New Evidence on Taxes and the Timing of Birth*

Sara LaLumia†
Department of Economics
Williams College

James M. Sallee‡
The Harris School
University of Chicago
and the NBER

Nicholas Turner§
Office of Tax Analysis
U.S. Department of Treasury

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Abstract

This paper uses data from the universe of tax returns filed between 2001 and 2010 to test whether parents shift the timing of childbirth around the New Year to gain tax benefits. Filers have an incentive to shift births from early January into late December, through induction or cesarean delivery, because child-related tax benefits are not prorated. We find evidence of a positive, but very small, effect of tax incentives on birth timing. An additional $1000 of tax benefits increases the probability of a late-December birth by only about 1 percentage point. We argue that the response to tax incentives is small in part because of confusion about eligibility and delays in the issuance of Social Security Numbers for newborns, as well as a lack of control over medical procedures on the part of filers with the highest tax values. We also document a precise shifting of *reported* self-employment income in response to variation in incentives from the Earned Income Tax Credit due to childbirth. We estimate that this reporting response reduces federal revenue by hundreds of millions of dollars per year.

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†Sara.LaLumia@williams.edu

‡Sallee@uchicago.edu

§Nicholas.Turner@treasury.gov

1 Introduction

The aim of this paper is to determine the degree to which parents are willing and able to shift the timing of the birth of their children in order to gain pecuniary benefits through the tax system. The incentive to alter birthdates follows from the fact that child-related tax benefits, which currently exceed $1700 on average, are not prorated based on the birthdate of a newborn. Thus, a child born on December 31 of a tax year qualifies for the full year's worth of benefits.[1] As a result, parents who expect to have a birth close to the New Year have an incentive to make sure that the birth occurs in December rather than January, perhaps by scheduling labor induction or delivery by cesarean section.

To many non-economists, the notion that parents strategically alter the timing of childbirth for tax benefits is peculiar, but it is accepted as a sensible, indeed likely, hypothesis by most in the profession for several reasons. First, tax economists have demonstrated that people are highly responsive to tax incentives in myriad contexts, especially when the benefits are large and discrete and especially when individuals need only change the date of an event or transaction in order to qualify for a benefit.[2]

Second, ample evidence demonstrates that the timing of birth can be manipulated. For example, there are substantially fewer births per day on weekends than on weekdays, which apparently reflects some combination of patient and physician preferences. Births surged in the first week of January 2000 in both the U.S. and Australia (Gans and Leigh 2009b), which implies that parents wanted to have "millennium babies." In Taiwan, cesarean births are more likely on days traditionally thought to be auspicious and less likely on days thought to be inauspicious (Lo 2003), and cesarean births are avoided in the lunar month of July, which is considered an unlucky time to have surgery (Lin, Xirasagar and Tung 2006).

Third, prior research has in fact found a strong link between the tax values garnered by particular children and the probability that they were born in late December rather than early January. The first paper to explore this issue, Dickert-Conlin and Chandra (1999), found that a 10 percent increase in child-related tax benefits (from $401 to $441 in 1996 dollars) increased the probability of a December birth by 1.4 percentage points (from 51.6% to 53%) in a sample of births taking place in the two weeks surrounding New Year's Eve. Gans and

[1]Parents potentially face a trade-off of lost tax benefits when the child ages out of eligibility in 17 or more years in the future. Accounting for the expected present value of those benefits, the gains to having a child in late December remain substantial. Nevertheless, parents with low discount rates or those who forecast an increase in tax values over time may be less responsive to current incentives.

[2]Discrete benefits, or tax "notches," are considered in Kleven and Waseem (2013); Ramnath (2013); Sallee and Slemrod (2012). Slemrod (1992) argues that responses to taxes are large when preferential treatment can be obtained via intertemporal shifting, which is born out in many examples, including capital gains realizations (Burman, Clausing and O'Hare 1994), changes to deductibility of donations (Ackerman and Auten 2011), and even the timing of death (Kopczuk and Slemrod 2003).

Leigh (2009a) find a smaller, but still substantial, *delay* in birth timing in response to a one time pecuniary bonus given to children born after a certain date in Australia. Neugart and Ohlsson (2013) also find a large birth timing response to a German tax incentive.[3]

Taken together, this evidence suggests that birthdates are manipulable and that they respond strongly to pecuniary incentives. It follows that one may expect to see increases in the total amount of strategic birth timing if tax values rise. Aggregate data fail to support this conjecture, however, because average tax values of children have risen substantially in recent years but shifting of births into December has been constant. Figure 1 shows the mean tax value of a child in the United States by year and the ratio of the number of births that take place in the last week of December to the number that take place in the first week of January. Even when removing the millennium, there is a slight negative relationship in the data, which casts doubt on the strength of tax effects on birth timing.

In this paper, we reinvestigate the relationship between tax incentives and the timing of birth using a data set superior in several ways to that utilized in prior research. We conclude that there is in fact tax-motivated birth timing, but that the effect of taxes is quite small. The data suggest several reasons why tax effects may be limited. First, not all tax filers appear to understand that children born at the end of a year qualify for benefits. Around 5% of parents of late December newborns fail to include their newborn on their tax return even though they file, which costs them $1700 on average in foregone tax benefits. This underclaiming is likely due to a lack of information, but we show that lags in the granting of Social Security Numbers for newborns (which are required on the tax form) may also be partly responsible. Second, birth timing requires the cooperation of physicians, and parents who stand to gain the most in terms of taxes—low-income filers likely eligible for the Earned Income Tax Credit (EITC)—appear to be less able to secure the necessary "supply side" cooperation.

While we conclude that the response of birth timing to tax incentives is quite small, we do document a large *reporting* response to birth-related tax incentives. Households on the phase-in portion of the EITC have an incentive to report additional income because it raises the value of their tax credit. Because the EITC is a function of the number of children

[3]Not all studies find a large response of birth timing to potential benefits. Evidence related to tax incentives in Japan is mixed (Kureishi and Wakabayashi 2008), and Dickert-Conlin and Elder (2010) find no evidence that U.S. parents shift births forward to occur just before school eligibility cutoff dates, despite the reduced child care costs associated with sending a child to kindergarten a year earlier. Maghakian and Schulkind (2011) examine tax incentives in the U.S. and find a small effect, a result which we discuss in detail below. There is also a related literature investigating the responsiveness of overall fertility to tax benefits. Whittington, Alm and Peters (1990) suggest that a $100 increase in the tax value of the personal exemption increases the fertility rate by 2.1 to 4.2 births per 1,000 women at risk. Crump, Goda and Mumford (2011) update and extend this analysis, however, and find a much smaller effect that is restricted to timing over the life cycle rather than an effect on total fertility.

in a household, whether a child is born in late December or early January will change the location of a particular household's EITC schedule. Among those reporting self-employment income (which is not subject to third-party verification and is therefore easily falsified), the income reported by parents of December and January newborns diverges sharply, with each group demonstrating significant bunching around their respective EITC-maximizing levels. The EITC literature has previously shown similar bunching of self-employment income (Saez 2010; Chetty, Friedman and Saez Forthcoming), but our novel identification strategy allows us to isolate a short-run response that better distinguishes reporting responses from changes in labor supply.[4] We argue below that this reporting response most likely implies tax evasion—though we cannot definitively rule out all forms of tax avoidance—and estimate that this evasion costs the tax system around $750 million per year.

For our analysis, we use micro data from the *universe* of tax returns filed between 2001 and 2010, augmented with data from the Social Security Administration that provides children's exact date of birth. These data provide us with a large number of births (over 800,000), accurate information about the tax value of children, and precise information about household income. In our preferred specification, we find that an additional $1,000 of tax savings is associated with a 1 percentage point increase in the probability that a birth occurs in the last week of December.

Our estimates are substantially smaller than those in Dickert-Conlin and Chandra (1999), who use a sample of 170 births and must impute tax values from self-reported income and demographic information from the National Longitudinal Survey of Youth. We estimate that a $1,000 increase in tax savings is necessary to generate the same amount of shifting that Dickert-Conlin and Chandra (1999) find will be induced by a $33 increase. Our results are similar in magnitude to those reported in Maghakian and Schulkind (2011). They use publicly available birth data from the U.S. Vital Statistics between 1990 and 2000. These data cover all U.S. births and report method of delivery, but they lack any information on income and they include only the month of birth, not the exact day. The authors therefore must use data aggregated to the monthly level and impute child-related tax benefits using Census data on individuals with the same demographic variables as those in the birth certificate records, both of which generate measurement error that may drive down estimated effects. Our tax return data allow for more precise estimate of tax values for each individual child.[5]

[4]Chetty et al. (Forthcoming) compare the earnings of filers observed in the year before and year of birth, without separating the sample by month or exact day of birth. They find that, in geographic areas with high awareness of the EITC, both self-employment and wage income are adjusted in credit-maximizing ways over the course of the year of birth. Our analysis is closely related but relies on comparison of filers experiencing births just days apart.

[5]On the other hand, the use of tax return data does raise the possibility of bias resulting from misreporting

Our paper proceeds as follows. In section 2 we outline our empirical strategy. Section 3 describes our tax return data and details our estimation of the tax value of children. Section 4 presents our main results, and section 5 investigates the sensitivity of these results to various potential sources of bias. We then discuss reasons why the tax effect might be small in section 6, and the final section concludes.

2 Empirical Strategy

Our aim is to determine whether or not parents strategically alter the timing of childbirth in response to tax incentives, and, if so, to quantify the magnitude of the response. Ideally, we would relate randomly varied tax incentives to the probability of strategic timing, but we do not have random variation and we do not know whether a birth occurred on a particular date by choice or by chance. Instead, we focus on a sample of births that take place close to New Year's Eve, which therefore plausibly could have been shifted into December for tax reasons, and ask if the probability of a December birth is systematically related to tax values. Variation in tax values is a complicated function of household structure, income, year and state of residence. Thus, depending on the control variables used, we can isolate several different types of identifying variation and look for robustness across related specifications.

We construct *TaxValue*, the reduction in total income tax liability caused by the addition of a dependent child to a return, by taking the difference between a filer's estimated income tax liability with and without a marginal dependent. In our baseline specification, we focus on the set of all births that take place within one week of New Year's Eve, and ask whether or not the probability that a child was born in December is related to that child's *TaxValue*. Regressions take the form:

$$DecBirth_i = \alpha + \beta TaxValue_i + \gamma \mathbf{X}_i + \epsilon_i, \tag{1}$$

where *DecBirth* is a dummy coded as one if the birth takes place in December, and $\mathbf{X}$ is a vector of controls. If parents with greater tax benefits from a December birth are more likely to have children in December, then β will be positive. This setup closely follows the strategy developed in Dickert-Conlin and Chandra (1999).

The birth of a child triggers eligibility for a number of tax provisions. The availability and generosity of these provisions depend on a taxpayer's income, with variation over time

of income to the IRS that is correlated with tax benefits. This is similar to a point made in Blank, Charles and Sallee (2009), which argues that administrative records about age at marriage from before 1980 are less accurate than retrospective survey data because individuals who were too young to marry legally had an incentive to misinform public officials. We address such concerns here in our study of EITC compliance.

as a result of policy changes. In most cases the birth of a child allows a parent to claim an additional dependent exemption. Exemptions are generally worth more to high-income taxpayers who face higher marginal tax rates, although personal exemptions were phased out at high levels of adjusted gross income (AGI) in tax years 1991-2009. For an unmarried taxpayer, a first birth can move the taxpayer from single filing status to the more generous head of household filing status with a larger standard deduction and wider brackets. For a low-income taxpayer, adding a child can make one eligible for a more generous EITC. This delivers a larger benefit in the 2000s than in the 1980s, thanks to legislative expansions of the EITC in the intervening years. Beginning in 1998, a new child can make a filer newly eligible for the Child Tax Credit. Nonrefundable through 2000, this credit was initially of little value to low-income filers. It is also of little value to high-income filers, due to AGI-based phaseout rules. The introduction of a refundable portion (known as the additional child tax credit) and expansions in credit generosity throughout the 2000s increased its value to low-income filers.

The net effect of these child-related provisions is shown in figure 2 for two years, 1986 and 2005. These years are the midpoints of the time periods analyzed in the Dickert-Conlin and Chandra paper and in our paper. We consider a hypothetical married couple living in Virginia and claiming their first child. In both years, the EITC creates a bump in *TaxValue* at low levels of AGI. In 1986, for incomes above the EITC range, tax savings rise steadily with income. By 2005, because of income-related phaseouts of various child-related tax benefits, filers with high levels of AGI do not have particularly high tax savings from claiming a first dependent. In fact, the real value of claiming a first child is essentially stagnant between 1986 and 2005 for those with real AGI above $130,000.

