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It's About Time: Cesarean Sections and Neonatal Health[☆]

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Abstract

Cesarean sections have been associated in the literature with poorer newborn health, particularly with a higher incidence of respiratory morbidity. Most studies suffer, however, from potential omitted variable bias, as they are based on simple comparisons of mothers who give birth vaginally and those who give birth by cesarean section. We try to overcome this limitation and provide credible causal evidence by using variation in the probability of having a c-section that is arguably unrelated to maternal and fetal characteristics: variation by time of day. Previous literature documents that, while nature distributes births and associated problems uniformly, time-dependent variables related to physicians' demand for leisure are significant predictors of unplanned c-sections. Using a sample of public hospitals in Spain, we show that the rate of c-sections is higher during the early hours of the night compared to the rest of the day, while mothers giving birth at the different times are similar in observable characteristics. This exogenous variation provides us with a new instrument for type of birth: time of delivery. Our results suggest that non-medically indicated c-sections have a negative and significant impact on newborn health, as measured by Apgar scores, but that the effect is not severe enough to translate into more extreme outcomes.

Keywords: Cesarean section neonatal health time variation instrumental variables

1. Introduction

Recent years have seen increasing concern over the rise in cesarean section births. Among OECD countries in 2013, on average more than 1 out of 4 births involved a c-section, compared to 1 out of 5 in 2000 (OECD, 2013). This rise has been largely debated because c-sections are associated with greater complications and higher maternal and infant mortality and morbidity compared to vaginal births. However, the available studies may suffer from omitted variable bias, as mothers who give birth by c-sections may be different from those who have vaginal births in terms of characteristics that can affect the health outcomes of the child and the mother after birth. Along these lines, the WHO has recently pointed out the need for more research in order to better understand the health effects of cesarean sections on immediate and future outcomes, remarking that “the effects of cesarean section rates on other outcomes, such as maternal and neonatal morbidity, pediatric outcomes and psychological or social well-being, are still unclear” (WHO, 2015).

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This paper aims to help fill this research gap by providing new evidence of a causal link between unplanned cesarean sections and newborn health outcomes. Understanding the impact of c-sections on neonatal health is of relevance, as fetal and neonatal outcomes have been shown to be determinants not only of future health, but also of other later life outcomes, such as test scores, educational attainment, and income (Almond and Currie, 2011). In particular, we look at the impact of c-sections on Apgar scores, a widely used measure of newborn well-being. Apgar scores have been found to be predictive of health, cognitive ability, and behavioral problems of children at age three (Almond et al., 2005), of reading and math test scores in grades 3-8 (Figlio et al., 2014), and of school attainment and social assistance receipt after age 18 (Oreopoulos et al., 2008). We also analyze the effect of c-sections on other indicators of newborn wellbeing, such as needing reanimation or being admitted to the intensive care unit (ICU).

In order to show the existence of a causal relationship between unscheduled c-sections and health, we use exogenous variation in the probability of having a c-section at different times of day. Indeed, although nature distributes births and associated problems uniformly, some studies have demonstrated that time-dependent variables related to physicians' demand for leisure are significant predictors of unplanned c-sections (Brown, 1996). Using a sample of birth registries in public hospitals in Spain, we first document that, in this context, unplanned c-sections are more likely to be performed in the early

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