because of the risk of the failure at fertilization and implantation. There is also a risk of spontaneous abortion. Even though they become pregnant at the same date, the delivery date can be different. In 2018, 92% of babies were born in 37-41 weeks of pregnancy, whereas 7.6%of them were born before 37 weeks. So, it will not be easy for couples to target the specific month when they try to be pregnant. At most, it could work as a rough guess.

Figure 3. shows two graphs for comparison. The left is for the first birth only and the right is for the second and later birth. If the wedding seasonal preference has a significant effect on monthly birth, its effect can be found only at the first birth. So, the pattern of two graphs should be different.

The relatively small number of births at summer season may be related with the seasonal preference avoiding hot summer. It is more conspicuous in the past. But for younger generations, it is not clear. It

implies that younger generation are less sensitive on the seasonal preference. Moreover, the seasonal preference theory is not suitable to explain the monthly fluctuation. That is, it cannot explain why January is preferred to December.

Figure 3. The Adjusted Number of Monthly Births by Birth Order, 1997-2018, South Korea
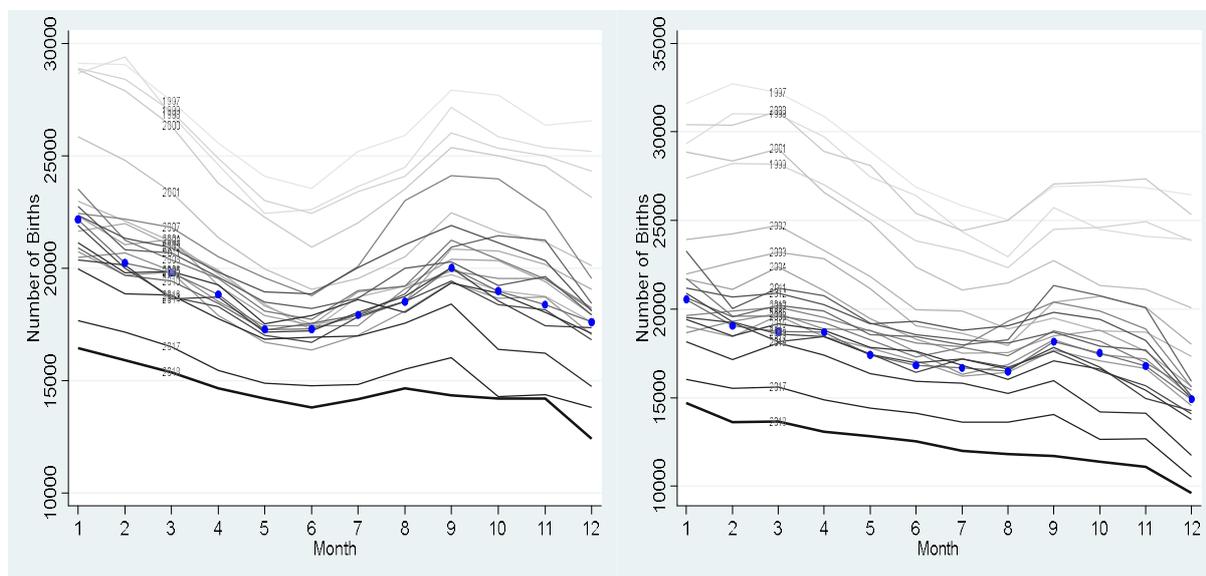
IV. By Choice: Educational Purpose

Birth date decides when the child should enter the elementary school. In South Korea, the school begins its academic year from March the first. When a child becomes at age 6, s/he should enroll to an elementary school. In the past, a child who was born in January or February can enter the school even though they are one year younger than classmates on March the first. Many parents prefer early entrance because they think it can give more chance to their children. If there is the same score at college entrance exam, the younger one becomes winner. Even though s/he fails at college entrance and should try one

more year, one-year younger child should not be frustrated because s/he saved one year and should simply accept the same age of the classmates.

But from mid 2000s, parents began to change their preference – giving more weight on path dependence. They think a child who is oldest among its classmates will show better performance and it generates a positive chain effect for the later lives. It is supported from many researches. Barnsley & Thompson(1988) showed that a child who was born at the beginning of the year were more likely to be selected as a junior hockey player because the selection was made on January. Thompson, Barnsley, & Stebelsky (1991) showed also that a child who was born on August was more likely to be selected to professional baseball player because junior baseball players were selected from August. Similar results could be found in academic achievements. Using French data, Bernadi (2014) argued that a child who was younger than classmates by month was more likely to be held back. When bullying in the school became the hot issue in mid 2000s, the path dependency preference spread quickly. As the victim of bullying is the small child who is relatively younger by month, many parents do not want to send their child at earlier ages (Kim 2007). New tendency of delaying child enrollment from children who were born in January and February were reported (Lee & Park 2008).