Taxation is not the only reason that individuals may prefer to give birth in late December instead of early January. Parents and doctors may wish to avoid being in the hospital and delivering a child during the New Year's holiday. If parents who have a strong non-pecuniary preference for a December birth, or who have lower costs of shifting their birth (perhaps because they have already decided to induce or have a c-section), also happen to have particularly high (or particularly low) tax values, our estimates could be biased upwards (or downwards).

To avoid such bias, we want to include in **X**, our vector of controls, anything that might be correlated with strategic birth timing and tax values. Women who have had a c-section are very likely to have a c-section for subsequent births.[6] Because strategic shifts in the timing of birth are less costly for deliveries that are already intended to be c-sections, we

[6] In 2003, 88.7% of women giving birth after a prior cesarean birth had another cesarean delivery. For comparison, 23.6% of women giving birth for the first time had a c-section (Menacker 2005).

might expect higher parity births to be more likely to end up in December, even without a tax motivation. Thus, we control for the number of prior own child dependents claimed. Women who are older are also more likely to have c-sections or induced delivery because of medical complications, so we control flexibly for maternal age.[7]

We suspect that higher income individuals are more likely to have control over their medical procedures and to schedule deliveries, in part because low-income individuals are less likely to have health insurance and c-section rates are somewhat lower among the uninsured (Aron, Gordon, DiGiuseppe, Harper and Rosenthal 2000). We account for this by controlling for a smooth polynomial or spline in income, which nevertheless leaves some residual relationship between taxable income and tax values as identifying variation. Alternatively, we can control very flexibly for taxable income and use the remaining sources of variation—from birth order, geography and time—for identification.

Geography provides useful variation in tax values that stems from state tax policy differences, but it may also introduce spurious correlation because medical practices often differ across locations, hospitals and individual physicians (Baicker, Buckles and Chandra 2006). To account for geographic differences, we run specifications that include state fixed effects, zip code fixed effects, or either set of fixed effects interacted with year. Finally, the average tax benefit of children is changing over time, and medical practices may also follow secular trends. To account for this, we can control for year fixed effects, or year fixed effects interacted with other variables. Including year fixed effects isolates the tax value variation to within-year variation, but, as detailed below, we also conduct other specifications that allow changes to the tax code to identify the coefficient of interest.

3 Data Description

3.1 Data Sources and Sample Restrictions

Our data are drawn from the universe of tax returns filed between 2001 and 2010, supplemented with information from the Social Security Administration. We begin with a Social Security Administration dataset, made available to the U.S. Department of Treasury, which reports the date of birth and Social Security Number (SSN) for all SSN-holders in the United States. We identify children born between 2001 and 2010, and we search for all tax returns that include these children's SSNs (as dependents) in the year of their births. Approximately

[7]Among women classified as low risk (first-time mothers with full-term singleton births), the rate of cesarean delivery in 2003 was 20.9% for women under 30 years, 32.7% for women ages 30 to 39, and 46.8% for women ages 40-54 (Menacker 2005).

86% of the newborns in the SSA data are claimed in the year of birth. This is a close match to the estimate of Orszag and Hall (2003) that 87% of households filed a return in 1999.

We impose a number of restrictions to arrive at our final estimation sample. First, we limit the sample to births that occur between December 25 and January 7. Next, we keep only those cases in which the primary filer claiming the newborn also filed a tax return in the year prior to the newborn's birth. We do this to preserve symmetry between our December and January samples. For a child born in January, to calculate the tax benefit that would have been realized if that child had been born in December, we need tax information in the year *before* the birth actually occurred. Thus, to appear in our sample, a filer claiming a January-born child must appear in the year of birth and the year before. To avoid differential selection of households that may not file in all years, we limit our December sample in a parallel way, dropping filers who claimed December-born children if they did not file a tax return in the prior year.

Next, we keep only returns that used a filing status of single, head of household, or married filing jointly in the year of birth and in the prior year. This eliminates a small number who were married filing separately. We are especially concerned about controlling for the mother's demographic characteristics, so we drop returns on which there is no female taxpayer between the ages of 16 and 50 listed as either the primary or secondary taxpayer in the year of the birth. Adoptive parents likely have little control over the precise timing of a child's birth, so we drop cases in which an adoption credit is claimed in the year of the newborn's birth. To ensure that we are able to control for geographic factors, we drop returns filed by U.S. citizens living outside of the 50 states and the District of Columbia. Finally, we drop data from January 2001 and December 2010, so that our data represent paired December and January samples that each span the same New Year.

3.2 Estimating Tax Values

We use the National Bureau of Economic Research's TAXSIM program to compute *TaxValue*, the tax savings associated with a December birth. This calculation is straightforward for December births. We compute the filing unit's actual tax liability as a function of income, filing status, and actual number of dependents claimed. We then compute the counterfactual liability, as if the birth occurred in January, by subtracting one from the number of dependents (or subtracting more than one when we observe a multiple birth) and by changing head of household filing status to single if the newborn is the only dependent child.[8]

[8]We do observe some taxpayers claiming a dependent exemption for a newborn while simultaneously using single filing status. These people may be leaving money on the table, although there are situations in which a parent is entitled to claim a dependent exemption for her child but is not entitled to use the head

The procedure for calculating *TaxValue* is slightly different in the case of January births. If a child is born in January of year t, we are interested in the tax value that would have been realized had the child been born in the previous month, December of year $t-1$. Thus, we identify January births using year t tax returns, but we do not use those returns to calculate the tax value. Instead, we locate the year $t-1$ return of the filer and compute that year's tax liability using TAXSIM. Then, we add one dependent to the tax return (or more in the case of multiple births), changing those with a single filing status to head of household, and calculate the counterfactual tax liability. As with December births, the difference in the two tax liabilities is our estimate of *TaxValue*.

Ninety-three percent of the filers in our sample have a constant filing status across the two years of returns, but the remainder experience some change. For December births, we simply use the filing status and household structure as it appears in the year of the child's birth, which is also the year for which the tax value is computed. The one exception is the switch between head of household filing status and single filing status in the case of a first-born child, as described above. We must make a more difficult choice about January births when filing status changes. For consistency and clarity, we have assumed in all cases that a child born in January would have been claimed by the primary tax filer had the child been born in December. For example, the most common transition is the case where the primary filer was single or head of household in the year prior to the child's birth and married filing jointly in the year of the birth. Among January births, 4.5% of our sample fits this description. In these cases, we assume that the person who is the primary filer in the birth year would have claimed the child. Our assumption is imperfect because it is possible that if the child had been born in December then the filer would have accelerated their change in marital status into the prior tax year, or then the child would have been claimed by the secondary filer.

3.3 Descriptive Statistics

Table 1 presents descriptive statistics for our sample of births occurring in the last week of December or the first week of January. After applying the restrictions described above, we have data on 819,850 births, of which 405,252 (49.4%) take place in December. In our data, December mothers have slightly higher income and attachment to the labor force. December mothers have an average AGI of approximately $69,500 while January mothers have an average AGI of approximately $67,400. The share of December mothers with positive

of household filing status. In order to file as head of household, an individual must satisfy the household maintenance test, by providing over half the costs of maintaining a home. There is no household maintenance test that must be satisfied in order to claim a dependent exemption (Holtzblatt and McCubbin 2003).

wage income in the tax year prior to the newborn's birth is 76.8, while the corresponding value for January mothers is 75.4.[9]

A comparison of sample means shows that December births have slightly higher average tax savings than January births, a value of $1,779 versus $1,740. Figure 3 offers further information on this point. It plots the average *TaxValue* by day of birth for all days in December and January. The average tax savings for births occurring in the last few days of December are higher than the average tax savings for births occurring in the first few days of January. This is consistent with tax-motivated shifting of births. But, it could also be explained by high-tax-value parents choosing to strategically move births forward to avoid the New Year's Day holiday; the pattern of tax values preceding Christmas is similar to the pattern preceding New Year's Day. We return to this point in section 5.

3.4 Comparison of Tax Returns and Vital Statistics

Not everyone files a tax return, so not all newborns appear in tax return data. To understand how that may influence our analysis, we compare the tax data to the birth certificate database from the National Vital Statistics System. The number of births that appear in our tax data track the number of births in the Vital Statistics data closely over time—the correlation between monthly raw counts of births is .93 in the raw data and .92 in our restricted sample. Our data also closely match the weekly cycle of births, where about 10% of births occur on each weekend day and 16% of births occur on each day of the work week.

Despite the high overall correlation across data sources, the data sets diverge in a seasonal pattern. Figure 4 plots two ratios. In both ratios, the denominator is the total number of births recorded in Vital Statistics in a particular month. The numerator for the upper line is the total number of newborns observed in tax return data with birthdates in a particular month, and the numerator in the lower line is the total number of such newborns in our final estimation sample, after imposing selection restrictions. In both cases, the ratio of tax-based newborn counts to Vital Statistics counts is always smallest in December.[10] A simple t-test rejects equality of these ratios across December and January.

Figure 5 repeats this analysis for several income categories. Because the Vital Statistics

[9]To facilitate comparison of our results with those of Dickert-Conlin and Chandra (1999), we construct matching variables where possible, including mother's wage income (from W2 records) and an urban residence dummy (using the Rural Urban Commuting Area classification established by the Economic Research Service of the United States Department of Agriculture). We do not have measures of mother's race or education, but those variables are not particularly strong predictors of birth timing in Dickert-Conlin and Chandra (1999).

[10]Part of the seasonal pattern in Figure 4 is due to variation in demographic characteristics of mothers, which has been shown by Buckles and Hungerman (Forthcoming) to vary seasonally. Seasonal variation in demographics, however, cannot explain a discontinuity at the New Year.

data has no income information, the figure plots four series that have the same denominator (total Vital Statistics birth counts by month) but have different numerators (income-specific tax-based birth counts by month). This figure reveals that the discontinuity at the turn of the year is highly pronounced for low-income filers and is not visible for high-income filers. Below, we demonstrate that the January discontinuity is not present for one-year old children and that we can eliminate the gap in December to January birth ratios from the two data sources by incorporating information about one-year-olds, instead of newborns.

4 Birth Timing Results

Our main empirical strategy is to run regressions of a December birth dummy on the tax savings that a filer would experience from claiming an additional dependent child and a set of controls. Table 2 presents results from a number of such regressions estimated as linear probability models. A matching Table A1 that uses a logit model is included in the appendix. Marginal effects from logit estimation are very similar, which is not surprising because the predicted probabilities for all observations are close to 0.5.

Column 1 shows the most parsimonious specification. The only right-hand side variable is the tax savings associated with a December birth. This specification uses tax variation due to income, birth order, marital status, geography and time period to identify the coefficient. The estimate of 0.0098 indicates that a $1,000 increase in the tax value of a child is associated with approximately a one percentage point increase in the probability of a December birth, which is a 2% change on the base probability of 0.494. This is a small effect, and it is precisely estimated.

Column 2 adds controls for mother's earnings, marital status, a dummy for whether the child is the first- or second-born, AGI, urban residence, mother's age and year fixed effects. This is the specification closest to Dickert-Conlin and Chandra (1999), differing only in our exclusion of mother's education and race, which are not available in our data set. This increases the tax coefficient slightly, to 0.0134. In sharp contrast, Dickert-Conlin and Chandra estimate a 0.344 marginal effect of a $1,000 increase in tax savings, which is 24 times larger than our estimate. Our estimates are quite close to the findings of Maghakian and Schulkind (2011), whose analysis indicates a marginal effect of around .016.

One possible source of the discrepancy between Dickert-Conlin and Chandra (1999) and our results is the changing correlation between income and tax values, primarily due to legislative expansions to the EITC and Child Tax Credit. Income and *TaxValue* were positively correlated in the earlier time period and are now negatively correlated. This changing relationship is evident in Figure 2, which shows tax values as a function of income for a sample household structure in 1986 (the midpoint of their sample period) and 2005 (the midpoint of our sample period).

