# The Gender Reveal: The Effect of Sons on Young Fathers' Criminal Behavior and Labor Market Activities

Kabir Dasgupta, André Diegmann, Tom Kirchmaier, Alexander Plum*

**Abstract**

Based on New Zealand's administrative court charges data, we document child gender-specific differences in future criminal behavior of young fathers. The deterrent impact of having a son on the future likelihood of receiving convictions persists for as long as ten years post-childbirth. Utilizing population-wide monthly tax registers and Census data, we provide key insights into the role model hypothesis. We show that young fathers with a son have (i) a higher likelihood of being in employment, (ii) higher wages & salaries, (iii) lower benefit dependency, (iv) better qualification, and (v) a higher likelihood of being in a partnered relationship.

- *We study child gender's effect on young fathers' crime and labor market outcomes.*
- *Empirical evidence is drawn from New Zealand's detailed administrative database.*
- *Having a son leads to a decline in young delinquent fathers' criminal behavior.*
- *The deterrent impact on crime is accompanied by increased labor market activities.*

**JEL Classification**: K42; J16; J13; J31; J64.
**Keywords**: Criminal behavior, Labor Market Performance, Young Fatherhood, Child Gender Preference.

*Corresponding author: **Alexander Plum**, Auckland University of Technology, New Zealand, *Email*: alexander.plum@aut.ac.nz.
Co-authors: **Kabir Dasgupta**, Federal Reserve Board, USA, *Email*: kabir.dasgupta@frb.gov; **André Diegmann**, Halle Institute for Economic Research (IWH), Centre for European Economic Research (ZEW), Germany, *Email*: andre.diegmann@iwh-halle.de; and **Tom Kirchmaier**, Centre for Economic Performance (CEP), London School of Economics (LSE) and Copenhagen Business School (CCG), United Kingdom, *Email*: t.kirchmaier@lse.ac.uk.

We thank all the participants of the annual conferences of the Australasian Society of Labour Economics (AASLE), 2021 and New Zealand Association of Economists (NZAE), 2021 who provided helpful feedback on our analysis. We are sincerely grateful to our two anonymous referees and our editor for their valuable comments and suggestions. All errors are our own.

# 1 Introduction

Family formation events such as forming romantic relationships and childbirths are considered to be positive milestones in a man's life. Both mothers and fathers tend to significantly adjust their behavior right from the prenatal stage (Massenkoff and Rose 2022). However, differences in fathers' parental investments, such as childcare, marital stability, fertility, and family income, are often driven by their gender preferences for children (Morgan et al. 1988, Dahl and Moretti 2008, Mammen 2008). García et al. (2018) show that families that raise girls tend to have poorer home environments and are more socio-economically disadvantaged than families with boys. Lundberg et al. (2007) observed that fathers are more likely to stay in the household if the child is a boy; conversely, Baker and Milligan (2016) document that parental preferences (for investing) are not influenced by the child's gender. It is also worth noting that parental preference for a child's gender can be influenced by socio-demographic attributes, including cultural norms, religious beliefs, and societal structures (Andersson et al. 2006, Barcellos et al. 2014).

In a recent study by Dustmann and Landersø (2021), the authors provide evidence for a link between criminal behavior and preference for a child's gender: young fathers aged 15-20 commit significantly fewer crimes when having a boy compared to those having a girl. As a potential explanation, the authors note that 'young fathers decide to act more responsibly and as a role model when they father a boy' (Dustmann and Landersø 2021, p. 3263). While Dustmann and Landersø (2021)'s results indicate that having a son prompts young fathers to distance themselves from criminal activities, our study seeks to build on and extend their empirical evidence by investigating whether those fathers reallocate their time to more productive activities to support their family.

Our study is the first to consolidate the dispersed literature in the related space and present a holistic portrayal of the child-gender effect on young fathers' criminal activity, labor market performance, and family formation. We use New Zealand's high-quality administrative data to investigate the impact of a child's gender on young fathers' likelihood of receiving a future conviction by following our sample for up to ten years after childbirth. Using high-frequency population-wide tax registers, we examine whether a child's gender has a statistically significant impact on their father's labor market performance. We further look at Census data and Department of Internal Affairs' birth records to test the robustness of our key labor market findings and to explore additional behavioral mechanisms such as educational achievements, partnership status, and further childbearing. To that end, our study provides key insights into the role model hypothesis concerning young fathers,

especially those who tend to have contact with the criminal justice system before childbirth. Moreover, our study highlights the importance of studying long-term implications of child gender by showing that these effects accumulate strongly over the course of ten years.

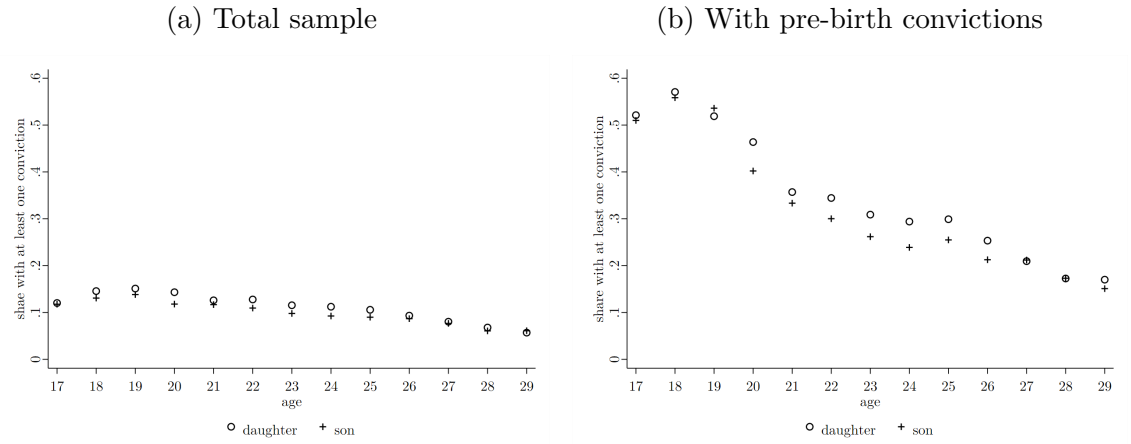
A large body of literature shows that young fathers are prone to various socio-economic risks, like dropping out of school, having poorer employment prospects, and engaging in risky behavior, including criminal activities (Larson et al. 1996, Weinman et al. 2002, Weinmann et al. 2006). Having a criminal record at a young age, in the form of an arrest or a conviction, can have a scarring impact on future labor market prospects. The stigma of having a criminal past can negatively affect employment opportunities and can undermine the acquisition of human and social capital (Western et al. 2001). Following rational choice theory, individuals who face adverse labor market opportunities that restrict access to legitimate ways of earning wage are more likely to turn to crime (Becker 1968), thereby creating a vicious cycle that can be difficult to exit. However, Sampson and Laub (1990), Corman et al. (2011), and more recently Massenkoff and Rose (2022) show that significant life events such as fatherhood can be considered as a 'turning point' which eventually leads to lower criminal activities.

To empirically assess the impact of the child's gender on criminal behavior and labor market performance, we use New Zealand's large administrative database, the Integrated Data Infrastructure. We begin our analysis by using highly detailed administrative data on all court charges registered in New Zealand, which we subsequently link with the Inland Revenue tax data and the 2013 Census. We track each individual over three years before the child's birth and up to ten years thereafter.

