

## **Analyzing Fertility Indicators: A Meta-Analysis of Existing Literature**

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### **Extended Abstract**

#### **1. Introduction**

Fertility refers to the experimental and potential behavior and act of childbearing; in other words, it is the number of living children that a woman is capable of bearing during her 35 fertile years. In recent years, there has been numerous studies conducted both in Iran and other countries on fertility indicators. This study is an attempt to examine fertility indicators of the past decade in both Iranian and foreign inquiries. The method adopted is meta-analysis and the population of the study consists of the entire scientific valid papers published in credible Iranian and foreign journals during the past decade. Out of 80 research papers related to the subject at hand, 45 studies on fertility indicators published from 2009 to 2019 were selected and then analyzed using CMA<sub>2</sub> Software. Results obtained from systematic review of effective variables on the extent of fertility or fertility indicators in the examined research yielded 45 related variables. Fixed effect value of 0.770 and random effect value of 0.695 demonstrate the high impact of the 45 variables on the extent of fertility; the top 7 variables include the power of women in family hierarchy, women's education in economic shifts, high age of marriage, fitness, abortion, father's education in upbringing, and women's education had the highest effects on fertility, respectively.

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## **2. Review of Literature and Theoretical Framework**

Fertility is one of the threefold factors in population development. It appears that the extent of demographic fluctuations is a function of fertility more than any other factor. Though this index features biological and physiological aspects, it originates from economic, social, and cultural elements.

In general, there are no comprehensive theories on fertility. Yet unquestionably, fertility developments are under the influence of a number of interacting factors. However, the share of each factor in increasing or reducing fertility, understanding causal impacts, or restriction of factors do not exist in a systematic classification. To date, there has been various views and theories put forth to explain fertility developments in different countries and regions.

According to theories, it can be concluded that both voluntary and involuntary factors affect fertility. Voluntary factors include the age of marriage, pregnancy prevention, gender and age structure of the population, distancing between births, etc., which can be controlled by parents voluntarily. Involuntary factors involve social, cultural and environmental aspects, along with couples' compatibility with said factors.

## **3. Method**

Meta-analysis is an approach or a toolbox intended for quantitative integration of data obtained from several studies with the purpose of discovering novel relations that cannot be attained using separate, individual inquiries (Qazi Tabatabaei & Vadadheer, 2009). The present inquiry is an applied study and can be considered as a quantitative research given the adoption of the meta-analysis method as well as the nature of the collected data. The total population of the study included the entire body of research on fertility indicators with the following keywords in Persian: fertility indicators, effective factors on fertility, and childbearing indicators; the following keywords in English were also considered in research published since 2008 to 2018.

In this study, first a systematic review was carried out to search for both foreign and domestic papers on fertility indicators within valid scientific databases. CMA<sub>2</sub> software was used to calculate the impact size of the factors. The extracted statistical data such as correlation coefficient was converted into impact size. To equalize and compare impact sizes, Hunter and Schmidt's method was employed. Finally, impact sizes were mixed and the result was interpreted based on Cohen's table.

## **4. Results and Discussion**

Out of the 80 examined papers (35 Persian and 45 English papers) in this study, 45 papers compatible with the criteria set in the study were selected. The purpose of this study was to identify fertility indicators in pervious literature.

All 45 selected studies have been conducted using surveys, and all of them involved theoretical frameworks and hypotheses. 18 studies (40%) were written in Persian and related to the Iranian context at various levels of cities, province, or the entire nation; 37 studies (60%) were related to European nations as well as developed and developing countries conducted at the level of region or nation. Papers with more significance levels related to fertility were selected in this study. The entire 56 variables and the size of fixed and random impacts calculated for all variables via software suggest the effectiveness of all 45 selected variables on fertility; however, calculations showed 7 factors that had higher effects on fertility.

### **5. Conclusion**

Out of the 46 variables entered into the software, 7 variables involved sizes larger than the others which included the power of women in family hierarchy, women's education in economic shifts, high age of marriage, fitness, abortion, father's education in upbringing, and women's education had the highest effects on fertility, respectively. There is a negative, inverse relation between these variables and fertility. In other words, increase in these variable results in reduced fertility.