Higher income parents are likely more able to shift births because they are more likely to have private insurance (as opposed to Medicaid) and be in a position to dictate care. Income may also be correlated with non-pecuniary reasons for birth timing (such as holiday "convenience" effects) if those effects vary across types of medical providers. Thus, if income is not adequately controlled for, tax value regressions may be subject to spurious correlation. Because of their sample size, Dickert-Conlin and Chandra (1999) are forced to control for income only linearly (and as an interaction with tax values), but a linear fit will obviously have trouble matching the tax value pattern because the EITC creates a significant non-linearity in the schedule. Thus the positive correlation between income and birth timing might lead to an upward bias in their estimates. In contrast, because of our larger data set, we are able to control for income quite generally and alleviate this source of bias. Moreover, when we match their specification, our estimates may not be subject to the same upward bias because income and tax values are negatively correlated in the time period we analyze.

Weighing against this explanation, however, is the fact that our *TaxValue* coefficient estimates remain very small if we assign tax values based on the tax code from the earlier time period. We have experimented with randomly altering the tax years associated with our data, drawing hypothetical tax years uniformly from the years 1979–1993 included in the Dickert-Conlin and Chandra (1999) sample. We use TAXSIM to re-estimate tax savings for these earlier tax years, holding constant all other characteristics of our sample. The idea is to reproduce any spurious correlation between income and birth timing that existed in the earlier period. This exercise fails to generate inflated coefficients, which casts doubt on whether the changing correlation of income and tax values can explain the difference between our results and those of Dickert-Conlin and Chandra (1999).

Additional columns in Table 2 probe the sensitivity of our results to alternative specifications. The next several columns control more flexibly for maternal age (replacing the linear age term with a full set of age dummies) and for AGI (replacing the linear AGI control with a 5-piece spline). These choices are motivated by the nonlinear relationships between maternal age, income, and the probability of cesarean birth. We also switch to a more flexible set of controls for birth order, including separate dummies for whether a child is the first-, second-, third-, or fourth-born. Column 4 includes state fixed effects and column 5 substitutes zip code fixed effects for state fixed effects. The goal in both cases is to account for time-invariant spatial variation in medical practices that might influence the probability of a late-December birth and that is spuriously correlated with tax values. The estimated coefficient on *TaxValue* changes very little. It is a precisely estimated 0.0154 in column 4 and a precisely estimated 0.0153 in column 5.

We are particularly concerned about whether a relationship between income and non-tax reasons to schedule a birth might be biasing the *TaxValue* coefficient. This concern motivates the substitution of a 5-piece spline in AGI for a linear AGI control, but even this specification may not be sufficiently flexible. Column 6 replaces the 5-piece AGI spline with dummies for each $10,000 AGI bin. This has little impact on the *TaxValue* coefficient, which is now 0.0168.

Column 7 goes further in controlling for income and demographics and relying on policy variation for identification. In that specification, year dummies are dropped, and the $10,000 AGI category variables are all interacted with marital status and dummies for first or second births, thereby controlling flexibly for household structure and income, which determine tax values within a given year. The goal of this specification is to isolate the tax variation that comes from policy changes over time. Variation related to a filer's household structure and income is removed. Again, the *TaxValue* coefficient changes very little. It is equal to 0.0153 in this specification. In sum, our tax data provide evidence that in recent years there is a small, but statistically significant, correlation between tax benefits and birth timing, which is stable across a variety of specifications.

The coefficients on other controls are generally stable across the specifications shown in Table 2. There is strong evidence of a relationship between birth parity and the probability of a late-December birth. First- and second-born children are persistently less likely than higher birth order children to be born in late December. Married mothers and mothers with higher levels of wage income have lower probabilities of late-December births.

If the positive correlation between tax values and December birth probability reflects a causal effect of taxes on birth timing, then we would expect to see a stronger relationship among people who are more likely to have scheduled deliveries, which lowers the cost of shifting. That is, for someone who is already planning to have an elective c-section or induction, it is relatively easy to shift the date of that delivery. Tax returns provide no information about the method of delivery, so we cannot limit the sample to cesarean and induced deliveries. However, there is substantial variation across states and over time in aggregate c-section rates. In addition, mothers who have already had a c-section are much more likely to have a c-section in subsequent births. Thus, mothers who already have children may be more sensitive to tax values, as many will intend to schedule delivery even before considering tax benefits. Wealthier people are also more likely to have c-sections and to schedule delivery.[11]

Table 3 uses these sources of variation to see if the birth dates of children who were more

[11] We document higher c-section rates among the socioeconomically advantaged in section 6.2.

likely to be delivered by c-section show a greater responsiveness to tax incentives. Column 1 of Table 3 adds the annual state-level c-section rate to our baseline analysis.[12] This has very little effect on the *TaxValue* coefficient or on other terms. Column 2 adds the interaction of *TaxValue* and the c-section rate. The *TaxValue* coefficient is no longer statistically different from zero, while the interaction term is positive. This suggests that mothers are more likely to consider the tax benefits of a December birth in making decisions about birth scheduling when they are more likely to have a c-section.

Column 3 includes an interaction of *TaxValue* with AGI. If higher-income parents have more control over their medical care, we expect a positive interaction. On the other hand, lower-income parents might attach a great value to each dollar of tax benefits, making the interaction term negative. These appear to cancel out, as the $TaxValue \cdot AGI$ interaction term is small and statistically insignificant. More evidence on the relationship between income and tax-motivated birth timing is shown in Column 4, which restricts the sample to those with AGI above $100,000. Here, tax savings of $1000 is associated with a 2.1 percentage point increase in the probability of a late-December birth. Column 5 considers mothers who claim at least one child older than the newborn. When first-born children are excluded, an additional $1000 of tax savings is associated with a 2.2 percentage point increase in the probability of a late-December birth. Table 3 is generally supportive of the hypothesis that mothers with a higher propensity to give birth via c-section exhibit a greater responsiveness of birth timing to taxes.

5 Potential Confounding Effects

As another check on the plausibility of our results, we repeat our analysis for windows of different widths around New Year's Day. It is easier to shift a birth by a day or two than by a week or more for medical reasons. Thus, we would expect to see less evidence of shifts in birth timing as we widen the sample window around the New Year. Figure 6 shows the coefficients on the $TaxValue$ term from 31 separate regressions, each of which expands the sample window to include a different number of days.[13] The first regression, represented by the left-most point in the figure, includes only births occurring within one day of the turn of the year (that is, only December 31 and January 1). Moving rightward in the figure, the

[12]To do so, we collected data on annual state-level c-section rates from the *Births: Final Data* series of the National Vital Statistics Reports. In 2001 the cesarean delivery rate ranges from a low of 17.2% in Utah to a high of 29.9% in Louisiana. All states experience an increase over the next decade. By 2010 the low is 22.6% in Arkansas and the high is 39.7% in Louisiana.

[13]These regressions include demographic controls, a full set of maternal age dummies, a 5-piece spline in AGI, and year dummies.

sample size gradually increases. The rightmost point is for a regression including all births from December 1 to January 31. As expected, the positive relationship between tax savings and the probability of a December birth is largest in very narrow windows around the turn of the year and gradually falls as the time frame increases. The decline in the coefficient, however, is not as fast as would be consistent with a zero effect of taxes on selection into birth dates more than two weeks away from the New Year. This suggests that our baseline estimate may be biased upwards by one or more of several potential confounding factors.

To explore this possibility further, we repeat our analysis on a placebo group of newborns for whom we expect there to be no tax-motivated shifting of births. Specifically, we use a sample drawn from the *first* week of December and *last* week of January. Children born in these windows were born at least 24 days from the New Year, making it very unlikely that tax-motivated birth timing was relevant in these cases. That is, children born at the beginning of December are not likely to have been born then because their parents induced labor for tax reasons. Similarly, children born at the end of January likely had due dates too far from New Year's Eve to make strategic birth timing in December feasible or medically safe. Thus, we would expect to find no correlation between taxes and December births in this sample if the only reason that December and January births differ in tax values was strategic timing.

In Table 4, the first row of column 2 shows the *TaxValue* coefficient in a regression predicting December birth for the placebo sample. (The first row of column 1 repeats the corresponding result for our main sample, from column 4 of Table 2.) For the placebo sample, we find a statistically significant coefficient on *TaxValue*. An additional $1000 of tax savings is associated with a 0.5 percentage point increase in the probability of a late-December birth, which is one-third the size of our main estimate.[14] In the next two subsections, we show that this placebo effect is largely explained by strategic reporting of self-employment income.

5.1 Strategic Reporting of Self-Employment Income

The tax savings associated with a late-December birth depends almost entirely on income realized *before* the child is born. There is no reason to expect labor income of late-December and early-January parents to diverge in the months leading up to birth. Pregnancy and anticipated changes in household composition might alter preferences for leisure prior to a birth, but any such effect will be similar for the two groups. In addition, as long as birth timing is at least partly unpredictable, during much of the year leading up to birth the parents in our sample will be uncertain about whether or not their children will be born

[14] We have estimated similar placebo effects for all of the specifications in Table 2, and all estimates are positive, statistically significant, and in the range of 0.004 to 0.007.

in December. Labor supply is likely to change discontinuously at the time a child is born. However, December parents in our sample have at most one week's worth of post-birth labor supply choices affecting the annual labor income used in computing *TaxValue*. This affords December parents little time to fine-tune their real labor supply choices in such a way as to maximize the child-related tax benefits they receive.

There is scope, however, for parents of December and January newborns to change their *reported* income in response to the exact date of birth of their child. For most types of income, misreporting is easily detected by the IRS because of third-party verification. Income earned as a result of self-employment (reported on a Schedule C) is not subject to third-party verification and is an important source of tax evasion (Slemrod 2007). Most commonly, misreporting of Schedule C income involves understating income. This is the behavior that minimizes tax liability of a filer facing a positive marginal tax rate. Filers who qualify for the EITC face a more complicated set of incentives for reporting self-employment income.

The EITC functions as a wage subsidy at the lowest levels of income. A taxpayer who reports more earned income, including Schedule C income, receives a larger credit. The credit reaches a maximum and then plateaus. We refer to the amount of earned income at which the credit reaches its maximum value as the first EITC kink. An EITC recipient maximizes her credit and minimizes her overall tax liability by reporting earned income exactly equal to this kink. While the opportunity to inflate self-employment income to boost EITC payments has long existed, studies using audit data from the 1980s and early 1990s found little evidence of over-reported self-employment income among EITC recipients (Joulfaian and Rider 1996; McCubbin 2000). More recent studies, however, have shown significant bunching of reported self-employment income precisely around the first EITC kink (Saez 2010; Chetty et al. Forthcoming).[15]

The value of the EITC and the location of the kink point depend on the number of children that a filer has. Filers with no children are eligible for only a very small EITC, one so small that it has regularly been treated as zero in the EITC literature.[16] With one qualifying child in 2010, a filer earning $8950 was exactly at the first EITC kink and eligible for the maximum credit of $3050. A 2010 low-income filer whose late-December first birth made her newly eligible for the EITC has an incentive to report earned income of exactly

[15]The amount of EITC remains constant as earnings increase within the plateau range. As earnings continue to rise, the EITC eventually begins to phase out. There is a second EITC kink point corresponding to the income cutoff between the plateau and phase-out ranges. Saez (2010) finds no evidence that taxpayers bunch around this second, less salient, kink point, nor do we find evidence of bunching at that point.

[16]In 2010, the maximum EITC for a filer with no qualifying children was $457, approximately 8% of the maximum EITC for a filer with multiple children. The set of papers that has relied on childless filers as a control group unaffected by the very small EITC available to them includes Eissa and Hoynes (2004) and Chetty et al. (Forthcoming).

$8950. An otherwise similar filer with an early January 2011 first birth has no particular incentive to report $8950 on her 2010 return.

Figure 7 shows the distribution of income around the first EITC kink point, restricting attention to filers whose newborn child will be the only dependent on the tax return.[17] That is, in the tax year from which these income data are drawn, filers with January births claim zero dependents and are eligible for only a very trivial EITC amount. Files with December births claim exactly one dependent and will maximize their EITC by reporting earnings equal to the first EITC kink. Distributions are plotted separately for late December births (left column) and for early January births (right column) as well as by the presence of Schedule C income (top row) or its absence (bottom row). In all cases, the horizontal axis measures the difference between a filer's income and the first EITC kink point.[18] When this difference is zero, a filer receives the maximum EITC payment.