Figure 1 provides a descriptive impression of criminal behavior of young fathers who have their first child between the age of 17 and 21. The left graph shows the fraction of individuals who received at least one conviction for each age year, separated by the child's gender. The distribution peaks at the age of 19, where about 15% of the sample received a conviction and the same steadily drops to about 6% at age 29. Crucial for our study, and even without considering the timing of childbirth, we observe a small gap in the share of convictions between men fathering a son than those who have a daughter. For example, at age 23, the respective fraction is 11.5% for fathers with a daughter and 9.8% for fathers with a son. This narrows with age–suggesting that childbirth can largely motivate young fathers to refrain from criminal activities and reallocate their resources into investments that can support childcare.[1]

[1]Consistent with the evidence from the U.S. (Massenkoff and Rose 2022), Appendix Figure A1 displays crime trends of young New Zealand fathers prior to and post childbirth. The graph shows

Figure 1: Age and crime distribution




*Notes:* The graph shows for each age year the fraction of convicted young fathers born between 1983-93 and of NZ European ethnicity and who where between 17 and 21 when their first child was born. The distribution is differentiated by the child's gender: circle refers to daughters and plus to sons. The left panel shows the distribution for all fathers and the right panel for fathers with a pre-birth conviction.

Several studies have shown that there is substantial state dependence in criminal activities (Blumstein et al. 1985, Nagin and Paternoster 1991; 2000). Mancino et al. (2016) present evidence suggesting that keeping youth out of crime can have long-lasting effects. To that end, Dustmann and Landersø (2021) create a crime propensity measure for the pre-birth period and find that the effect of 'having a son versus a daughter on fathers' criminal convictions is far more pronounced for those fathers whose crime propensity is high' [p. 3287]. In a similar spirit, we differentiate young fathers according to their pre-birth conviction records and construct a binary variable if the father was convicted between 36 and 6 months before the child's birth and 0 otherwise. The graph in Figure 1b indicates that the child's gender plays a large role for this sub-population. Following on from the previous example, we see that for fathers aged 23, the share of convicted is 4 percentage lower for those having sons compared to those with daughters (30.9% vs 26.2%). Furthermore, the impact of the child's gender seems to be long-lasting, as this gap is still apparent even until the age 27.

Our regression estimates confirm our descriptive findings. The estimated interaction effect of a child's gender and their father's pre-birth convictions is strongly

the monthly number of convictions of young fathers aged between 19 and 21 in the time window that spans from 24 months before their first childbirth to 24 months after childbirth. Overall, the graph indicates that the incidence of convictions begins to decline a few months before childbirth and reaches its minimum at the birth month. On average, after childbirth, the trend remains substantially below the pre-birth level. This suggests that childbirth can largely motivate young fathers to refrain from criminal activities.

significant, suggesting that young pre-birth offenders respond considerably to their child's gender. This includes having a lower accumulated number of convictions as well as a lower number of serious convictions characterized by imprisonment or home detention when having a boy compared to having a girl child. For young fathers without a pre-birth conviction, we hardly find any significant impact of the child's gender on differences in future criminal activities.[2]

We extend our analysis to investigating differences in labor market performance by linking Inland Revenue tax data to our sample of young fathers.. For previously convicted fathers with a son, we find that over the ten years post-childbirth, there is significantly stronger labor market attachment (indicated by a 15%-increase in number of months receiving earnings from wages and salaries), higher accumulated earnings from monthly wages and salaries (suggested by a 21.5%-rise), and a lower level of benefit dependency (indicated by a 21.6%-decline). We find no statistically significant differences in paternal response to their child's gender when looking at young fathers with no pre-birth convictions. When linking our spine with the 2013 Census, our key labor market findings based on Inland Revenue data are further supported by the corresponding survey measures. Further, we find a lower probability of having no qualification and an elevated likelihood of being in a partnered relationship (married, civil union, or *de facto*) when having a son compared to having a daughter. Once again, these results hold only for fathers with a pre-birth conviction.

Our results are consistent with the role model hypothesis: young fathers want to become role models to their newborns, which is more pronounced if the child is a son rather than a daughter. We argue that the extended analysis of criminal activity, labor market performance, and family formation largely supports the role-model hypothesis. Sub-sample analyses show that the documented *son*-effect among individuals with a criminal record is particularly pronounced among individuals with low labor market attachment before birth. These young fathers adjust towards productive activities and away from crime, in particular, violent offenses. This raises an interesting policy parameter; while small, there appears to be disparity in parental investments across child gender, potentially resulting in inequality in children's long-term human capital outcomes.

The remainder of this paper is structured as follows: In Section 2, we describe our primary data source, the sample, and discuss potential biases of the sample. In Section 3, we present descriptive evidence on the sample of fathers in New Zealand and provide a balancing test concerning the child's gender. We then discuss our

[2]Interestingly, we do not find a gender effect for older age groups as well as the largest minority group in New Zealand, the indigenous Māori.

empirical strategy to identify the effects of the first child's gender on convictions and labor market outcomes in Section 4. Section 5 provides descriptive evidence and regression results. Section 6 concludes.

# 2 Data

**Data and sample.** To analyze the effect of a child's gender on fathers' criminal behavior and labor market performance, we use various administrative datasets that are hosted in the Integrated Data Infrastructure (IDI).[3] Administered by Statistics New Zealand (Stats NZ), the IDI is a large research database that holds population-wide datasets from various public agencies and organizations. Each individual is assigned with a unique confidentialized identifier, which allows linkage across all datasets.

To select our sample of interest, we start with the Department of Internal Affairs' (DIA) birth register of the entire New Zealand population (dating back to the 19$^{\text{th}}$ century). The birth register provides birth date information at the monthly level as well as the parents' unique individual identifier, enabling us to identify parent-child pairs.[4] We restrict the sample to live-born singleton first child births by excluding observations pertaining to fathers who had twins (or multiple births), fathers whose first child was stillborn or birth records where child's gender is not identified. We define our main sample of young fathers as all males born between 1983 and 1993 and who become a parent for the first time between ages 17 and 21. We chose 17 as the lower age threshold as young juvenile offenders in New Zealand (NZ) are covered under the Oranga Tamariki Act (the OT Act, 1989). Specifically, the regulation prevents minors aged below 17 from being tried in adult court and therefore reduces the likelihood of receiving a conviction. Dustmann and Landersø (2021) show in their study that father aged 21-25 do 'not respond to their child's gender'. As such, following the previous analysis, we chose 21 as the upper age ceiling for our young fathers' sample.

There is empirical evidence of a stark ethnic divide in New Zealand's conviction-based outcomes. While about 70% of the population is of European descent – labeled as NZ European – the largest minority population (about 16.5%) – the indigenous Māori – are over-represented in the criminal justice system (StatsNZ 2019*a*, Pratt

[3]Please note the disclaimer in the Appendix.

[4]One caveat is that we are not able to differentiate between biological and adopted children. However, in contrast to other countries, adoptions in New Zealand, which includes a legal transfer of parenting rights and responsibilities from birth to adoptive parents, are rare. For example, in 2010 there were almost 64 thousand childbirths (StatsNZ 2020) and only 193 adoptions (MoJ 2020).

2006, McIntosh and Workman 2017, Elkington 2017). For example, about every second prisoner belongs to the indigenous population. Among the list of potential reasons cited for such apparent ethnic divide, ethnicity-motivated bias in the justice system is a prominent inclusion. As such, to avoid sample selectivity concerns, we homogenize our data by restricting our baseline sample to NZ Europeans. We additionally discuss the impact of the gender of the child for Māori in Section 5. We link our sample to the personal details dataset to provide ethnicity information as well as other individual-level demographic characteristics. While it is possible to have multiple cultural identities, we restrict our sample to men who declare solely to be of NZ European ethnicity. It is worth mentioning that the fraction of individuals with missing information on ethnicity is negligible and lies below 1% of our initial sample based on birth records. Based on the ethnicity indicators in the personal details file, about 70% of men born between 1983-93 identify as NZ European.

The crime data comes from the Ministry of Justice's (MoJ) register of court charges which contains records of all charges processed by criminal courts in New Zealand since 1992. Each charge includes information on the offense type, the offense date, the date when the charge was filed, and the date when the outcome of the criminal proceedings was declared. We use the offense date to establish our time identifier for criminal behavior. Even though we have information on the exact day of the offense, we transform it into monthly information, the most granular date provided across all the datasets we use.