The change of preference brought the change of law. The national assembly revised the education law and changed the starting point of entrance age from March to January at the late 2008. From 2009, the new elementary students have the same age.

It made parents have different preference of child birth month. By early 2000s, parents prefer January and February to March or April to give more opportunity. In mid 2000s, parents' preference of January and February got weaker considering the path dependency. From 2009, parents prefer January to December for the path dependency.

At here, we need to differentiate the actual birth date and registered birth date because the school enrollment is made based on registered age. What if there are fabrication of birth date? In South Korea, birth registration is made by parent's report. They need to bring a document such as birth certificate

issued by medical doctor or certified midwife from early 1990s. If they do not have the proper document, they can do it if they can bring two witness – it is called "Guarantee of the Neighborhood system". It is the case when the baby is born at home, other places, or unknown place. Not all the babies who are born at other than hospital fabricated the birth date. But it is possible with no risk.

If there are unusual proportions of birth at preferred month, it can be used as the evidence of birth date fabrication. Figure 4 shows the proportions of birth place other than hospital from 1997 to 2018. The thick line with oval mark is the average of the year. The proportions are similar or a bit smaller than the average of the year in most months except two months. The unusual high proportion in January and February until the early 2000s raised the doubt the veracity. From mid 2000s, February changed to the similar level of other months. But January show weirdly big proportions until recently.

Figure 4. Proportion of births at other than hospital, 1997-2018, South Korea
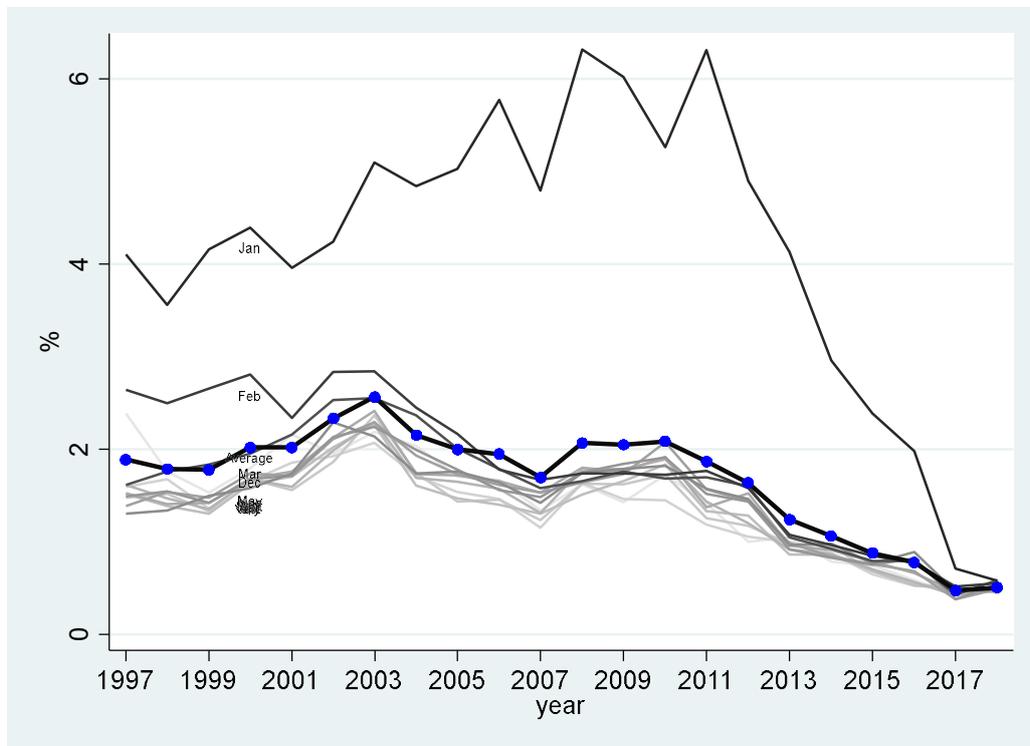
The details from the selected months which are related with educational preference can be found at table 1. It shows the adjusted number of births per month and proportion born in other than hospitals. The number of December is the records of the previous year (-1). Until 2005, the proportion born at home, other place, or unknown in February is bigger than the average. But the gap is decreasing. The adjusted number of births in February outnumbered that in March until 2003. And then, two numbers become similar. From 2009, the focus changed to between December and January. The proportion born in other than hospital in December is like other months. On the contrary, January always shows much higher proportion born in other than hospital. Especially in 2008, 2009, and 2011, it hit over 6% while yearly average is approximately 2%. The 4%p can be attributed to fabrication. It implies that there is preference of January and February before 2009 to give more opportunity to their children, and preference of January after 2009 to support path dependency for their children.