**Keywords:** Fertility, Indicator Factors, Meta-Analysis

### **References (In Persian)**

1. Adibi Sadeh, M. (2011). شناسخت عوامل مهم تأثیرگذار بر میزان باروری [Identifying the most important factors affecting fertility]. *Iranian Social Development Studies*, 4(2), 81-98.
2. Baseri, A., Pejhan, A., Farhadpour M. (2016). بررسی عوامل اقتصادی و اجتماعی و جمعیتی موثر بر تعداد فرزندان ایده ال در بین کارکنان وزارت تعاون، کار و رفاه اجتماعی [Exploring economic, social, and demographic factors affecting ideal number of children among employees of Ministry of Cooperatives, Labour, and Social Welfare], (Unpublished master's thesis). Islamic Azad University, Tehran, Iran.
3. Chaboki, A., Seyyedani, F., & Saati Masoumi, T. (2018). ارزش‌های فرهنگی و گرایش به فرزندآوری در زنان ۱۵-۴۹ ساله شهر همدان [Cultural values and tendency towards child bearing among 15-49- year- old women in Hamadan]. *Journal Gender and Family Studies*, 6(1), 106-127.

4. Chamani, S., Shekarbeigi, A., & Moshfegh, M. (2011). مطالعه تعیین‌کننده‌های [Investigating the sociological factors of fertility in the last two generations (married women of Tehran)]. *Social and Cultural Strategies*, 5(20), 137-165.
5. Enayat, H., & Parnian, L. (2013). مطالعه ارتباط جهانی‌شدن فرهنگی و گرایش به فرزندآوری [The study of cultural globalization and tendency to fertility]. *Journal of Woman and Society*, 4(2), 109-136.
6. Faraji, E., Safiri, Kh., Kamali, A. (2018). بررسی عوامل اجتماعی مؤثر بر تمایل به باروری [Social factors affecting tendency to fertility within women 18-40 years old in Ilam city]. *Journal of Woman and Society*, 9(35), 289-316.
7. Ghazi Tabatabaie, M., & Vodadhir, A. (2010). فراتحلیل در پژوهش‌های اجتماعی و رفتاری [Meta-analysis in social and behavioral researches]. Tehran, Iran. Jameshenasan.
8. Giddens, A. (2014). تجدد و تشخص، جامعه و هویت شخصی در عصر جدید. [Modernity and self-identity: Self and society in the late modern age] (N. Movafaghian, Trans.). Tehran, Iran. SAMT.
9. Good, W. J. (1973). خانواده و جامعه [Family and society] (V. Nasehi, Trans.). Tehran, Iran. Bongah Nashr va Tarjomeh.
10. Hezarjaribi, J., & Abbaszadeh, A. (2010). بررسی تأثیر عوامل اجتماعی-اقتصادی بر میزان باروری زنان شهر تبریز [Investigation on tendency to fertility and its related social factors (a case study of married women aged 15 to 50 in Tabriz)]. *Journal of Woman And Family Studies*, 3(6), 139-156.
11. Hosseini, H. (2007). درآمدی بر جمعیت‌شناسی اقتصادی اجتماعی و تنظیم خانواده [An introduction to socio-economic demography and family planning]. Tehran, Iran. SAMT.
12. Hosseini, H. (2013). جمعیت‌شناسی اقتصادی اجتماعی و تنظیم خانواده [socio-economic demography and family planning]. Tehran, Iran. Bu-Ali Sina University Press.
13. Hosseini, H., & Abbasi Showasi, M. J. (2009). تغییرات اندیشه‌ای و تأثیر آن بر رفتار و ایده‌آل‌های باروری زنان کرد و ترک [Ideational changes and its impact on fertility behavior and attitudes of Kurd and Turk women]. *Women in Development and Politics*, 7(2), 55-84.
14. Houman, H. (2008). راهنمای عملی فراتحلیل در پژوهش علمی [A guide for meta-analysis in scientific researches]. Tehran, Iran. SAMT.