A criminal charge may be filed by the Police, Corrections, local authorities, or other government agencies. Usually, each charge refers to one offense. For example, an individual may attend court on one occasion for three charges of burglary and one of assault, which would result in a total of four charges. In addition, the dataset holds information on the outcome of the charge, e.g., whether the individual was convicted or acquitted. As a conviction can receive multiple sentences, the dataset also lists the five most serious sentences. The seriousness ranking follows from the Australian and New Zealand Society of Criminology (ANZSOC) code, which allows us to identify the most serious sentence imposed. These charges includes (hierarchically ranked) imprisonment, home detention, community detention, intensive supervision, community work, supervision, monetary fines, deferment, and others.[5] We focus on convictions that include imprisonment, home or community detention, community work, supervision and exclude those where the most serious sentence is a fine, deferment or other. Dustmann and Landersø (2021) exclude in their study traffic offenses, which, in NZ's context, mostly lead to fine-based penalties. However,

[5]Individuals with no sentence recorded as highest sentence are dropped from the sample.

we do not exclude traffic offenses *per se* as in some instances, certain traffic offenses can result in receiving serious sentences.

Next, we include monthly earnings from wages and salaries and benefit recipiency by linking our sample to Inland Revenue's employee monthly schedule (IR-EMS). These tax records include employment-related information for all of New Zealand's workforce except for self-employed individuals for which data is only available on the annual level. We use border movement and deaths data from the Ministry of Business, Innovation and Employment and DIA to remove overseas and deceased individuals. We also link our sample with the 2013 Census, which holds a wide range of individual-level information.

The sample period covers the years between 2002 and 2020.[6] Furthermore, we allow the fathers' data to be observed for a minimum of three consecutive years before the child was born and up to ten years post childbirth. Following these criteria, we focus on fathers whose first child was born between January 2005 and December 2010. Our final sample consists of 5 550 individuals who became a father between ages 17 and 21 (including fathers aged 21 years and 11 months).

**Selectivity of the sample.** Although the child's gender cannot be directly manipulated, our observed sample can be selective. One reason for selectivity is selective abortion. For example, we would observe a lower share of daughters in the sample if fathers with high preferences for a son influenced the likelihood of abortion when the in utero unborn child is female. The sample of fathers with a daughter might then be negatively selected, leading to biased estimates. According to the 1977 Abortion Act, however, it is not permitted to perform an abortion based on sex preferences. An abortion can take place if the woman is not more than 20 weeks pregnant, though most abortions (91% in 2020) occured during the first 12 weeks of pregnancy (in the first trimester).[7]

To test for selective abortion among young first-time mothers, we use the DIA birth register to calculate the share of boys in the data differentiated by the mother's age at birth. In total, we counted 199 203 births. Columns (1) and (2) of Table 1 show a share of sons of around 51% for first-time mothers. Performing a simple

[6]The period prior to 2002 represents a different legislative regime in the justice system. This is due to the implementation of the *Sentencing Act 2002*. The regulation introduced "a number of substantive and procedural changes to sentencing policy and procedure" (Roberts 2003, p. 254), including the type of sentence for juvenile offenders.

[7]Empirical evidence for the UK (Adamou et al. 2013), US (Almond and Sun 2017), Australia (Edvardsson et al. 2018) and Canada (Wanigaratne et al. 2018) indicate that favoring a son is more prevalent among the Asian minority populations. However, a study by Simon-Kumar et al. (2021) using New Zealand birth records 'did not reveal male-favouring sex ratios and any conclusive evidence of sex-selective abortion among Indian and Chinese populations' [p. 1].

$t$-test to test whether the shares differ between young (aged 17-21) and older (22-39) mothers provides no evidence for statistically significant differences. Panel B in Appendix Table A1 provides the same shares for mothers of NZ European ethnicity. Again the shares are slightly above 51%, with no significant differences between the two age groups.

Table 1: Sample selectivity test

| | Share of sons by mother's age | | Fatherhood recognition | Migration | Deceased |
|---|---|---|---|---|---|
| | 17-21 | 22-39 | | | |
| | (1) | (2) | (3) | (4) | (5) |
| Son | 0.516 | 0.515 | 0.002 | 0.005 | 0.001 |
| | (0.003) | (0.001) | (0.001) | (0.004) | (0.002) |
| Mean | - | - | 0.951 | 0.021 | 0.005 |
| Observations | 28 203 | 171 000 | 199 203 | 5 586 | 5 424 |

*Notes:* The table shows in columns (1) and (2) the share of sons (excluding multiple births and still birth) of all first-time mothers with a birth in the years 2005-10 and aged between 17 and 39. Column (3) shows the regression coefficient of fatherhood recognition on an indicator variable equal to 1 if the child is a boy and zero if the child is a girl delivered by women aged between 17 and 39 in the period 2005-2010. Column (4) shows the regression coefficient of migrating within the first two years after childbirth on an indicator variable equal to 1 if the child is a boy and zero if the child is a girl for young fathers aged between 17 and 21. Column (5) shows the regression coefficient of deceasing within the first two years after childbirth on an indicator variable equal to 1 if the child is a boy and zero if the child is a girl for young fathers aged between 17 and 21. Robust standard errors in parentheses.

A further concern is that recognition of fatherhood might depend on the child's gender. During the last two decades, the registration rate of fathers has been around 94% with an increasing trend over time (StatsNZ 2019*b*). The DIA data allows us to test whether the probability of fatherhood recognition differs by the child's gender. Column (3) of Table 1 provides evidence that the gender of the child does not correlate with fatherhood recognition. In Appendix (Table A2), we provide more detailed results showing that fatherhood recognition is lower for younger mothers. The interaction effect between young mothers and the gender of the child is, however, not significantly different from zero. This result indicates that selective fatherhood registration is not a concern in our analysis.

Finally, we provide evidence on selective migration and the fathers' death after birth. In the data, we can observe if an individual moved abroad and if so, the timing of the decision. We define a migrating father if he spent more than 365 days abroad and moved out of the country within the first 24 months after childbirth. Following this definition, about 2.1% of young fathers in our sample are migrants. This increases to approximately 3% when we change the definition to 100 days or more abroad. Column (4) of Table 1 provides regression results of the migration probability on the child's gender. The marginal effect of having a son on migrating

is 0.005 and insignificant. Similarly, we do not find any evidence for selective death probabilities, as shown in Column (5). Overall, these results provide confidence that the sample is unlikely to be biased.

# 3 Fatherhood in New Zealand context

For an overview of socio-economic characteristics of young fathers, we provide distributional numbers on their labor market characteristics, marital status, and criminal behavior nine months before the child's birth. We compare our sample of interest to older fathers in the neighboring age bracket 22-25 and those aged 26-39. To ensure comparability, we follow similar restrictions to our spine and restrict the sample to NZ European men with a childbirth between 2005 and 2010.

Table 2: Pre-birth characteristics

| | Father's age at child's birth | | | | | |
|---|---|---|---|---|---|---|
| | 17-21 | | 22-25 | | 26-39 | |
| | mean (1) | $p-$value (2) | mean (3) | $p-$value (4) | mean (5) | $p-$value (6) |
| Employed | 0.692 | 0.666 | 0.777 | 0.981 | 0.737 | 0.208 |
| | (0.456) | | (0.416) | | (0.440) | |
| Wages & salaries | 7.542 | 0.164 | 7.895 | 0.491 | 8.346 | 0.254 |
| | (0.672) | | (0.594) | | (0.587) | |
| Benefits | 0.132 | 0.610 | 0.089 | 0.527 | 0.027 | 0.171 |
| | (0.339) | | (0.285) | | (0.161) | |
| Married | 0.018 | 0.589 | 0.181 | 0.344 | 0.515 | 0.515 |
| | (0.131) | | (0.385) | | (0.500) | |
| Offense | 0.023 | 0.598 | 0.008 | 0.948 | 0.001 | 0.925 |
| | (0.152) | | (0.460) | | (0.038) | |
| $N$ | 5 550 | | 8 649 | | 48 183 | |
| Population share | 0.089 | | 0.139 | | 0.772 | |

*Notes:* The table shows means and standard deviations in parentheses of pre-birth characteristics at nine months before the child's birth, differentiated by the father's age when the first child was born. We test for significant difference of the mean values by child's gender and display the respective $p-$value. Employment refers to the share of individuals receiving income from wages & salaries. Wages & salaries is measured as log values. Offense refers to receiving a conviction nine months before child's birth. All statistics refer to the first-born child.