For filers with no Schedule C income, there is no bunching around the first EITC kink point regardless of when a child is born. Comparing the top left and top right figures, there is bunching around the first EITC kink point for Schedule C filers with December births. Chetty et al. (Forthcoming) define "sharp bunchers" as EITC recipients who have qualifying children, who report some self-employment income, and who report total income within $500 of the first EITC kink. They find that 2.89% of EITC filers with children met this definition in 2009. For the first-child sample used in the construction of figure 7, approximately 1.0% of December parents meet this definition of sharp bunching versus 0.55% of January parents. As the newborns in our sample age, we expect that parents learn more about the EITC and are more likely to engage in sharp bunching. Figure 7b plots the difference across the December and January distributions for Schedule C filers. Each bar height is equal to the percentage of December observations in a given income bin minus the percentage of January observations in the same income bin. This figure shows that the excess December mass is clustered at and to the right of the first kink point. It also shows that the excess mass at the kink point is drawn from the left tail of the distribution—that is, there are relatively few parents of December newborns who are reporting income below the EITC kink.

The birth of a second child shifts the income at which a filer maximizes her EITC. For example, in 2010 the first EITC kink increases from $8,950 to $12,550 when a filer's second qualifying child is born. Figure 8 plots the distribution of income around the first EITC kink point for filers whose newborn becomes the second dependent child. As was true in the first child case, there is no evidence of bunching among filers who report zero Schedule C

[17] For clarity, the sample included in the figure is also restricted to filers whose earnings are at most $3500 in either direction away from the kink.

[18] We plot the data relative to the kink point rather than in terms of absolute earned income because the location of the kink point changes slightly from year to year.

income. For filers with Schedule C income, those with December births bunch around the kink point that maximizes their EITC payments. Among filers with January births, there is also bunching, but it occurs at a point a few thousand dollars below the first kink for filers with two children. This is approximately the location of the first kink for filers with *one* qualifying child, which is the number of qualifying children that can actually be claimed by these January parents. Together, Figures 7 and 8 suggest that both late-December and early-January parents with Schedule C income are willing to strategically report that income in a credit-maximizing way. December parents face the opportunity to do this one year earlier, and they immediately seize that opportunity.[19]

Why do parents of December and January newborns have different distributions of income around the kink points in the EITC schedule? A natural explanation is that the groups have differences in their labor supply due to the subsidy's incentives, but this explanation is implausible in our population because we are comparing people who gave birth within a few days of each other. Late December births do not afford parents, even those with the flexibility of self-employment, much time to make adjustments in real labor supply. Unless parents have perfect knowledge in advance of whether their baby will be born in December or January (which cannot be the case for most filers given the limited amount of birth retiming), we would expect to see some evidence of bunching in the January data if the December bunching were driven by a forward-looking real labor supply response.

Saez (2010) and Chetty et al. (Forthcoming) previously found greater bunching among Schedule C filers than among those with earned income derived solely from wages.[20] This suggests that the bunching is due to reporting responses, rather than actual labor supply, because Schedule C filers are better able to misreport without getting caught by the IRS. A comparison of wage earners and the self employed is not conclusive, however, because it may be that among low-income workers only the self-employed have enough flexibility to select true income close to a kink point. Our comparison of those giving birth on either side of the New Year is stronger evidence of a reporting response because both groups would have had similar expectations of a December baby throughout the year when labor supply decisions

[19]We have also constructed figures showing the year $t+1$ income distribution of parents whose first children are born early in January of $t+1$. This is the first year in which January parents can claim their newborns. For filers with Schedule C income, the degree of bunching for these January parents is very similar to the year t bunching of December parents shown in the top left-hand panel of Figure 7. This figure is available upon request.

[20]Note that Chetty et al. (Forthcoming) do find evidence that wage income bunches around the first EITC kink point in the year of a child's birth, but only in geographic ares with the highest levels of EITC awareness. This suggests that the most tax-savvy wage earners do adjust post-birth real labor supply. They also find, as we do, that many filers with Schedule C income do not bunch their income, suggesting that not all people avail themselves of the opportunity to maximize their subsidy, perhaps because they are willing to pay to be honest as suggested in LaLumia and Sallee (2013).

were made, and there is simply too little time for labor supply adjustments once a child is born at the end of December.

An alternative explanation is based on heterogeneity. Suppose that the most tax-savvy parents are the ones who ensure that their child is born in December, and they are also the ones most likely to bunch their income. Under this explanation, parents of children with late December birthdays would be more tax-savvy on average than parents of children with early January birthdays. If true, we should expect to see the differences in bunching persist across birth months even when children are older. We find the opposite. As soon as January self-employed parents are first able to claim their newborn children, they exhibit a degree of bunching that matches what we find for parents of December newborns (results not shown). This weighs against the notion that December bunching is isolated to a different "strategic type."

If the differences in the income distribution are not due to real labor supply or compositional differences across parents of children born in different birth months, then the differences must be due to reporting differences, which may represent legal avoidance or illegal evasion. Legal avoidance could take two forms. The first is a shifting-forward of income realization into the year of the child's birth (from the subsequent year) among December parents. Forward-shifting normally requires that some action, like actual collection or at least invoicing, be performed before the end of the calendar year. Parents of a child born in the last week of December have little time to carry out these actions. In our data, December parents report on average \$1000, or around 1/12th, more in Schedule C income than January parents. It seems likely that low-income Schedule C filers are engaged in informal work where cash exchanges prevail, invoices are uncommon and capital expenditures and inventories are limited. If true, then the opportunities for intertemporal shifting of income would be limited. This weighs against (but does not entirely rule out) legal forward shifting of income as an explanation.

A second form of legal avoidance is to alter reported net self-employment income not by increasing the amount of reported income itself but by deducting fewer business expenses. Decisions about which costs to deduct can be made in a short window of time while having a large impact on annual income. We have no direct way of ruling out this mechanism, the legality of which is murky, but note that it has the same revenue impact as pure evasion because it implies foregone revenue (that is, greater EITC payouts) that is not recovered in a subsequent year.

Our setting provides new evidence that the bunching around the first EITC kink point is due to strategic reporting and not to real labor supply responses. Moreover, it seems that evasion is the most likely explanation, though subtle forms of avoidance cannot be completely ruled out. This is potentially at odds with the findings of Kleven, Knudsen, Kreiner, Pedersen and Saez (2011). They use randomized audits in Denmark to conclude that the bunching of self-employment income around kink points in the Danish tax schedule is about one-third attributable to evasion and about two-thirds attributable to legal avoidance methods that are not overturned in an audit. It is, of course, possible that the breakdown of evasion and avoidance is different for a random sample of Danish taxpayers than it is for low-income filers in the U.S.

Lastly, we provide a back of the envelope calculation of the EITC overpayments made as a result of this reporting response, under the assumption that the response represents tax evasion resulting from filers claiming false income to maximize their return. Here, we use data from the placebo period (December 1 to 7 and January 25 to 31) to isolate the effects of misreporting, but our estimates are similar if we use data from the treatment period. We compute a difference-in-differences of the mean tax savings associated with a December birth. The first mean value for our difference-in-differences estimate is the tax value, in the year of their birth, for all children born in December ($1764). The second is the tax value for these same children when we recode all Schedule C income as zero ($1697). The difference between these two values ($67) indicates how much reported Schedule C income, which includes both real labor supply and evasion (or avoidance), raises tax values on average. We then calculate the corresponding values for children born in January ($1746 and $1696). Because we are using the tax information for the year prior to the child's birth to calculate tax values as if they had been born in December (as we do throughout the paper), the birth of these January newborns provides no marginal incentive to evade. The difference for January births ($50) reflects the tax value resulting from real Schedule C income but not evasion. The difference-in-differences, which is $17, is thus an estimate of the revenue lost due to Schedule C evasion, per child claimed in the tax code, averaged over all children including those not eligible for the EITC and those not evading. In our sample period, from 2001 to 2010, there were an average of 3.8 million newborns per year claimed on tax returns. Thus the annual amount of tax evasion attributable to Schedule C misreporting by new parents is $17 * 3.8 million per year = $65 million per year.[21]

If the revenue lost is due to evasion, there is no reason to think it will be limited to the year in which the child is a newborn. The EITC is available as long as a child is younger than 19, or up to 24 if the child is a full time student, and Dowd and Horowitz (2011) show that the probability a child is claimed as a dependent for the EITC declines with the child's

[21] We get a very similar answer if we perform the calculation on just those who file the EITC, for whom the difference-in-differences estimate finds the per child revenue loss to be $40. Considering the fraction of children claimed on the EITC, the total cost is very close to our estimate here.

age. From their results, we estimate that \$65 million per year for newborns translates to \$753 million per year for children of all ages.[22] This is a rough calculation, but it is useful in giving a sense of the order of magnitude of the reporting response. While significant, \$753 million is only around 4.5% of the total amount of overclaiming related to the EITC in tax year 2010 (Government Accountability Office 2011), and about 1.3% of the \$60 billion of federal EITC spending in 2010.

5.2 Noncompliance Biases Estimates Upward

We have argued that filers with a December newborn changed their reported income so as to maximize the value of the EITC. This will raise the average tax value of December births and bias our results upward. There are several ways to deal with this challenge. One method is to estimate our main specification on the sample of those who do not have any Schedule C income. Dropping those observations lowers our sample size by 148,047 (18%), with 73,123 coming from January and 74,924 coming from December. This method gives us a sample of observations less likely to have manipulated income, but it drops somewhat more observations from December and eliminates a potentially interesting part of the sample. Alternatively, we recalculate tax values based on all sources of income except for Schedule C income; that is, we change Schedule C income to zero for all filers and re-estimate $TaxValue$. This alternative, less easily manipulated, tax value measure can be used directly as the regressor of interest or it can be used as an instrument for the original tax value, in which case it isolates the variation attributable to all non-Schedule C factors.

Table 4 shows the sensitivity of our results to alternative treatments of Schedule C income. In all cases the set of controls matches column 4 of table 2. Any one of the three alternatives reduces the estimated tax effect for children born around the turn of the year. The tax effect falls to 0.0111 when Schedule C filers are dropped and to 0.0081 or 0.0094 when the zero-Schedule-C tax value calculation is used in the reduced form or as an IV, respectively. The second column in table 4 repeats this analysis for the placebo sample of the first week of December and the last week of January. The significant 0.0054 *TaxValue* coefficient found in the baseline placebo estimate falls substantially, to 0.0014, when all filers with Schedule C income are dropped. When using the tax value that sets Schedule C income equal to zero, either as an IV or in the reduced form, the placebo effect becomes a tightly estimated zero.

[22] Specifically, Dowd and Horowitz (2011) report that 43% of newborns appear on an EITC return but only 22% of 11 year olds are claimed. For our calculation, we assume that the decline in claiming is linear between newborns and 19-year-olds, and interpolate the number of children appearing at each age. This calculation suggests that newborns who appear on an EITC return appear, on average, 11.6 times in their life. We further assume that the amount of evasion attached to each child is constant over the age distribution, so our estimate is \$65 million times 11.6.

Together, these results suggest that strategic reporting of self-employment income biases the baseline results upwards. Correcting for this confounding effect lowers our preferred estimate of the effect of taxes on the probability of a late December birth to approximately 0.9 percentage points, roughly one-third smaller than the estimates in table 2.

5.3 Non-tax Convenience Effects Are Small

Parents and physicians may prefer that labor and delivery occur when a hospital's staffing level is high and its patient count is low. Weekdays tend to have greater numbers of hospital employees at work and lower risks of mortality from some causes (Bell and Redelmeier 2001), and average daily birth counts are higher on weekdays than on weekends. Similarly, anticipated hospital crowding on holidays, including New Year's Day, might influence parents to schedule births for shortly before a holiday. If a preference for holiday avoidance is negatively correlated with *TaxValue*, our baseline estimates will understate the causal impact of taxes on the probability of a December birth.

To quantify this potential bias, we estimate the relationship between tax values and having a child at another "convenient" time, either on a weekday or just before a major holiday. There is no tax provision that treats weekday births more favorably than weekend births. Thus, any relationship between the tax value of a newborn and the probability of a weekday birth cannot be measuring a causal effect of taxes. Instead it must reflect spurious correlation between child-related tax benefits and the propensity to schedule a birth for a time when hospitals are fully staffed. Similar logic applies to any relationship between *TaxValue* and the probability of a pre-holiday birth for holidays other than the New Year.