15. Kaveh Firouz, Z., & Karami, F. (2015). بررسی ابعاد ساختار قدرت در خانواده و رابطه آن با باروری [Assessment of the impact of family power structure on fertility rate in Tehran City]. *Women in Development and Politics, 13*(2), 291-308.
16. Khalajabadi Farahani, F. (2016). فراتحلیل روابط با جنس مخالف قبل از ازدواج در بین جوانان [Meta-analysis of premarital heterosexual relationships among young people in Iran over the past 15 years (2001-2015)]. *Journal of Family Research, 12*(47), 339-367.
17. Kohan, Sh., Simbar, M., & Taleghani, F. (2012). تبیین تجربه توانمندی در تنظیم خانواده [Exploring women's empowerment experiences in family planning in socio-cultural context of Isfahan city: A qualitative study]. *Iranian Journal of Nursing Research, 7*(25), 27-36.
18. Mahmoudian, H. (201). سن ازدواج در حال افزایش: بررسی عوامل پشتیبان [The increasing age at marriage: examining the protective factors]. *Nameh-Ye Olum-E Ejtemai, 11*(24), 27-53.
19. Mesrabadi, J. (2016). فراتحلیل - مفاهیم، نرم افزار و گزارش نویسی [Meta-analysis, Concepts, software and report-writing]. Tabriz, Iran: Shahid Madani University Press.
20. Mohammadi, A., Hosseini, H., & Nurollahzadeh, A. (2012). بررسی رفتار، تمایلات و ایده آل های باروری زنان ازدواج کرده ی ۴۹-۱۵ ساله شهر دهلران [Exploring the behavior, intentions and ideals of fertility of married women of 15-49 years old in Dehloran city] (Unpublished master's thesis). Bu-Ali Sina Univewrsity, Haedan., Iran.
21. Mohammadi, N., & Seifouri, B. (2016). بررسی جامعه شناسختی عوامل مؤثر بر ترجیح باروری [A sociological study of the factors influencing women's fertility preferences]. *The Women and Family Cultural Education, 11*(36), 49-70.
22. Moini, S. R., Golshani Foomani, M. R., & Jokar, M. (2014). تفاوت و اشتراک در نگرش و شدت تمایل والدین دارای فرزند (منطقه ۳ و ۲۰ شهر تهران) به داشتن فرزند دیگر [The differences and similarities of parents (districts 3 and 20) in attitude and intensity of having children to other children] (Unpublished master's thesis). Islamic Azad University, Tehran, Iran.

23. Noghani Dokht Bahmai, M., & Mirmohammadtabar, S. A. (2016). *فرا تحلیل، مبانی*. فراتحلیل، مبانی، *CMA2* [Meta-analysis, basics and applications with *CMA<sub>2</sub>* software]. Mashhad, Iran. Ferdowsi University of Mashhad Press.
24. Shiri, T., & Bidarian, S. (2009). بررسی عوامل اقتصادی جمعیتی مؤثر بر باروری زنان ۱۵-۴۹ ساله [A survey of the effective economic-demographic factors on the fertility of employed women aged 15-49 in education organization - Tehran's 22 district]. *Journal of Sociological Researches*, 3(3), 93-106.
25. Toodeh Fallah, M., Kazemipoor, Sh. (2010). بررسی تأثیر نوسازی بر سن ازدواج با تأکید بر شاخص‌های جمعیت شناختی ازدواج در سطح کشور و ۷ استان منتخب ۱۳۸۵ [A study on the effect of modernization on marriage age with emphasis on demographic indices of marriage event in whole country and 7 selected provinces in 2006]. *Social Studies*, 3(8), 105-130.