The bottom row of Table 2 displays the relative distribution of the three age groups. About 8.9% of the first-time father's with a child-birth between 2005 and 2010 belonged to the youngest age bracket, 13.9% to the neighboring age bracket (22-25 year old fathers), and the largest majority (77.2%) to the age bracket 26-39. This is in line with findings from StatsNZ (2019*b*), showing that since the 1980s and through the 90s, the median age of fathers at childbirth has been climbing up. In

1980, the median age was 28.5 and reached a high of 32.8 in 2005 and has remained at that level since.

Table 2 shows the share of employed fathers is substantially higher among 22-25 year olds compared to 17-21 year olds (+8.5 percentage points). The difference is marginally lower when the 17-21 year old fathers are compared to the oldest age group. This is possibly because a higher fraction of older fathers tend to be self-employed, which are not captured in our definition. For those employed, we see a strictly higher wage level for the older age groups. Furthermore, benefit dependency is highest among the youngest age group (13.2%) and the lowest for the oldest age category of fathers (2.7%). In terms of marital status, less than 2% of the young fathers were married before their child's birth. This fraction is 10 times higher for the middle age group category (18.1%). Further differences are apparent when it comes to criminal behavior. About 2.3% of the young fathers received a conviction nine months before childbirth, and about 40% of those convicted individuals received a serious sentence like imprisonment or home-detention. For both the older age group fathers, criminal activities are substantially lower (less than 1%) than the youngest cohort. In line with Stats NZ's confidentiality guidelines, the share of serious sentences among convicted fathers for both older age groups was too small to be revealed.

Most importantly, we tested the equality of means, dependent on the future child's gender. Table 2 presents the respective $p-$values. We find no statistically significant differences across any of the outcomes, indicating that the pre-birth observable characteristics between fathers of sons and daughters were balanced. This holds across all three age groups.

# 4 Empirical strategy

Our empirical analysis compares conviction-based and labor-market-related outcomes among individuals who father a son relative to those father with a daughter. Our outcome variable, $y_{it}$, is a continuous measure (e.g., number of convictions, number of months receiving income from wages and salaries, earnings level) for individual $i$ up to year $t$ after the birth of his first-born child.

To estimate the child's gender effect on $y_{it}$, our model takes the following form:

$$\begin{aligned} y_{it} =& \alpha + \beta_1.\text{son}_i + \beta_2.\text{pre-birth conviction}_i \\ &+ \beta_3.\text{son}_i \times \text{pre-birth conviction}_i + X_i'\gamma + u_{it}, \end{aligned} \tag{1}$$

where $\text{son}_i$ is an indicator equal to 1 if the child is a boy, and zero otherwise. As high-

lighted in Appendix Figure A2, the likelihood of committing crimes after the child's birth also depends on pre-birth convictions. The indicator pre-birth conviction$_i$ takes the value 1 if the father has received at least one conviction in the pre-birth period $t = -36, \ldots, -6$, and zero otherwise. Finally, we also include an interaction effect between the child's gender indicator and the pre-birth conviction indicator.

We follow each individual over ten years post-childbirth, as long as they are physically present in New Zealand and not deceased. For the accumulated number of convictions, we consider the logarithmic value of the outcome variable up to time $t$ and add a value of 1, as standard in the literature. As a robustness test, we use the inverse hyperbolic sine transformation of the number of convictions as it can account for zeros (Ravallion 2017, Bellemare and Wichman 2020). However, the results are virtually identical. As described earlier, our observation period for the pre-birth period ranges from 36 months to six months prior birth and are used as a placebo exercise.

The vector $X_i$ includes time-invariant information, including year-of-childbirth and month-of-childbirth fixed effects, father's age at child's birth, and an indicator variable on receiving a conviction in the pre-birth period that includes imprisonment or home detention. Despite the plausibly exogenous nature of the child's gender, we include these pre-birth observable characteristics to increase the precision of our estimates.

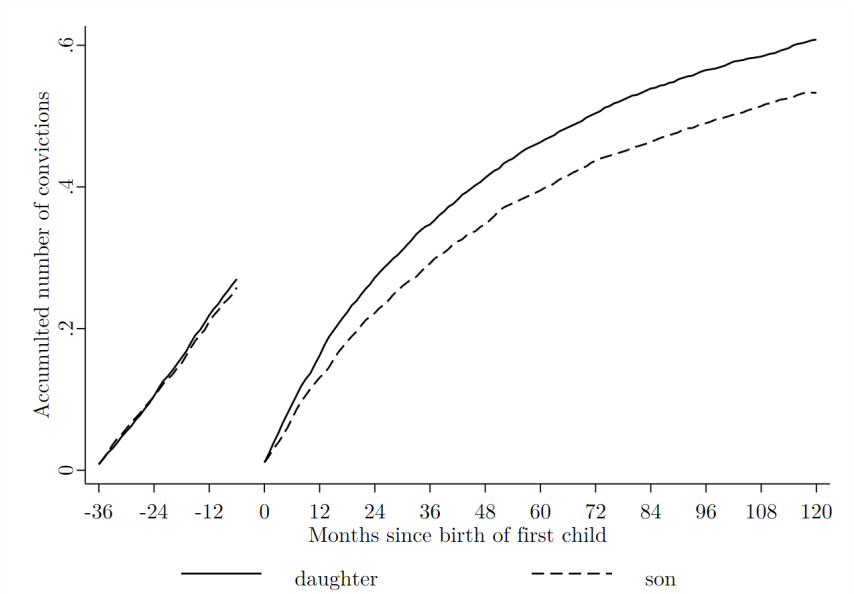
# 5 Empirical Results

## 5.1 Criminal activities after child's birth

**Descriptive evidence.** We provide descriptive statistics to examine the likely association between a child's gender and the father's criminal behavior. We sum up the number of days with at least one conviction for the ten years following the birth of the first child. We then transform this number by adding one and taking its log value. Figure 2 shows the evolution of the accumulated number of convictions, differentiated by the child's gender. A difference is clearly observable, and is significantly different from zero at the 1% level from the $4^{th}$ month onward. We also add up and transform the number of convictions for the pre-birth period, ranging from 36 to 6 months before birth. Here, we do not observe any difference, which is further confirmed by statistical tests.

The likelihood of receiving a conviction also depends on previous criminal records. Therefore, we split our sample into young fathers who received a conviction before the birth of their first child ($N = 1,134$, equal to 20.4% of the sample) and fathers

Figure 2: Child-gender related difference in conviction rates




*Notes:* The graph shows the accumulated log number of convictions (+1) by gender of the first child for the pre- and post-birth period. The pre-period starts 36 months before and stops at 6 months before the birth of the first child, the date when the child's gender can be determined with a high level of confidence.

without a pre-birth conviction ($N = 4,416$, equal to 79.6% of the sample). The upper graphs in Appendix Figure A2 show the evolution of convictions for fathers with (Figure A2a) and without (Figure A2b) a pre-birth conviction. First, the level of convictions is substantially higher for those fathers with a pre-birth conviction. Further, we observe a large difference in number of convictions between fathers with sons compared to fathers with daughter. This is especially evident for fathers who were in contact with the criminal justice system before the child's birth. For fathers with pre-birth convictions, we observe a 19.3% difference ten years after the child's birth (significantly different at the 1% level). For fathers without pre-birth convictions, there is a 3.9% difference (significantly different at the 10% level).