Table 1. Adjusted Number of Births and Proportion born in Other than Hospital at selected Months

	Adjusted Number of Births				Proportion born in other than Hospital				
	Dec(-1)	Jan	Feb	Mar	Dec(-1)	Jan	Feb	Mar	*Average*
1997	n.a.	60,734	61,776	59,641	n.a.	4.10	2.64	1.61	*1.92*
1998	53,031	57,993	60,400	57,834	2.38	3.55	2.49	1.75	*1.81*
1999	49,132	56,258	56,638	55,153	1.76	4.15	2.65	1.84	*1.81*
2000	48,145	59,253	58,246	57,530	1.53	4.39	2.80	1.95	*2.06*
2001	48,481	54,724	53,136	52,421	1.79	3.96	2.33	2.16	*2.07*
2002	40,203	46,910	46,354	45,904	2.16	4.24	2.83	2.53	*2.38*
2003	34,948	43,651	44,605	44,219	1.95	5.10	2.84	2.55	*2.59*
2004	37,066	44,043	42,168	43,674	2.19	4.84	2.45	2.36	*2.20*

2005	33,585	39,770	38,132	39,456	2.03	5.03	2.16	2.00	*2.04*
2006	31,604	39,124	39,972	39,655	1.70	5.77	1.78	1.78	*1.97*
2007	33,307	42,087	42,068	41,927	1.67	4.79	1.67	1.58	*1.71*
2008	35,136	45,239	40,856	39,985	1.33	6.31	1.74	1.65	*2.15*
2009	33,571	42,724	39,301	38,549	1.62	6.02	1.74	1.75	*2.12*
2010	32,531	41,550	39,256	39,653	1.43	5.26	1.72	1.68	*2.11*
2011	34,371	46,042	40,885	41,864	1.72	6.31	1.77	1.70	*1.96*
2012	32,893	43,532	42,009	41,815	1.42	4.90	1.58	1.60	*1.67*
2013	33,204	42,819	39,262	37,296	1.00	4.13	1.07	1.05	*1.30*
2014	30,940	39,899	39,379	36,794	1.04	2.96	0.97	0.92	*1.09*
2015	31,636	40,561	38,259	39,028	0.78	2.38	0.85	0.79	*0.90*
2016	30,880	38,133	36,031	36,900	0.75	1.97	0.77	0.79	*0.80*
2017	26,506	33,710	32,677	32,125	0.59	0.71	0.51	0.42	*0.48*
2018	24,335	31,159	29,544	29,019	0.43	0.58	0.55	0.58	*0.51*

The weirdly big proportion of birth at other than hospital in January is decreasing. The gap from the average become only 0.04%p in 2018. It can be explained by the abolition of Guarantee of the Neighborhood system – report with two witness. The national assembly revised the law on family registration on May 2016, which would be in effect from November 30, 2016. Parents could report its child birth to the local government office 1) with birth certificate, 2) or with other documents which are able to prove the birth. 3) If there is no document, they should visit Family Court in advance and get the certificate from the court. With the certificate they can report the child birth. It makes the fabrication much harder and risky.

V. Discussion

In general, there are more babies in January and fewer babies in December comparing to other months. Does it happen by chance or by intention? Even though there is parents' seasonal preference, it is not much successful to explain the variation of the monthly births by it. The more appealing theory is educational purpose. Parents have different preference – opportunity vs. path dependency. Following the law changes, January holds the most wanted month. February was preferred month comparing to March until mid 2000s. From 2009 December became the least favored month. The weird proportion of birth outside of hospital is the evidence that parents have modulated child birth date using witness system at birth registration.

Recently these effects become out of date. The adjusted monthly birth looks straight line. The slope reflects the decline of fertility, not the fluctuation. Even in January, the proportion of birth outside of hospital is close to the average of the year. It implies that the variation of monthly birth happens more randomly than ever.

We raise several hypotheses to explain the fluctuation of monthly births. It should be cautious that the different hypotheses are not mutually exclusive and exhausted. Accepting one does not necessarily mean that others should be disputed. Nonetheless, the amount of fluctuation is decreasing. It changes in a more monotonous way. It means that the impacts of intentional changes of monthly births become weaker nowadays.

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