#### References (In English)

1. Abbasi-Shavazi, M. J., & McDonald, P. (2007). Family change in Iran: Religion, revolution, and the state. In R. Jayakody, A. Thornton, & W. Axinn (Eds.), *International family change* (pp. 191-212). New York, NY: Routledge.
2. Al Awad, M., & Chartouni, C. (2014). Explaining the decline in fertility among citizens of the GCC countries: The case of the UAE. *Education, Business and Society: Contemporary Middle Eastern Issues*, 7(2/3), 82-97.
3. Androka, R. (1978). *Determinants of fertility in advanced societies*. London, England: Methuen and Co Ltd.
4. Arokiasamy, P. (2009). Fertility decline in India: Contributions by uneducated women using contraception. *Economic and Political Weekly*, 44(30), 55-64.
5. Bastian, M. (2016). *Family systems and fertility behaviour in Europe from a network perspective*, (Unpublished doctoral dissertation). Wageningen University, Netherlands.
6. Becker, G. (1960). An economic analysis of fertility. In National Bureau of Economic Research (Ed.), *Demographic change and economic change in developed countries*. Princeton: Princeton University Press.
7. Bongaarts, J. (1978). A framework for analyzing the proximate determinants of fertility. *Population and Development Review*, 4(1), 105-132.
8. Borenstein, M. (2009). Effect sizes for studies with continuous data. In H. Cooper, L. V. Hedges, & J. C. Valentine (Eds.), *The handbook of research synthesized meta-analysis* (2nd ed., pp. 221-235). New York, NY: Russell Sage Foundation.

9. Borman, G. D. & Grigg, J. A. (2009). The visual and narrative interpretation of research synthesis. In H. Cooper, L. V. Hedges & J. C. Valentine (Eds.), *The handbook of research synthesis and meta-analysis*, (2nd ed., pp. 497-519). New York, NY: Russell Sage Foundation.
10. Brinker, G., & Amonker, R. (2013). Socioeconomic development and fertility trends among the states of India. *International Journal of Sociology and Social Policy*, 33(3), 229-245.
11. Brown, L. (1981). World food resources and population: The narrowing gap. *Population Bulletin*, 36(3), 1-44.
12. Caldwell, J. (1982), *Theory of fertility Decline*. London, England: Academic Press.
13. Carter, S. K. (2010). Beyond control: body and self in women's childbearing narratives. *Sociology of Health & Illness*, 32(7), 993-1009.
14. Cleland, J., & Wilson, C. (1987). Demand theories of the fertility transition: An iconoclastic view. *Population studies*, 41(1), 5-30.
15. Davis, K., & Blake, J. (1956). Social structure and fertility: An analytic framework. *Economic Development and Cultural Change*, 4(3), 211-235.
16. Easterlin, R. A., & Crimmins, E. (1985). *The fertility revolution: A supply-demand analysis*. Chicago, CA: University of Chicago Press.
17. Freedman, D. S., & Thornton, A. (1982). Income and fertility: The elusive relationship. *Demography*, 19(1), 65-78.
18. Frejka, T., & Gietel-Basten, S. (2016). Fertility and family policies in central and eastern Europe after 1990. *Comparative Population Studies*, 41(1), 3-56.
19. Goldscheider, C., & Uhlenberg, P. R. (1969). Minority group status and fertility. *American Journal of Sociology*, 74(4), 361-372.
20. Grogan, L. (2006). An economic examination of the post-transition fertility decline in Russia. *Post-communist Economies*, 18(4), 363-396.
21. Haghghat, E. (2014). Establishing the connection between demographic and economic factors, and gender status in the Middle East: Debunking the perception of Islam's undue influence. *International Journal of Sociology and Social Policy*, 34(7), 455-484.
22. Higgins, J. P., Thompson, S. G., Deeks, J. J., & Altman, D. G. (2003). Measuring inconsistency in meta-analyses. *British Medical Journal*, 57, 327-357.
23. Hunter, J., & Schmidt F. L. (2004). *Methods of meta-analysis*. Thousands Oaks, CA: Sage.
24. Jenkins, L., & Macadar, D. (2018). *Challenges posed by low fertility in Latin America and the Caribbean*. New York, NY: UNFPA.
25. Jensen, A. (2009). The value of children – fertility, personal choices and public needs. In J. Qvortrup, K. B. Rosier, & D. A. Kinney (Eds.),