Column 1 of table 5 predicts whether a birth occurs on a weekday. Here we use a sample of births from the first week of December, a time without any significant holidays and too early to plausibly contain births that have been accelerated for tax reasons. There is a positive and statistically significant correlation between taxes and weekday birth, but it is small—around 10% of the magnitude of our baseline estimates. Columns 2 through 6 consider samples of births occurring in two-week windows centered around other holidays. We consider Memorial Day, July Fourth, Labor Day, Thanksgiving, and Superbowl Sunday.[23] In each case we repeat our main specification with the same set of controls, where the dependent variable is coded as 1 if the birth took place in the week before the holiday. All of the estimated coefficients are small, with the largest one-tenth the size of our main estimate. The coefficient for Memorial Day is significant at the 10% level, but all other estimated effects are statistically

[23]We define a holiday as the first day of an extended work weekend. The Memorial Day and Labor Day holidays begin on the Saturday before the Monday holiday, the Thanksgiving holiday begins on Thursday, and the Superbowl holiday begins on Saturday.

insignificant at conventional levels. These results weigh against concerns that correlations between tax values and propensities to time births for convenience have a significant impact on our estimates.

5.4 Accounting for Missing Tax Data Lowers Estimated Tax Effect

As documented in section 3.4, infants born in December are systematically less likely to be claimed on a tax return in the year of their birth than are infants born in January. This means that our baseline analysis may suffer from bias due to missing data. Accounting for this bias drives down our estimated tax effect still further.

A newborn might fail to appear in the tax data for three reasons. First, if the parent makes a typo in entering the number or the IRS makes an error in transcribing the data, we will be unable to find the newborn's SSN in the tax data. This type of random error surely accounts for some missing children, but it cannot explain a seasonal pattern.

Second, the rightful claimant of the child might not file his or her taxes at all. Some people fall below the filing threshold, so they are not required to file taxes. Such filers with children, however, will most likely qualify for a refund from the EITC if they have any earned income. Filers may not realize this immediately, however. If learning about the EITC takes time, this could explain our seasonal pattern. Parents who have a child in January have 14 months to learn of their eligibility in order to file in the year of their child's birth, whereas parents who have a December birth have only 4 months.

Third, the potential claimant of the child might file his or her taxes but not claim the child. This would be a costly mistake in nearly all cases (the exception being if the filer had exactly zero tax liability for the year). The most obvious explanation for this would be if parents do not realize that a child born at the end of the year qualifies as a dependent. Eligibility confusion is plausible, as it is not altogether intuitive to think that a child born, for example, on December 31 should qualify a family for a year's worth of benefits.

The instructions for the 1040 do not necessarily resolve such confusion if it exists. For example, the 2012 instructions list a variety of conditions for deeming a child a dependent, including that the child "lived with you for **more than half** of 2012. If the child did not live with you for the required time, see *Exception to time lived with you*, later" (bold font added). Several pages later, the exception explains that "if the person meets all other requirements to be your qualifying child but was born or died in 2012, the person is considered to have lived with you for more than half of 2012 if your home was this person's home for more than half the time he or she was alive in 2012." To a tax lawyer, this makes clear that a newborn can be claimed (although what if the child did not leave the hospital until January?), but it seems likely that not all individuals find this section of the instructions and interpret it correctly.

If eligibility confusion is the cause of the missing December newborns, then the discrepancy between December and January births appearing in the tax data should disappear when children are older. This is exactly what we find. In our data, we identify 405,252 children born in the last week of December and claimed on a tax return in the year of their birth. We find 414,598 children born in the first week of January and claimed on a tax return, which makes December births 49.4% of our sample. When we look instead at one-year olds claimed on tax returns, we find 468,753 children born in the last week of December and 449,734 children born in the first week of January. December births account for 51.0% of the one-year-olds claimed on tax returns and born in the two-week period centered around the turn of the year. This matches precisely December's share of Vital Statistics births in the corresponding two-week windows between 1994 and 2002 (excluding the millennium).[24]

To consider the possible impact of these missing observations on our regression estimates, we impute a tax value for each child missing in his year of birth but observed one year later, and add these observations into our sample. We must observe income in order to impute a tax value. Thus we use slightly different procedures to calculate tax values when a parent is missing from the tax universe in the year of her child's birth and when the parent files but fails to claim the newborn. If the parent did file in the child's birth year, we apply our standard tax value estimation procedure.[25] If the parent did not file in the child's birth year, we pull income information from the return filed in the following year, when the child was one. This is less reliable than our standard tax value calculation, as income fluctuates across years. Nevertheless, an examination of these values should give us a sense of whether and how the absence of some newborns from the tax return data influences our estimates.

Table 6 shows regression results when children who are missing from the tax data as newborns but present as one-year-olds are included in the sample. The top panel repeats our baseline procedure with no correction for potential misreporting of Schedule C income. Adding parents who did file in the year of the child's birth without claiming the newborn (column 2) drives down the *TaxValue* coefficient from around 0.0154 to 0.0111. Including our imputed tax value for those who did not file at all in the year of the newborn's birth (column 3) drives down the estimate still further to about 0.0052.

[24]The tax data and the Vital Statistics data cover different years, so this coincidence does not guarantee that we have completely resolved the puzzle of missing December births, but it does suggest that the December versus January imbalance is a short-term phenomenon.

[25]Of the 63,501 December-born children who are missing as newborns and present at age one, two-thirds have parents who filed in the birth year but failed to claim the newborn. Of the 35,136 January-born missing newborns, 54% had a primary filer who filed in the birth year.

The bottom two panels correct for Schedule C misreporting by using an estimate of tax value that excludes Schedule C income completely, or a two-stage least squares analysis that uses the tax value estimated without Schedule C income as an instrument for the fully inclusive tax value. Results are similar across the two methods. When we include parents who filed in the year of birth, but failed to claim the newborn, our estimated tax coefficient falls by 40%, from 0.0094 to 0.0056 in Panel B and 0.0081 to 0.0048 in Panel C. When we also include in our sample parents who did not file a tax return in the year of the newborn's birth, but did file and claim the one-year-old in the following year, our coefficients become even smaller and are no longer statistically significant. The estimated tax value for this group is far more speculative than our other estimates, however, because it relies on tax data from a year other than the year of the child's birth. For that reason, we do not emphasize these results other than to note that the uneven representation of December and January newborns in tax return data appears not to be biasing our results downwards. If anything, correcting for this issue lowers our estimated tax effects.

We can also use these imputed tax values for children missing from the tax code in the year of their birth to calculate the amount of money left on the table by tax filers. Newborns who do not appear in the tax data could be the result of a parent entering an SSN incorrectly, a transcription error on the part of the IRS, changes in family structure over time, or taxpayer confusion about the legality of claiming a newborn. The incremental increase in the number of children not claimed in December, as compared to January, however, seems most likely to be due to taxpayer confusion about their ability to claim a newborn. Of January births, 4.3% of those who are claimed as a one-year-old do not appear in the data when they are newborns, but their primary filer has a return. For December births, 9.6% of children fit that description, suggesting that around 5.3% of December newborns are not claimed in the year of their birth because of confusion or other mistakes. Our data suggest that the failure to claim these 5.3% of newborns is not because they had particularly low tax values—we estimate that the mean tax value in that group is $1,706 (as compared to $1,779 in our main sample). This suggests that a modest number of filers may be leaving a significant amount of money on the table due to confusion about the tax code or other frictions that prevent proper filing.

6 Why Is There Not More Tax-Induced Birth Timing?

We have used data from tax returns to estimate a very small effect of taxes on birth timing. This small magnitude might be surprising in light of the estimates of Dickert-Conlin and Chandra (1999). However, in this section we establish, using Vital Statistics data, that the total amount of birth timing around New Year's Eve is small. It is smaller than the number of births shifted from a typical weekend to surrounding weekdays; it is smaller than the number of births delayed to occur just at the beginning of the new millennium; and it is similar to the number of births shifted forward to occur just before other major holidays. A small number of births being shifted at the margin along which there are tax benefits to shifting provides *prima facie* evidence that the effect of taxes on birth timing must be small.

To provide context for interpreting the quantity of birth timing around New Year's Eve, we analyze Vital Statistics data available from December 1994 to January 2002.[26] Considering only the last week of December and the first week of January, 51.0% of births take place in December. If the counterfactual is an equal number of births in each of the two weeks, then the 51.0% ratio is consistent with 2% of early-January births being shifted. Christmas complicates this analysis. If some births are accelerated from the last week of December to earlier in December, we may be understating the percentage of early-January births being shifted. Thus, we also compare the number of births in the first week of January to the number that occur in the last two weeks of January. That comparison suggests that 6.4% of births shift out of the first week of January.[27] Looking at day-specific birth counts suggests that most births shifted out of the first week of January would otherwise have occurred on January 1 or 2. Together these two days contain 17% fewer births than the average two-day period at any other point in January.

To determine if this amount of birth shifting is large or small, we compare it to the amount of shifting evident at other times. Approximately 20% of births take place on a typical weekend, whereas we would expect 2/7ths, or 28.6%, if all births took place on random days. This implies that 30% of births expected to take place on a weekend are shifted to a weekday, almost double the amount of shifting around New Year's Eve. A second comparison is to birth timing around the millennium. The number of births in the first week of January 2000 exceeded the number in the last week of December 1999. The fraction of December births in that two-week window was only 48.5%. While the first week of January typically contains fewer births than any other week in January, in 2000 it contained 2.6% "extra" births. This suggests that the willingness to shift births into the first days of the new millennium, with no associated monetary benefit, swamps willingness to shift births in response to tax incentives. A third comparison comes from other holidays. Of the births that take place within a two-week window around Thanksgiving, 52.5% are in

[26]We examine these years because counts of births by exact date are not publicly available in other years. We omit December 1999 and January 2000 because of the millennial effects, in which extra births occurred in early January. Including those months would make forward-shifting around the New Year look even smaller.

[27]Calculations based on comparing the first week of January to the next three weeks in January, the 8th to the 28th, yield nearly identical estimates.

the week before, suggesting that 5% of births that would take place in the week starting with Thanksgiving are accelerated. In the two week periods centered around July Fourth, Memorial Day, Labor Day and Christmas, the pre-holiday week contains from 50.6% to 51.1% of births. Thus, the small degree of tax-motivated shifting we have estimated with tax return data is corroborated by patterns observed in Vital Statistics data.

In the remainder of this section, we explore several barriers that may explain why so few people accelerate receipt of tax benefits by scheduling births for late December. As discussed above, some individuals may be unaware that having a December newborn entitles them to the full tax benefits of a dependent. The pattern of missing December newborns is consistent with such confusion. In addition, we provide evidence that delays in receiving Social Security Numbers and physician preferences on the supply side of the market might play a role in dampening the birth timing response to tax incentives.

6.1 Delays in Social Security Numbers May Cost Some Taxpayers

To claim a dependent child on a tax return, a filer must list the child's Social Security Number on the 1040 (LaLumia and Sallee 2013). Obtaining an SSN is not an instantaneous process, and in fact typically takes several weeks. Although the parent of a late-December newborn will almost certainly have received her child's SSN by the standard April 15 filing deadline, a large majority of individuals file well in advance of this deadline. Low-income individuals are particularly likely to file early. In recent years, more than 50% of refundable EITC payments are made in February (LaLumia 2013), indicating that the recipients of these payments filed at some point in February or late January. As a result, some filers—particularly low-income filers—may not have their child's SSN at the time that they otherwise wish to file.

Choosing to file early, and forgoing the opportunity to claim a newborn whose SSN has not yet arrived, is an expensive choice. However, it is one low-income filers might make if they are not well-informed, if they face liquidity constraints, or if they are extremely impatient. It may be inconvenient and costly for taxpayers to assemble their tax documents and go to a tax preparation location. If they first learn of the SSN requirement while meeting with the tax preparer, they may be unwilling to endure the hassle of leaving and returning a second time after some delay. We also know from the study of refund anticipation loans that filers are willing to take loans with extremely high implicit annual interest rates (Berube, Kim, Forman and Burns 2002). This costly choice of the filer is not necessarily countered by the incentives of a paid preparer because the preparer likely has a strong incentive to get a filer to complete her return in a single visit. Preparers serving this population may not trust that their clients will return if sent away, so the preparers may not have an incentive to advocate that the filer wait for an SSN to file.