As being convicted is a broad measure and can include serious sentences (like imprisonment and home detention) as well as less serious sentences (like supervision), we also look at the number of convictions that lead to custodial sentences only (Appendix Figure A2c and Figure A2d). Here, the difference in receiving such a conviction is even further pronounced between the two groups. Moreover, for fathers with a pre-birth conviction, the number of serious sentences that include imprisonment or home detention is substantially lower: ten years after the child's birth, a difference of 12% can be observed (statistically significant at the 5% level). For fathers without a pre-birth conviction, the difference is much smaller (1.7% 10 years after the childbirth) and not statistically significant.

**Regression estimates.** We now turn to regression estimates following the empirical model described in Section 4. Table 3 presents the regression results of the impact of a child's gender on post-birth criminal activities. As we are mainly interested in the gender effect and its interaction with pre-birth convictions on post-birth criminal activity, the table only presents these two coefficients. Panel A refers to the total number of convictions accumulated over a time period of ten years after childbirth. For the ease of presentation, we show the estimates for the first five years after childbirth and further show the estimates for eight and ten years after childbirth. The estimated coefficients of the son indicator are found to be negative for all periods evaluated. While the magnitude of the impact ranges between 1 and 4%, the estimates are only statistically significant at the 10% percent level for a few periods starting from the fourth year after birth. We observe much larger effects when looking at the interaction effect of a child's gender and pre-birth conviction. For instance, twelve months after childbirth, the number of convictions for fathers with a pre-birth conviction decreases by 8.5% (significant at the 5% level). The magnitude of the mitigating effect increases to 17.2% when we evaluate the sample ten years after a child's birth (significant at the 1% level). This indicates that fathers with a pre-birth conviction who have a son are substantially less likely to be convicted after the child's birth than previously convicted fathers with a daughter. Additionally, we check whether the child's gender affects the accumulated number of convictions over the period of 36 to 6 months before the child's birth. We do not find any statistically significant effect. This plausibly provides further empirical support for random assignment and that the treatment group (fathers with a son) are on a similar criminal trajectory than the control group (fathers with a daughter).

We further examine whether distancing from crime includes committing less serious offenses that lead to imprisonment or home detention. We present these results in Panel B of Table 3. When looking at the interaction effect, we find results consistent with findings in Panel A. At the first year post-birth, the number of custodial sentences (imprisonment and home detention) falls by 5.5% for previously convicted fathers with a son. The magnitude of this effect once again rises over time as we observe a decline in custodial sentences by 11.4% at the tenth year after a son was born. Most of the regression estimates of the interaction effect are statistically significant at conventional levels.

In the data, each crime record holds information on the offense type, aggregated into 16 categories following the ANZSOC classification. Thus, we are able to test whether a father's criminal activities in particular offense types respond to the gender of the first child. We use the ANZSOC codes to form four categories (due to the

Table 3: Criminal behavior after child's birth

| | Months to/from birth of first child | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | -6 | 12 | 24 | 36 | 48 | 60 | 96 | 120 |
| **Panel A:** ***Number of convictions*** | | | | | | | | |
| Son | -0.015 | -0.009 | -0.013 | -0.020 | -0.027* | -0.029 | -0.035* | -0.026 |
| | (0.016) | (0.008) | (0.012) | (0.014) | (0.016) | (0.017) | (0.020) | (0.022) |
| Son × Pre-birth conviction | | -0.085** | -0.136*** | -0.134*** | -0.134** | -0.138** | -0.141** | -0.172*** |
| | | (0.036) | (0.045) | (0.051) | (0.054) | (0.057) | (0.063) | (0.066) |
| Mean | 0.708 | 0.302 | 0.602 | 0.868 | 1.121 | 1.355 | 1.895 | 2.212 |
| **Panel B:** ***Number of imprisonment/home detention*** | | | | | | | | |
| Son | -0.001 | 0.003 | 0.006 | 0.008 | 0.000 | 0.001 | -0.008 | -0.012 |
| | (0.008) | (0.003) | (0.005) | (0.006) | (0.008) | (0.009) | (0.011) | (0.012) |
| Son × Pre-birth conviction | | -0.055** | -0.072** | -0.061* | -0.066 | -0.097** | -0.098* | -0.114** |
| | | (0.024) | (0.032) | (0.037) | (0.040) | (0.044) | (0.051) | (0.054) |
| Mean | 0.051 | 0.039 | 0.063 | 0.079 | 0.092 | 0.103 | 0.127 | 0.137 |
| *N* | 5 550 | 5 469 | 5 400 | 5 334 | 5 289 | 5 220 | 5 130 | 5 121 |

*Notes:* The table shows the child-gender related difference (boy vs. girl) and the interaction effect between child-gender and pre-birth conviction based on OLS regressions of total convictions (Panel A) and convictions that lead to imprisonment or home detention (Panel B) before and after childbirth. Each coefficient corresponds to a separate regression. Count refers to the log-transformed accumulated number of convictions (+1). The pre-period starts 36 months before and stops at 6 months before the birth of the first child, which is the time when the gender of the child can first be identified. Robust standard errors in parentheses, significance level: *** p<0.01, ** p<0.05, * p<0.1.

low number of observations, we do not include homicide, sexual offenses, and miscellaneous): (1) burglary and dangerous acts, (2) drug-related offenses and fraudulent activities, (3) property damage and public order offenses, (4) theft and traffic offenses. Table 4 provides information on the specific ANZSOC codes. For each group, we create a binary indicator equal to 1 if within ten years after the child's birth, the individual received at least one conviction in the respective ANZSOC code, 0 otherwise

The lower part of Table 4 shows that 21.3% of the young fathers had at least one conviction which included theft or traffic offense in the ten years after the birth of the first child. A comparable share is found for burglary and dangerous acts (19.4%). Further, 16.1% of individuals were convicted for property damage or public order offenses, and 9.2% were convicted due to involvement with drugs or fraud.

Applying linear probability models, the regression results show that fathers with a pre-birth conviction are, on average, 6.9 percentage points less likely to have received a conviction that involves burglary or dangerous acts when fathering a son compared to having a daughter. A similar effect is found for offenses that include drugs and fraud. In both cases, the effect is statistically significant at least at the 5% level. These results suggest that the documented effects on conviction and imprisonment are particularly pronounced for serious offenses. Moreover, the results are consistent with the role model hypothesis; young fathers with a criminal history before childbirth reduce their criminal behavior if the child's gender is a boy

Table 4: Offense category

| | Burglary, dangerous acts (1) | Drugs, fraud (2) | Property damage, Public order offenses (3) | Theft, Traffic (4) |
|---|---|---|---|---|
| ANZSOC code | 4,5,7,15 | 9,10 | 2,6,12,13 | 6,8,11,14 |
| Son | -0.002 | -0.001 | -0.022** | -0.006 |
| | (0.010) | (0.007) | (0.010) | (0.011) |
| Pre-birth conviction × Son | -0.069** | -0.071*** | -0.035 | -0.035 |
| | (0.031) | (0.028) | (0.031) | (0.032) |
| Mean | 0.194 | 0.092 | 0.161 | 0.213 |
| *N* | 5 121 | 5 121 | 5 121 | 5 121 |

*Notes:* The table shows the child-gender related difference (boy vs. girl) and the interaction effect between child-gender and pre-birth conviction based on OLS regressions by offense type 10 years after childbirth. The Australian and New Zealand Standard Offence Classification (ANZSOC) classification is used to to form four mutual exclusive groups (excluding homicide, sexual offenses, and miscellaneous). In cases of multiple charges on the offense date, we restrict it to the conviction with the most serious sentence. Each coefficient corresponds to a separate regression. For each category, we construct a binary indicator variable taking the value of 1 if the individual received within the ten years after the child's birth at least one conviction in the respective ANZSOC code and 0 otherwise. Robust standard errors in parentheses, significance level: *** p<0.01, ** p<0.05, * p<0.1.

rather than a girl. Dahl and Moretti (2008) highlight possible channels in an utility maximizing framework to study family formation decisions. This can be applied in a broader context to derive implications on the allocation of time. Fathers might want to become *role models* to their newborns, which might be more pronounced if the child is of their preferred gender. As such, young fathers may also derive more *utility* from spending time with a son than a daughter. If fathers tend to have a strong preference for sons, having a boy may prompt delinquent fathers to allocate time away from criminal activities.