- Structural, historical, and comparative perspectives (sociological studies of children and youth, Volume 12, pp.195 – 220). London, England: Emerald Group Publishing Limited,*
26. Lai, P. F. B., & Cheung, W. L. P. (2016). Does demographic change impact Hong Kong economic growth?. In J. W. Kensinger (ed.), *The spread of financial sophistication through emerging markets worldwide* (pp. 207-241). Bingley, England: Emerald Group Publishing Limited.
  27. Lesthaeghe, R. (1995). The second demographic transition in Western countries: An interpretation. *Gender and family change in industrialized countries*, 17-62.
  28. Lesthaeghe, R. (2006). Second demographic transition. *Population and Development Review*.P62-225-227.
  29. Lipsey, M. W., & Wilson, D. B. (2001). *Practical meta-analysis*. Thousand Oaks, CA: Sage.
  30. Majumder, N., & Ram, F. (2015). Explaining the role of proximate determinants on fertility decline among poor and non-Poor in Asian countries. *Journal Plos One*, 10(2), e0115441. \*
  31. McDonald, P. (2000). Gender Equity-Social Institutions and the future of Fertility. *Journal of Population Research*, 17(1), 1-16.
  32. Mcquillan, K. (2004). When dose religion influence fertility?, *Population and Development Review*, 30(1), 25-66.
  33. Nguyen-Dinh, H. (1997). A socioeconomic analysis of the determinants of fertility: The case of Vietnam. *Journal of Population Economics*, 10(3), 251-271. \*
  34. Oláh, L. (2015). Changing families in the European Union: Trends and policy implications, *Families and societies*. A project funded by European Union's Seventh Framework Programme under Grant Agreement. no.320116.
  35. Piotrowski, M., & Tong, Y. (2016). Education and fertility decline in China during transitional times: A cohort approach. *Social Science Research*, 55, 94-110. \*
  36. Robinson, W. C. (1997). The economic theory of fertility over three decades. *Population Studies*, 51(1), 63-74.
  37. Rogers, E. M. (1995). *Diffusion of innovations* (5<sup>th</sup> ed.). New York, NY: The Free Press.
  38. Schmidt, F. L. (2015). History and development of the Schmidt–Hunter meta-analysis methods. *Research Synthesis Methods*, 6(3), 232-239.
  39. Self, Sh. (2008). Developing countries and fertility: Role of agricultural technology. *International Journal of Development Issues*, 7(1), 62-75.



40. Sheikh, Q., Sadaqat, M., & Meraj, M. (2017). Reckoning females' education as a determinant of fertility control in Pakistan. *International Journal of Social Economics*, 44(3), 414-444.
41. Sly, D. F. (1970). Minority group status and fertility: An extension of Goldscheider and Uhlenberg. *American Journal of Sociology*, 76(3), 443-459.
42. Sobotka, T., Skirbekk, V., & Philipov, D. (2011). Economic recession and fertility in the developed world. *Population and Development Review*, 37(2), 267-306.
43. Sorenson, A. M. (1985). Fertility expectation and ethnic identity among Mexican-American adolescents: An expression of cultural ideals. *Sociological Perspectives*, 28(3), 339-360.
44. Tu, E. J. C., Yan, Y., & Zhao, J. (2017). Ultra-low fertility, gender equity and policy considerations. *Asian Education and Development Studies*, 6(2), 112-124.
45. Van Der Gaag, N., & de Beer, J. (2015). From demographic dividend to demographic burden: The impact of population ageing on economic growth in Europe. *Tijdschrift Voor Economische en Sociale Geografie*, 106(1), 94-109.
46. Vogl, T. S. (2016). Differential fertility, human capital, and development. *The Review of Economic Studies*, 83(1), 365-401.
47. Weeks, J. R. (2002). *Population: An introduction to concepts and issues* (7<sup>th</sup> ed.). New York, NY: Wadsworth.
48. Wilson, D.B. (2009). Systematic coding for research synthesis. In H. Cooper, L. V. Hedges, & J. C. Valentine (Eds.), *The handbook of research synthesis and meta-analysis* (2nd ed., pp. 159-176). New York, NY: Russell Sage Foundation.
49. Xenitidou, M., & Gilbert, N. (2009). *Innovations in social science research methods*. Guildford, England: University of Surrey.
50. Zeng, Y., & Hesketh, T. (2016). The effects of China's universal two-child policy. *The Lancet*, 388(10054), 1930-1938.