There is variation across states in the average time elapsed between a child's birth and her parents' receipt of a Social Security number. The process begins with parents filling out an application at the hospital immediately following the birth of their child. That document is processed by a state agency, which then forwards the information to the federal Social Security Agency, which takes around two weeks to process the form and mail a Social Security card to parents. SSA reports on its website the average time that it takes each state to process a form, which ranges from 1 to 5 weeks.

Figure 9 shows that states with longer average SSN processing times have more December newborns missing from tax return data. The vertical axis, computed from tax return data for births in the two-week window around the turn of the year, measures the state-specific fraction of births in the last week of December. A lower value suggests that more December-born newborns are missing from the tax return data. The horizontal axis measures the average processing time, in weeks. A fitted OLS regression line is included in the figure. The slope coefficient from that regression is -0.0036, with a standard error of 0.0014.[28] This indicates that states with longer delays have relatively fewer late-December births appearing in tax return data, consistent with the hypothesis that delays in obtaining an SSN explain some portion of the cases in which parents fail to claim an eligible child.

6.2 Some Willing Parents May Be Unable to Shift

The decision to shift a child's date of birth is not made unilaterally by parents. Birth dates are manipulated by the scheduling of delivery, involving either labor induction through the use of pitocin or the performance of a cesarean delivery. Either procedure requires the cooperation of a doctor. If delivery is already being scheduled for reasons unrelated to taxes, any additional shifting of birth is likely to be low cost because parents need only request a difference in delivery date. If delivery is not already being scheduled, then parents desirous of tax benefits would have to convince their doctor to schedule the birth.[29]

As demonstrated in figure 2, the greatest rise in child-related tax benefits in recent years has been for low-income filers eligible for the EITC. Many of these low-income patients will be covered by Medicaid. Medicaid recipients are less likely to have cesarean deliveries than are privately insured patients, and there is a positive relationship between Medicaid

[28]Circle sizes indicate state population. The coefficients are very similar, and are statistically significant, whether or not the data are weighted by population size. They are also similar when monthly counts of December and January births are used in place of weekly counts.

[29]Baicker et al. (2006) argue that geographic differences in cesarean rates appear to be driven by supply side factors related to doctors, rather than demand side factors related to patients, which supports the reasoning developed here.

reimbursement rates for c-sections and the number of c-section deliveries (Gruber, Kim and Mayzlin 1999; Currie and Gruber 2001). Doctors may be more willing to cater to the preferences of those with generous private insurance and choice of provider.[30] If the parents who have the highest tax values are less able to shift their births, this will limit the strength of any tax incentives and mute any effect of rising average benefits in the time series.

Auxiliary evidence on the ability of different demographic groups to choose the timing of their birth comes from Vital Statistics data. Table 7 shows that mothers from less advantaged backgrounds are less likely to have given birth via c-section or induction, and are more likely to have a weekend birth. Both patterns suggest that low-income mothers have less ability to choose a tax-advantaged birth date. This helps to explain why we estimate only a small effect of taxes on birth timing.

7 Conclusion

Our results cast doubt on the hypothesis that, over the last decade, large numbers of parents have strategically shifted the timing of childbirth in response to tax incentives. Our research has the benefit of using actual tax return information, which greatly improves the accuracy of estimated tax values, and large estimation samples drawn from the universe of tax returns. Our results do show a positive correlation between tax values and the probability that a child is born in December, but that correlation is quite small and precisely estimated. We estimate that an additional $1000 of child-related tax benefits increases the probability that a child is born in the last week of December rather than the first week of January by only about one percentage point. These findings are similar to the conclusions of Maghakian and Schulkind (2011), but they differ greatly from the magnitude of the findings in Dickert-Conlin and Chandra (1999).

We estimate a small correlation between birth timing and taxes, but this is commensurate with the modest amount of birth timing that takes place around New Year's Eve. This begs the question of why there is not more strategic birth timing to begin with, especially given the apparent willingness of parents and physicians to alter birth timing around other dates, like holidays, weekends or the millennium. Our partial explanation is that many of the filers with the most to gain—low-income parents eligible for the EITC—may have the least control over medical procedures and may be the least likely to have a scheduled delivery, which facilitates tax-motivated timing.

Another partial explanation is related to a new fact we document, which is that the

[30] When patients giving birth are themselves physicians, c-section rates are lower and there is little relationship between reimbursement rates and the probability of a c-section (Johnson and Rehavi 2013).

percentage of December-born children claimed immediately on tax returns is lower than the percentage of January newborns claimed at the first available opportunity. The pattern of newborns not claimed on tax returns is suggestive both of confusion regarding eligibility and omissions caused by delays in the issuance of Social Security Numbers. Both factors suggest that some low-income filers, many of whom have high tax values, face obstacles that keep them from taking advantage of child-related tax benefits.

Finally, our analysis also uses a novel approach for identifying noncompliance in self-employment income for recipients of the EITC. Our evidence is based on comparing the tax returns of parents who had children a few days apart, either in late December or early January. The self-employment income of parents of December newborns diverges sharply from their January counterparts, which is difficult to explain in terms of actual labor supply given the similarity of their demographic situation. This is consistent with previous findings in the literature regarding the role of self-employment income with regards to the EITC, but our approach offers stronger evidence that this strategic reporting represents evasion rather than avoidance.

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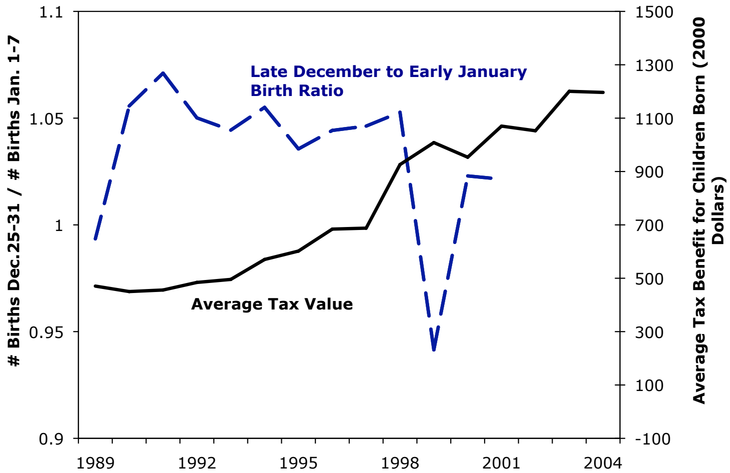
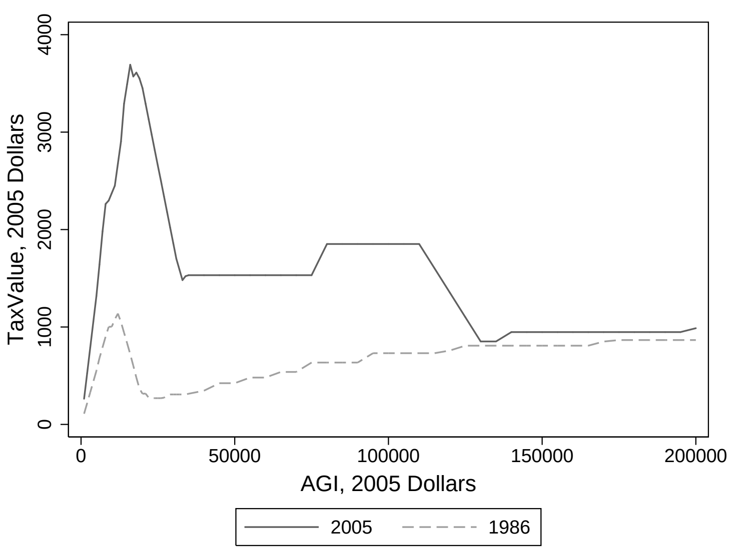
Figure 1: Average Tax Savings Per Child and Ratio of Late December to Early January Births Over Time



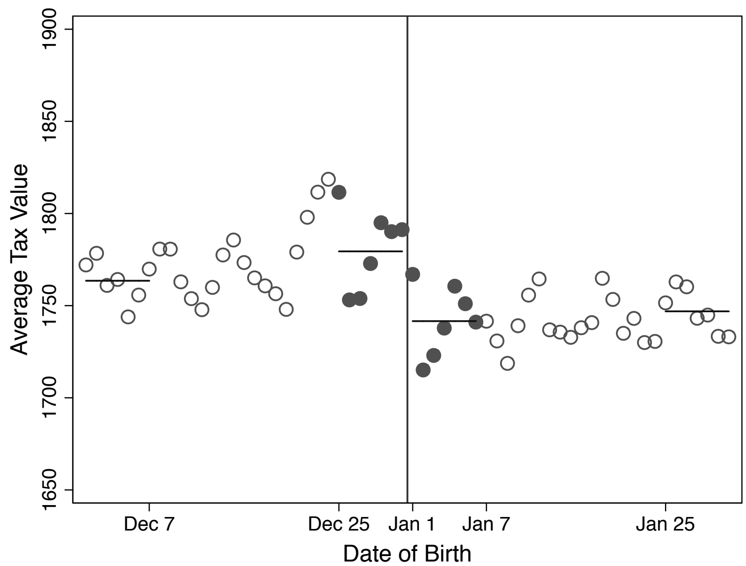
Source: Birth counts come from the Vital Statistics. Public use versions of these data do not include counts of births by exact day after 2002. Average tax values are estimated from the March CPS and TAXSIM.

Figure 2: Tax Savings from a December Birth, by AGI



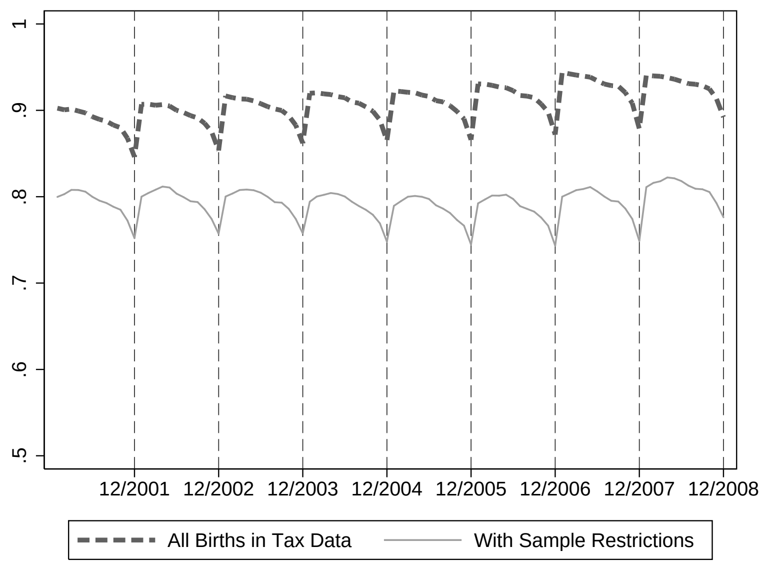
The figure plots the combined federal and state tax savings associated with claiming a first dependent, for a married couple filing in Virginia. Dollar amounts are reported in 2005 dollars.

Figure 3: Tax Value by Date of Birth



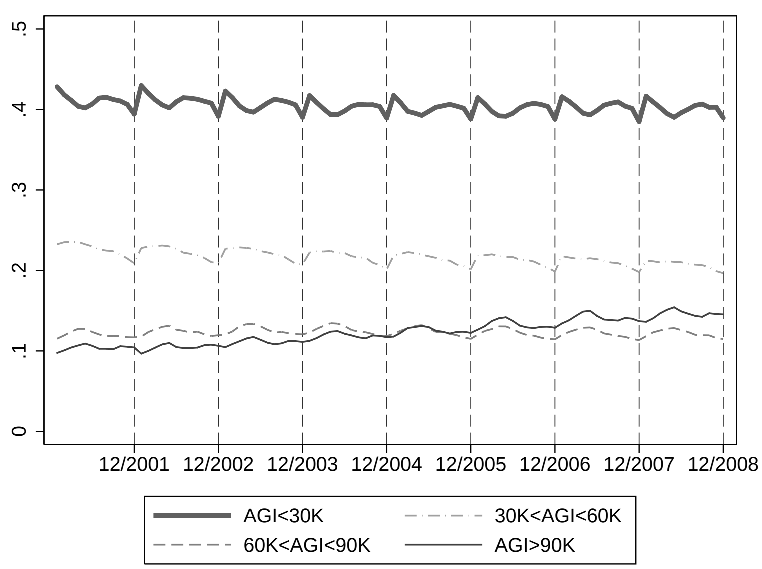
This figure plots the mean value of combined federal and state tax savings associated with a December birth, by the child's date of birth, for all December and January births meeting the sample restrictions. The shaded data points are the ones used in our main estimation sample. The horizontal bars indicate averages over several time periods, namely December 1 - 7 (placebo treatment period), December 25-31 (true treatment period), January 1-7 (true control period) and January 25-31 (placebo control period).