**Heterogeneous estimates.** The available of sufficient data allows us to dig deeper and to analyze the son-effect on criminal activity for important subgroups. These subgroups are classified based pre-childbirth characteristics. We provide evidence for the subgroup of (i) unmarried fathers, (ii) for mothers without convictions, (iii) as well as for father's and mother's employment status. Table 6 presents the coefficient estimates as well as the combined effect (son coefficient and interaction effect with pre-birth conviction).

The son-effect for unmarried fathers and mothers without a pre-birth convictions is very similar to the baseline effect. The main reason for this result is that only very few fathers are married pre-birth (around 2%) and only 3% of the mothers have a conviction before birth. The more interesting margins represent the employment statuses of the parents. First, we split the sample by the father's labor market attachment in the period 18 to 6 months before the child's birth: employed at least

Table 5: Effect heterogeneity by pre-birth characteristics

| | Unmarried | Mother w/o pre-birth convictions | Father employed[a] | Father not employed[b] | Father & mother not employed[c] |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| Son | -0.026 | -0.034 | -0.025 | -0.024 | 0.037 |
| | (0.022) | (0.022) | (0.021) | (0.059) | (0.079) |
| Son × Pre-birth conviction | -0.186*** | -0.171** | -0.116 | -0.241** | -0.276** |
| | (0.066) | (0.069) | (0.086) | (0.107) | (0.138) |
| Combined | -0.212*** | -0.205*** | -0.141* | -0.265*** | -0.238** |
| | (0.062) | (0.065) | (0.083) | (0.090) | (0.111) |
| Mean | 2.25 | 2.07 | 1.30 | 4.59 | 5.24 |
| *N* | 4 977 | 4 872 | 3 693 | 1 428 | 888 |

*Notes:* The table shows the child-gender related difference (boy vs. girl) and the interaction effect between child-gender and pre-birth conviction based on OLS regressions of total convictions 10 years after childbirth. [a] Father has been receiving earnings from wages & salaries in at least six months of the time window 18 to 6 months before childbirth. [d] Father has been receiving earnings from wages & salaries in five or less months of the time window 18 to 6 months before childbirth. [e] Father and mother have been receiving earnings from wages & salaries in five or less months of the time window 18 to 6 months before childbirth. Robust standard errors in parentheses, significance level: *** p<0.01, ** p<0.05, * p<0.1.

six months (Column 3) vs. employed for five and less months (Column 4). Column (3) shows negative point estimates of having a son on convictions in the years post-birth. The combined effect for fathers with a pre-birth conviction is around 14% and is noticeably below the baseline effect size. The effect is strongly driven by fathers with low labor-market attachment. Conviction rates decrease by almost 27% if the father was not employed pre-birth. Column (5) shows a similar pattern when restricting the sample to fathers and mothers with low labor market attachment.

To further test this relationship, we run separate regressions based on father's pre-birth conviction and interact the son variable with a continuous variable on the share of months employed before childbirth. Column (1) in Appendix Table A6 indicates that for fathers without a pre-birth conviction, the effect of the child's gender does not vary much by labor market attachment. Although relatively imprecisely estimated, Column (2) reveals that the son-effect is halved for fathers with a pre-birth conviction and employed in all twelve months in the time window 18 to 6 months before childbirth. These results provide evidence that our key findings are mainly driven by the most socio-economically vulnerable group of fathers. Also, these individuals can more substantially adjust their time use towards productive activities, which results in a stronger estimates of the observed child gender effect.

**Sample heterogeneity.** Dustmann and Landersø (2021) find a child-gender effect only for very young fathers. We also test this by documenting the gender effect on convictions for first-time fathers aged 22-25 as well as for those aged 26-39. Similar to existing evidence in the literature, our results show that older first-time fathers

do not react differently in terms of criminal activity if the child is a boy rather than a girl.

Table 6: Sample heterogeneity

| | Older fathers when first child born | | Māori | |
|---|---|---|---|---|
| | Aged between 22-25 (1) | Aged between 26-39 (2) | Convictions (3) | Imprisonment (4) |
| Son | -0.004 | -0.003 | -0.000 | -0.020 |
| | (0.010) | (0.007) | (0.023) | (0.014) |
| Son × Pre-birth conviction | -0.047 | -0.020 | 0.025 | 0.016 |
| | (0.064) | (0.114) | (0.051) | (0.044) |
| Combined | -0.051 | -0.023 | 0.025 | -0.005 |
| | (0.063) | (0.114) | (0.045) | (0.042) |
| Mean | 0.85 | 0.31 | 3.92 | 0.40 |
| *N* | 8 649 | 44 187 | 8 058 | 8 058 |

*Notes:* The table shows the child-gender related difference (boy vs. girl) and the interaction effect between child-gender and pre-birth conviction based on OLS regressions of total convictions (Columns (1)-(3)) and convictions that lead to imprisonment or home detention (Column (4)) ten years after childbirth. Each coefficient corresponds to a separate regression. Count refers to the log-transformed accumulated number of convictions (+1). Robust standard errors in parentheses, significance level: *** p<0.01, ** p<0.05, * p<0.1.

So far, our analysis has focused on young fathers who identify as NZ European. According to the 2018 Census, the indigenous Māori are the largest ethnic minority comprising 16.5% of the population. As StatsNZ (2019*b*) documents, there are large ethnic differences regarding mothers' median age at birth, with Māori mothers being on average five years younger than NZ European mothers. Appendix Table A4 provides pre-birth descriptive statistics for young Māori fathers. Large pre-birth disparities are observed in terms of lower employment rate, lower wage level, higher benefit dependency, and higher conviction rate compared to NZ European young fathers. Columns (3) and (4) of Table 6 show the gender effects on convictions and imprisonment ten years after childbirth. We document rather precise zero effects of the gender of the child on young father's conviction rates. We find the largest minority group does not appear to adjust their criminal behavior after childbirth as a response to their first child's gender, whereas young males of NZ European ethnicity who father a son reduce their criminal behavior relative to individuals who father a daughter. We refer the interested reader to Appendix Table A5 for more detailed results, including the child-gender effect on labor market performance.

This finding could provide some further meaningful insight into the possible role model hypothesis. The key findings observed in our crime analysis, particularly for young European fathers, may likely be driven on individuals' cultural background. As also observed in Dustmann and Landersø (2021)'s study, the role model effect might be more prevalent among Europeans or in Western societies. In comparison,

the pre-colonial Māori society is widely believed to have been fundamentally inclusive of sexual diversity (Aspin and Hutchings 2007).

## 5.2 Labor market performance after child's birth

One way to test whether the shift in criminal activity is related to a role model phenomenon is to study differences in labor market outcomes. The literature has documented that fatherhood significantly increases hourly wages as well as hours worked (Lundberg and Rose 2002). Among mothers, Massenkoff and Rose (2022) show that childbirth is a major life event, with arrest rates decreasing strongly after pregnancy. The authors further document an increase in employment among fathers. Lundberg and Rose (2002) also document a stronger response of men's labor supply and wages in response to birth of sons.