Figure 4: Ratio of Tax-Based Count to Vital Statistics Count



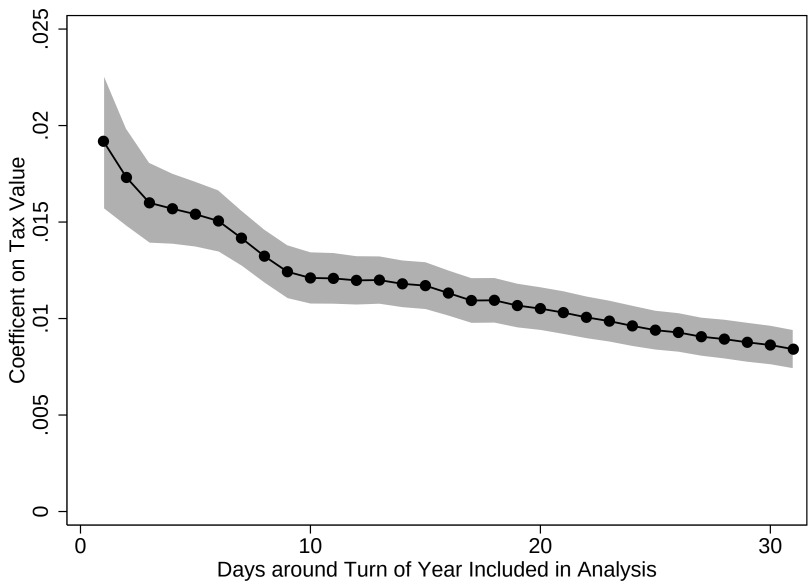
Each line shows the ratio of month-specific counts of newborns appearing in tax return data to corresponding month-specific counts from Vital Statistics data.

Figure 5: Ratio of Income-Specific Tax Counts to Total Vital Statistics Counts



Each line shows the ratio of the number of newborns claimed by parents in a particular AGI category to the corresponding month-specific count of all births appearing in Vital Statistics.

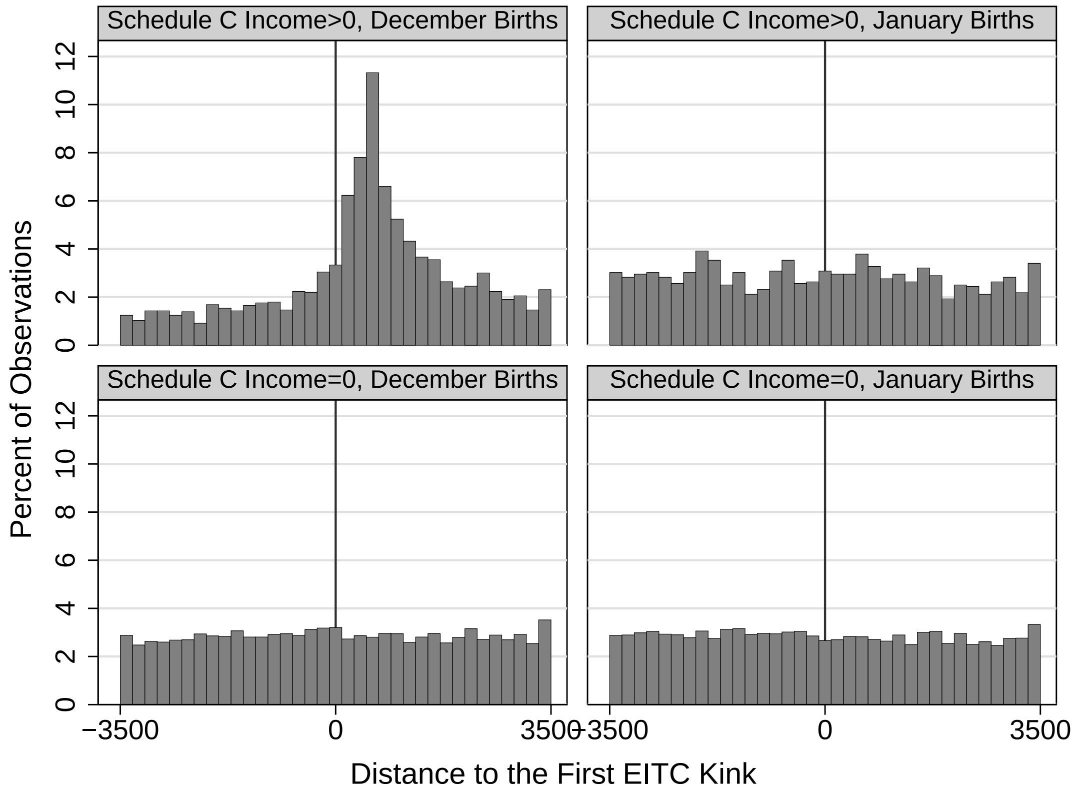
Figure 6: Coefficient on Tax Value, by Days Included in Sample



Each point represents the coefficient on *TaxSavings* from a linear probability model predicting December birth. The shaded area shows 95% confidence intervals. The number of birth dates included in the regression gradually increases from births at most one day from the turn of the year on the left-hand side of the figure (that is, December 31 and January 1 births only) to births up to 31 days from the turn of the year on the right-hand side of the figure (that is, all births occurring in the months of December and January).

Figure 7: Distribution of Distance Between Income and First EITC Kink by Self-Employment and Birth Month: Filers For Whom Birth is First Child

(a) Distribution By Month and Schedule C Status



(b) Difference in Distribution Across Months for Schedule C Filers

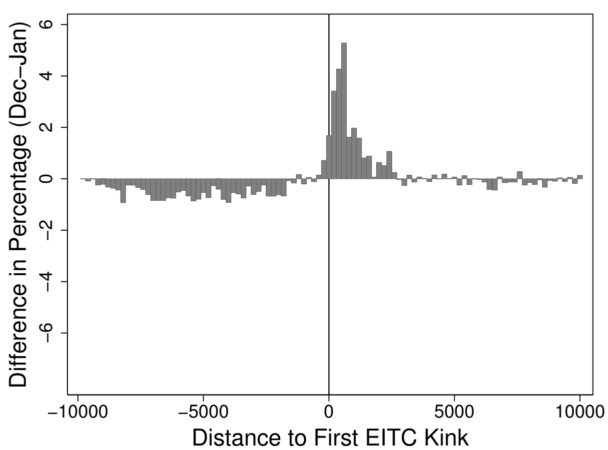
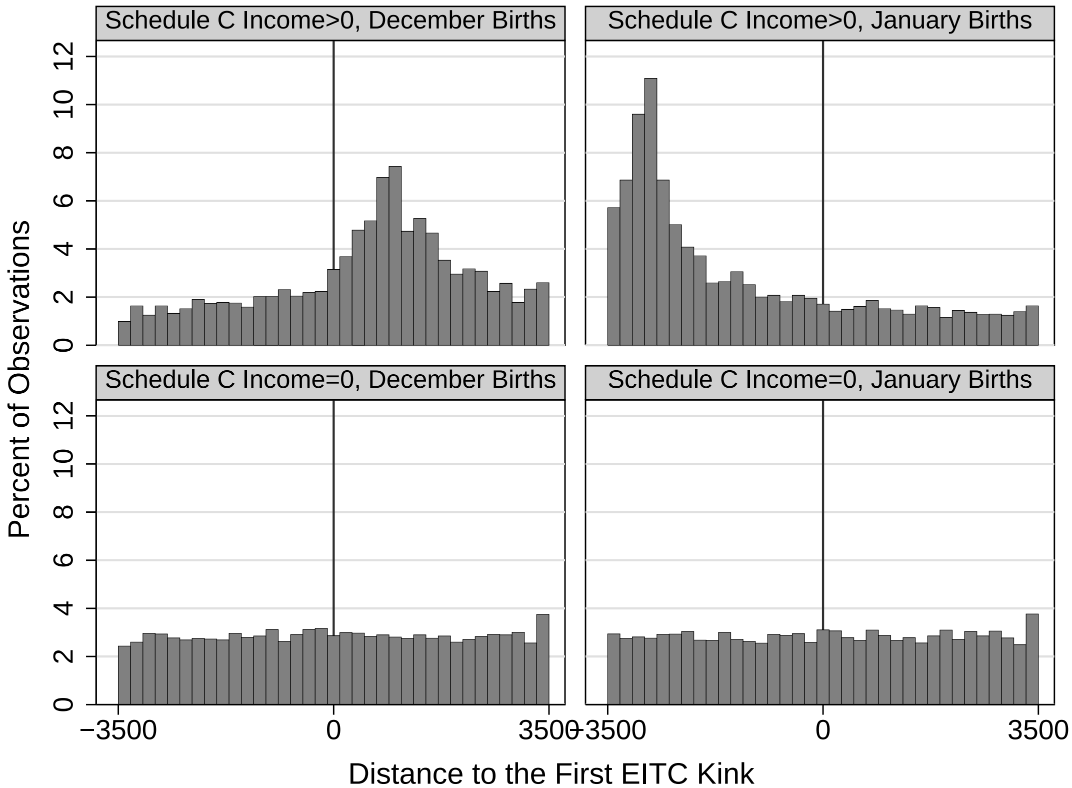


Figure (a) plots the distribution of the difference between earned income in year t and the minimum amount of earned income that would maximize the EITC receipt for the filer had the child been born in that year.

Figure 8: Distribution of Distance Between Income and First EITC Kink by Self-Employment and Birth Month: Filers For Whom Birth is Second Child

(a) Distribution By Month and Schedule C Status



(b) Difference in Distribution Across Months for Schedule C Filers

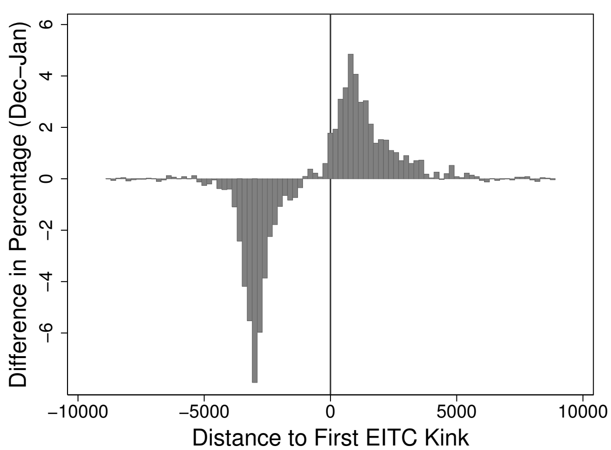
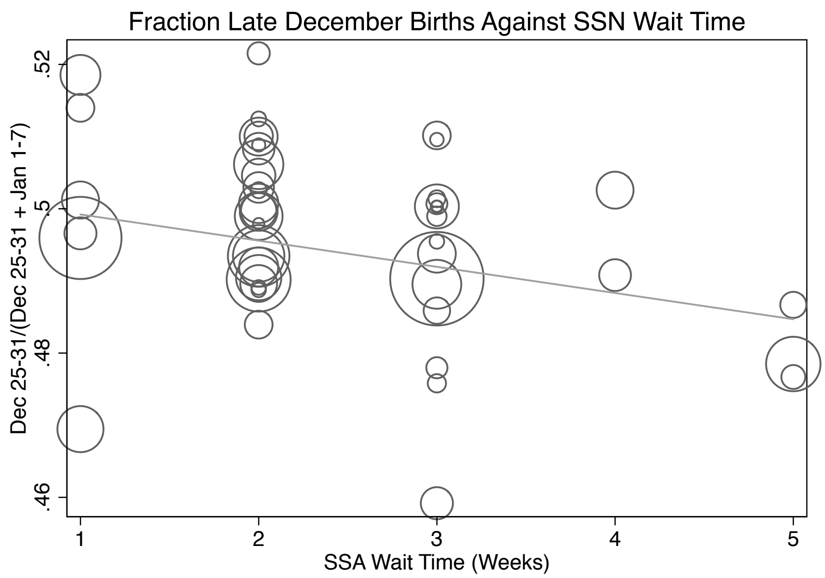


Figure (a) plots the distribution of the difference between earned income in year t and the minimum amount of earned income that would maximize the EITC receipt for the filer had the child been born in that year.