The administrative data provides information on the employment status as well as wages and salaries. Panel A of Table 7 provides regression results on the number of months receiving earnings from wages and salaries. We do not find any significant impact of having a son compared to having a daughter. However, for the interaction effect, we find that fathers of a son with a pre-birth conviction have a substantially larger number of employed months compared to fathers of a daughter with a pre-birth conviction. From year four onward, the effect size hovers between 14 and 15% and is found to be statistically significant at least at the 5% level.

The Inland Revenue tax data provides monthly information on wages and salaries at the employer-level. Therefore, accounting for the possibility of multiple job holdings, we measure a sum of earnings aggregated across all employers. Panel B provides the respective coefficients for accumulated earnings since a child's birth. The magnitude of the child-gender variable is small and not significant. In terms of the interaction effect, we find the same pattern with respect to number of employed months, indicating that the level of accumulated earnings from wages and salaries are higher for young men with a pre-birth conviction when they father a son compared to having a daughter. In particular, from the third year after a son is born, the earnings of formerly convicted fathers significantly increase by approximately 20-28% over the period of the next seven years analyzed in our study.

Finally, we test whether any child's gender-specific differences in benefit dependence exist. Panel C presents estimates for the number of months receiving benefits since the child's birth. Consistent with the results on employment and earnings, we document substantially lower number of months receiving benefits for previously convicted fathers of a son than those with a daughter. Unlike the slightly delayed impact observed in the case of the employment-related outcomes presented in Pan-

els A and B, we find statistically significant effects for benefit dependence right from the first year after a son is born. For formerly convicted men who father a son, the number of months receiving benefits declines by approximately 12% and the magnitude of the decrease is found to be around 22% at the tenth year after birth.[8]

Table 7: Labor market performance after child's birth

| | Months to/from birth of first child | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | -6 | 12 | 24 | 36 | 48 | 60 | 96 | 120 |
| **Panel A:** ***Number of months receiving earnings from wages & salaries*** | | | | | | | | |
| Son | -0.001 | -0.002 | -0.018 | -0.009 | -0.010 | -0.014 | -0.021 | -0.022 |
| | (0.016) | (0.013) | (0.016) | (0.017) | (0.019) | (0.019) | (0.019) | (0.020) |
| Son × Pre-birth | | 0.037 | 0.066 | 0.096* | 0.141** | 0.147** | 0.165*** | 0.150** |
| conviction | | (0.041) | (0.049) | (0.054) | (0.057) | (0.059) | (0.061) | (0.062) |
| mean | 21.26 | 10.59 | 19.33 | 27.76 | 36.02 | 44.50 | 69.70 | 86.20 |
| *N* | 5 301 | 4 890 | 5 022 | 5 061 | 5 082 | 5 040 | 5 013 | 5 025 |
| **Panel B:** ***Accumulated earnings from wages & salaries*** | | | | | | | | |
| Son | 0.031 | 0.018 | -0.004 | -0.003 | -0.013 | -0.016 | -0.040 | -0.048 |
| | (0.030) | (0.030) | (0.030) | (0.031) | (0.031) | (0.031) | (0.031) | (0.031) |
| Son × Pre-birth | | 0.099 | 0.130 | 0.196** | 0.247** | 0.250** | 0.275*** | 0.215** |
| conviction | | (0.094) | (0.095) | (0.098) | (0.099) | (0.099) | (0.098) | (0.096) |
| mean | 40,262 | 28,036 | 53,707 | 80691 | 109,144 | 140,300 | 245,439 | 325,055 |
| *N* | 5 301 | 4 890 | 5 022 | 5 061 | 5 082 | 5 040 | 5 013 | 5 025 |
| **Panel C:** ***Number of months receiving benefits*** | | | | | | | | |
| Son | 0.005 | 0.014 | 0.038 | 0.040 | 0.039 | 0.052 | 0.063 | 0.059 |
| | (0.028) | (0.026) | (0.033) | (0.038) | (0.041) | (0.044) | (0.049) | (0.051) |
| Son × Pre-birth | | -0.116* | -0.165** | -0.220** | -0.168* | -0.169* | -0.190* | -0.216** |
| conviction | | (0.068) | (0.079) | (0.086) | (0.090) | (0.094) | (0.102) | (0.105) |
| mean | 3.07 | 2.31 | 4.56 | 6.84 | 9.12 | 11.32 | 17.03 | 20.39 |
| *N* | 5 550 | 5 469 | 5 400 | 5 334 | 5 289 | 5 220 | 5 130 | 5 121 |

*Notes:* The table shows the child-gender related difference (boy vs. girl) and the interaction effect between child-gender and pre-birth conviction based on OLS regressions of number of months receiving earnings from wages and salaries (Panel A), accumulated earnings from wages and salaries (Panel B), number of months receiving benefits (Panel C) before and after childbirth. Each coefficient corresponds to a separate regression. All counts are log-transformed (+1 for number of months receiving benefits). The pre-period starts 36 months before and stops at 6 months before the birth of the first child, which is the time when the gender of the child can first be identified. Robust standard errors in parentheses, significance level: *** p<0.01, ** p<0.05, * p<0.1.

Is the lower crime effect driven by the same individuals who experience positive labor market outcomes? To investigate this question, we construct a binary indicator taking the value of 1 if the individual was employed for at least for 100 months in the 10 years post-childbirth and did not receive any conviction, and 0 otherwise. In the sample, 41.2% of the young fathers fulfil these criteria. When running a linear probability model, we do not find any significant impact of having a son ($\beta_{\text{son}} = -0.011; se = 0.016$) on this variable. However, the interaction effect of the child's

[8]Appendix Table A5 shows the results for the indigenous Māori. Similar to the gender effect on conviction rates, we also do not document any systematic effects on labor market outcomes.

gender with a pre-birth conviction shows an elevated likelihood of 6.6 percentage points (se=0.026), significant at the 5% level. This finding indicates that men with a pre-birth conviction who father a son have both a stronger attachment to the labor market and are also distancing themselves from crime compared to men with a daughter.

Together, our results provide strong evidence for a shift in productive activities for young fathers with pre-birth convictions. These fathers reduce their criminal activity and increase their labor market participation if they father a son rather than a daughter. The crime effects in terms of convictions and imprisonment/home detention are immediately visible after birth and increase slightly in absolute terms over the course of ten years. The labor market effects, however, kick in with some time delay and become visible around three years after childbirth. Reasons for this observation may be related to labor market frictions. While one might be able to promptly stop engaging in criminal activities (in particular violent crimes), the job search process could take some time. This may be the case for young individuals with convictions (Pager 2003).[9] In addition, it might also be the case that individuals start to invest more into some form of formal education or participate in labor market programs that aim to increase participation. This might speak to the empirical finding of fewer months receiving benefits (e.g., one year after childbirth) but no immediate and simultaneous increase in months receiving earnings.

## 5.3 Robustness and further behavioral adjustments

The 2013 Census provides another rich dataset that allows us to test robustness of the labor market results and to provide potential insights into underlying mechanisms including educational outcomes and family formation. The population-wide survey incorporates a wide range of individual-level and household-level information. In general, the 2013 Census provides a detailed portrayal of the New Zealand population based on responses collected on March 5, 2013. We link our primary sample of men having a child between the ages of 17 to 21 in the period 2005-10 with the Census. At the time of the Census, the mean age of our fathers was 24.8 years. Note that the sample size is smaller due to unidentifiable responses or missing information. We construct several binary outcome variables and use linear probability models to estimate the impact of child's gender, and it's interaction effect with pre-birth conviction. As further covariates, we include the father's age at child's

[9]Ex-offenders might also be more likely to have mental illnesses and trauma (Raphael 2010). Doleac and Hansen (2020) even document unintented consequences of "ban the box" policies due to an increase in statistical discrimination against demographic groups that include more ex-offenders.

birth, child's and father's age at Census night, as well as birth month of the child.