Figure 9: Fraction of Births in December Out of All Births in Two-Week Window Against Reported Average SSN Wait Times by State



Average wait times for a SSN by state are taken from the Social Security Administration's website. Parents must wait an additional two weeks for processing by SSA after SSA receives an application from the state agency. Circle sizes are proportional to the number of births in each state. The fitted line is a regression line fitted to the weighted data.

Table 1: Descriptive Statistics

	Full Sample	December Births	January Births
Tax value	1759.45	1779.45	1739.90*
	(1003.92)	(985.39)	(1021.33)
AGI	68461.64	69517.56	67429.52*
	(341,486)	(350,824)	(332,102)
Mother has wages>0	76.1	76.8	75.4*
	(42.7)	(42.2)	(43.1)
Mother's wages	21417.64	21846.88	20998.08*
	(34897.43)	(36148.69)	(33624.16)
First child	39.9	39.9	39.9
	(49.0)	(49.0)	(49.0)
Second child	37.6	37.8	37.5
	(48.4)	(48.5)	(48.4)
Third child	16.5	16.5	16.6
	(37.1)	(37.1)	(37.2)
Fourth child	5.3	5.3	5.3
	(22.3)	(22.3)	(22.4)
Fifth or greater child	0.6	0.6	0.7*
	(7.9)	(7.6)	(8.3)
Married	74.2	74.3	74.1
	(43.7)	(43.7)	(43.8)
Mother's age	29.4	29.5	29.3*
	(6.4)	(6.3)	(6.5)
Child is male	51.1	51.1	51.1
	(50.0)	(50.0)	(50.0)
Urban	80.7	81.0	80.4*
	(39.5)	(39.3)	(39.7)
Observations	819,850	405,252	414,598

Standard errors are in parentheses. A star in the last column indicates that the means for December and January births are significantly different at the 5% level. For January births, characteristics are measured in the tax year prior to the birth.

Table 2: Predicting December Birth, OLS Results

	No Controls	Closest to DCC	Alternative Specifications				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Tax Value	0.0098***	0.0134***	0.0151***	0.0154***	0.0153***	0.0168***	0.0153***
(in $1000s)	(0.0007)	(0.0007)	(0.0008)	(0.0008)	(0.0008)	(0.0009)	(0.0011)
Mom's Wages,		0.00014***	-0.0001***	-0.0001***	-0.0001***	-0.0001***	-0.0001***
$(t-1)$		$(2.11{\cdot}10^{-5})$	$(2.80{\cdot}10^{-5})$	$(2.76{\cdot}10^{-5})$	$(2.72{\cdot}10^{-5})$	$(2.77{\cdot}10^{-5})$	$(2.97{\cdot}10^{-5})$
Married		0.0058***	-0.0402***	-0.0416***	-0.0453***	-0.0381***	
		(0.0019)	(0.0025)	(0.0024)	(0.0025)	(0.0025)	
1st or 2nd Kid		-0.0043***					
		(0.0015)					
First Kid			-0.0191***	-0.0201***	-0.0192***	-0.0251***	
			(0.0068)	(0.0070)	(0.0068)	(0.0068)	
Second Kid			-0.0121*	-0.0121*	-0.0122*	-0.0159**	
			(0.0067)	(0.0069)	(0.0067)	(0.0067)	
Urban		0.0069***	-0.0006	0.0029**		-0.0004	-0.0005
		(0.0015)	(0.0016)	(0.0015)		(0.0016)	(0.0016)
AGI		$2.84{\cdot}10^{-6}$					
		$(1.75{\cdot}10^{-6})$					
Mother's Age		0.0013***					
		(0.0001)					
Year Dummies		Yes	Yes	Yes	Yes	Yes	
Mom's Age Dummies			Yes	Yes	Yes	Yes	
5-Piece Spline in AGI			Yes	Yes	Yes		
State Dummies				Yes			
Zip Code Dummies					Yes		
Flexible AGI Controls						Yes	Yes
Interact Income with Married, Kids							Yes
N	819,850	819,850	819,850	819,850	819,850	819,850	819,850
R^2	0.0001	0.001	0.005	0.006	0.046	0.005	0.006

Each column shows the result of a linear probability model predicting December birth. Columns 3 through 7 also include dummies for third- and fourth-order births. Standard errors are clustered on state by year. Asterisks indicate statistical significance as follows,*** 1%, ** 5%, * 10%.

Table 3: Predicting December Birth, Allowing Heterogeneity in C-Section Likelihood

	Adding State C-Section Rates		AGI	AGI	Higher Order
	Level	Interaction	Interaction	>100K	Births
	(1)	(2)	(3)	(4)	(5)
Tax Value (in $1000s)	0.0154***	0.0004	0.0142***	0.0206***	0.0219***
	(0.0008)	(0.0051)	(0.0007)	(0.0046)	(0.0012)
TaxValue · C-Section Rate		0.0005***			
		(0.0002)			
TaxValue · AGI			$9.39 \cdot 10^{-6}$		
			($6.31 \cdot 10^{-6}$)		
C-Section Rate	-0.0001	-0.0011			
	(0.0010)	(0.0010)			
Demographic Controls	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes
Mom's Age Dummies	Yes	Yes	Yes	Yes	Yes
5-Piece Spline in AGI	Yes	Yes	Yes	Yes	Yes
N	819,850	819,850	819,850	139,824	491,493

The table shows results of linear probability models predicting December birth. This matches column 3 in table 2, which has a tax coefficient of 0.015. Column 4 is limited to observations where the AGI on the return exceeds $100,000. Column 5 is limited to observations where the newborn is not the first dependent child claimed on the return. Standard errors are clustered on state by year. Asterisks indicate statistical significance as follows,*** 1%, ** 5%, * 10%.

Table 4: Sensitivity of Results to Potential Misreporting of Schedule C Income

	Treatment Period (Dec 25 - Jan 7) (1)	Placebo Period (Dec 1-7 and Jan 25-31) (2)
Baseline	0.0154***	0.0054***
	(0.0008)	(0.0008)
Alternative Treatments of Schedule C Income		
Drop Filers With Sch C≠0	0.0111***	0.0014*
	(0.0008)	(0.0008)
Zero Out Schedule C, Reduced Form	0.0081***	-0.0006
	(0.0007)	(0.0007)
Zero Out Schedule C, IV	0.0094***	-0.0007
	(0.0008)	(0.0008)

Each coefficient reports coefficients from a separate linear probability model regression that includes controls matching those in column 4 of table 2. The first column uses the main sample of data from the two weeks surrounding the New Year. The second column uses the first week of December and last week of January. Dependent variable is coded as 1 if the birth took place in December in either case. The first row reports a coefficient for our standard $TaxValue$ variable. The second row drops all observations with Schedule C income not equal to zero. The third row replaces the standard *TaxValue* calculation with the tax value estimated after setting Schedule C income equal to zero for all filers. The fourth row is the second stage coefficient from an IV regression where $TaxValue$ is instrumented by the tax value with Schedule C income set equal to zero. Standard errors are clustered on state by year. Asterisks indicate statistical significance as follows,*** 1%, ** 5%, * 10%.

Table 5: Are Tax Values Correlated with Birth Timing Around Weekends or Other Holidays?

	Birth Occurs on Weekday	Birth Occurs on				
		Memorial Day	July Fourth	Labor Day	Thanksgiving	Superbowl
	(1)	(2)	(3)	(4)	(5)	(6)
Tax Value (in $1000s)	0.0019***	-0.0011**	-0.0006	0.0006	0.0002	0.0001
	(0.0007)	(0.0005)	(0.0005)	(0.0005)	(0.0006)	(0.0005)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Mom's Age Dummies	Yes	Yes	Yes	Yes	Yes	Yes
5-Piece Spline in AGI	Yes	Yes	Yes	Yes	Yes	Yes
State Dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	435,977	1,122,110	1,139,469	1,145,207	1,030,983	1,085,168

The table shows results of linear probability models predicting birth in a particular time period. The control specification matches column 3 in table 2. For the weekday regression, the dependent variable is coded as 1 if the child is born on a weekday, as opposed to a weekend, and the sample is drawn from the first week of December. Each holiday period is a two-week symmetric window centered on (a) the Friday before the holiday weekend for Memorial Day and Labor Day, (b) the Thursday of Thanksgiving, (c) the Sunday of the Super Bowl and (d) the exact day of July 4. Data come from tax years 2001 to 2009. Standard errors are clustered on state by year. Asterisks indicate statistical significance as follows,*** 1%, ** 5%, * 10%.

Table 6: Sensitivity of Results to Treatment of Newborns Missing from Tax Returns

	Baseline	Parent Filed in Birth Year	Parent Filed in Subsequent Year
	(1)	(2)	(3)
A. OLS with no Schedule C correction			
Tax Value	0.0154***	0.0111***	0.0052***
(in $1000s)	(0.0008)	(0.0008)	(0.0006)
B. Zero Out Schedule C Income, IV			
Tax Value	0.0094***	0.0056***	-0.0006
(in $1000s)	(0.0008)	(0.0006)	(0.0007)
C. Zero Out Schedule C Income, Reduced Form			
Tax Value	0.0081***	0.0048***	-0.0006
(in $1000s)	(0.0007)	(0.0007)	(0.0006)
N	819,850	881,717	918,583

The table shows results of linear probability models predicting December birth. The specifications used in these regressions matches column 4 of Table 2. All regressions include a 5-piece spline in AGI, a set of maternal age dummies, state dummies, and year dummies. The two-stage least squares result use the tax value with Schedule C income zeroed out as an instrument for the full tax value. Standard errors are clustered on state by year. Asterisks indicate statistical significance as follows,*** 1%, ** 5%, * 10%.

Table 7: Method and Timing of Birth, by Mothers' Characteristics

	Percent C-section or Induced	Percent Weekend Births
Less than high school	35.7%	22.6%
High school degree	42.7%	20.7%
Some college	46.3%	20.0%
Four-years of college or more	45.8%	20.1%
Teen mother	34.2%	23.5%
Not teen mother	43.8%	20.5%
Born outside US	35.9%	23.0%
Native born	44.9%	20.1%
Total	42.8%	20.8%

The table reports the percentage of births that take place on Saturday or Sunday across different demographic characteristics of mothers in the 2002 Vital Statistics birth certificate records. If 2/7 of all births took place on the weekend, weekends would account for 28.6% of births.

Table A1: Predicting December Birth, Logit Results

	No Controls	Closest to DCC	Alternative Specifications				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Tax Value	0.0098***	0.0135***	0.0151***	0.0154***		0.0142***	0.0142***
(in $1000s)	(0.0007)	(0.0007)	(0.0008)	(0.0008)		(0.0007)	(0.0007)
Mom's Wages,		0.00016***	-0.0001***	-0.0001***		-0.0001******	0.0001***
$(t-1)$		$(2.29{\cdot}10^{-5})$	$(2.94{\cdot}10^{-5})$	$(2.91{\cdot}10^{-5})$	.	$(203{\cdot}10^{-5})$	$(2.08{\cdot}10^{-5})$
Married		0.0057***	-0.0406***	-0.0419***		-0.0387***	
		(0.0019)	(0.0025)	(0.0025)		(0.0018)	
1st or 2nd Kid		-0.0046***					
		(0.0016)					
First Kid			0.0058	0.0073		0.0303***	
			(0.0072)	(0.0073)		(0.0073)	
Second Kid			0.0107	0.0118*		0.0315**	
			(0.0070)	(0.0070)		(0.0070)	
Urban		0.0068***	-0.0006	-0.0021		0.0042***	0.0042***
		(0.0014)	(0.0015)	(0.0015)		(0.0015)	(0.0015)
AGI		0.0031					
		(0.0021)					
Mother's Age		0.0013***					
		(0.0001)					
Year Dummies		Yes	Yes	Yes	Yes	Yes	
Mom's Age Dummies			Yes	Yes	Yes	Yes	
5-Piece Spline in AGI			Yes	Yes	Yes		
State Dummies				Yes			
Zip Code Dummies					Yes		
Flexible AGI Controls						Yes	Yes
Interact Income with Married, Kids							Yes
N	819,850	819,850	819,850	819,850	819,850	819,850	819,850

Each column shows the result of a logit model predicting December birth. Columns 3 through 7 also include dummies for third- and fourth-order births. Due to computational limitations, we have not estimated column 5, which includes zip code fixed effects.