Table 8: Further evidence

| | 2013 Census | | | | | DIA |
|---|---|---|---|---|---|---|
| | High income[a] | Non-employed[b] | Receiving benefits[c] | No qualification[d] | Relationship[e] | Second child[f] |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Son | -0.007 | 0.013 | 0.017* | -0.025 | -0.005 | 0.011 |
| | (0.016) | (0.012) | (0.009) | (0.018) | (0.017) | (0.012) |
| Son × Pre-birth conviction | 0.073** | -0.125*** | -0.082** | -0.042 | 0.108** | 0.028 |
| | (0.032) | (0.040) | (0.036) | (0.036) | (0.044) | (0.027) |
| Combined | 0.066** | -0.112*** | -0.065* | -0.067** | 0.104** | 0.039 |
| | (0.028) | (0.038) | (0.035) | (0.032) | (0.040) | (0.025) |
| Mean | 0.236 | 0.181 | 0.098 | 0.671 | 0.642 | 0.194 |
| Mean fathers aged 22-25[g] | 0.288 | 0.132 | 0.060 | 0.599 | 0.665 | |
| *N* | 3 603 | 3 906 | 3 558 | 3 495 | 3 846 | 5 385 |

*Notes:* Information from the 2013 Census. Unidentifiable responses and not stated are excluded. Using linear probability models and controlling for father's age at child's birth, child's and father's age at Census night, birth month of the child. Robust standard errors in parentheses, significance level: *** p<0.01, ** p<0.05, * p<0.1. [a]A binary indicator taking the value of 1 if the total personal income is $50,001 or higher and zero otherwise. [b]A binary indicator taking the value of 1 if the individual states being part-time or full-time employed and 0 if being unemployed or not being in the labor force. [c]A binary indicator variable taking the value of 1 if the individual states receiving one of the following: unemployment benefit, sickness benefit, domestic purposes benefit and/or invalids benefit. The individual further not states receiving income from wages, salary, commissions, bonuses etc paid by his employer. The variable takes the value of 0 if the individual receives income from wages, salary, commissions, bonuses etc paid by his employer. [d]A binary indicator taking the value of 1 if the individual states having no further post-school qualification and 0 else. [e]A binary indicator taking the value of 1 if the individual states being partnered (not further defined), spouse, civil union partner or *de facto* partner and 0 if non-partnered. [f] bindary indicator taking the value of 1 if the individual has a second child according to the Department of Internal Affair's (DIA) birth record, and 0 otherwise. [g]Mean values for NZ European fathers who were aged between 22-25 in the year 2005-10 when their first child was born. Only provided for the 2013 Census.

The first three variables of Table 8 test for robustness of the labor market results.[10] The first variable of interest is the level of total personal income. The information pertains to a period of 12 months ending in 31 March 2013 and is a broader income measure than the IR-EMS scheme as it includes income from *all* sources, including self-employment. The income data is collected from all adults aged 15 years and over. The income level is provided in bandwidths, and our ('high-income') indicator variable takes the value of 1 if the total personal income is $50,001 or higher and zero otherwise. It is worth noting that for 2013, the median personal income was $28,500.[11] Column (1) of Table 8 shows that fathers with a pre-birth conviction are 7.3% points more likely to have a high income when having a boy relative to having a girl. This group is also 12.5% points less likely to state that they are non-employed (which includes unemployment and out of labor force) than

[10]For comparison reasons, the last row also holds the mean values for NZ European fathers who were aged between 22-25 in the year 2005-10 when their first child was born (only 2013 Census).

[11]Numbers retrieved (on 27 January 2022) from: `https://www.stats.govt.nz/assets/Uploads/Retirement-of-archive-website-project-files/Reports/2013-Census-QuickStats-about-income/quickstats-income.pdf`

being (full- or part-time) employed (column (2)). Further, the likelihood of receiving benefits (unemployment, sickness, domestic purposes and/or invalids) is 8.2% less for fathers having a boy than a girl. Evidently, these Census-based findings qualitatively corroborate our previous labor market findings obtained from the Inland Revenue data.

We also investigate whether the level of post-school education attained by the individual differs depending on the child's gender. The marker is generated by Stats NZ and the variable flags whether the individual has gained over and above school qualifications. To create our indicator, we include any qualifications awarded by educational and training institutions, as well as those gained from on-the-job training. It is worth noting that a substantial share of individuals without further qualification still acquire post-school education at a higher age. For example, in the 2013 Census, about 40% of NZ European men aged 25 stated having no post-school education. Linking them with the 2018 Census shows that one-third of them gain some post-school qualification within the five-year window between the two censuses. Thus, we construct a binary indicator that equals 1 if the individual states having no post-school qualification and 0 else. Although somewhat imprecisely estimated, column (4) of Table 8 shows that pre-birth convicted young fathers with a son are less likely to have no qualification. This result could indicate that the process behind the gender effect is partly driven by higher human capital investments.

Existing research on the effects of child gender has found evidence that girls are disproportionately more likely to be raised by single mothers (Morgan et al. 1988; Dahl and Moretti 2008). Preferences for a boy might become visible as a form of family formation. Such findings indicate the possibility of having a stronger commitment to the well-being of sons, thereby increasing the likelihood of being in more stable relationships (Morgan et al. 1988, Dahl and Moretti 2008). We test the family formation hypothesis by studying the probability of being in a relationship. We consider a person to be in a relationship if he is married, in a civil union or in a *de facto* relationship. It is important to note that in NZ, the rules related to property division, maintenance and inheritance are the same for married and unmarried couples (Atkin 2008), and no legal differences are made for couples in a marriage or in a *de facto* relationship. Column (5) shows that fathers who have a boy are 10.8% points more likely to find themselves in a partnered relationship than those with a daughter. This complements our findings of productive activities along the family formation dimension and indicates that this particular group of newborn males receive higher investments, which can be perceived as a policy-relevant concern in the family welfare realm.

The last column of Table 8 shows a further dimension of family formation. In this case, the outcome variable takes the value of 1 if the father has a second child and 0 otherwise. Both, the level and the interaction effect are insignificant indicating that this dimension is unaffected. This finding also shows that an increase in the intensity of childcare due to a second child is unlikely to explain our main result.

# 6 Conclusion

Child's gender can influence fathers' parental investments in childcare (Dahl and Moretti 2008, Mammen 2008, García et al. 2018) as well as risk-taking behavior such as criminal activities (Dustmann and Landersø 2021). Based on novel micro-level data, our paper provides a comprehensive analysis of the gender of the child on criminal activity, labor market performance, and family formation, thereby providing a full and joint view on the role model explanation put forward in the literature.

Using detailed administrative data from New Zealand, we utilize court charge information to contribute to a small and inconclusive finding in the literature. Consistent with Dustmann and Landersø (2021), we find that young fathers are significantly less likely to receive convictions when having a boy relative to having a girl. In contrast, however, this effect is entirely driven and apparent for fathers who already had contact with the criminal justice system prior to childbirth. . We further observe that the effect is persistent, accumulates over a longer period, and remains statistically significant even ten years after childbirth. These results also hold for offenses that lead to custodial (or more serious) sentences like imprisonment or home detention and are concentrated within offense categories of burglary, drugs and fraud.

Importantly, when we link our spine of young fathers with detailed administrative employment-related tax data, we find that young men with a pre-birth conviction have significantly better future labor market outcomes when they father a son rather than a daughter. Although the son-effect kicks in with some time delay, the differences accumulate and are strongly visible ten years after the child's birth. Moreover, these young fathers not only shift time towards productive activities, but are also more likely to have higher educational attainment and stay in a partnership with the mother.

Our paper contributes to a growing literature by exploring policy-relevant insights into the role model hypothesis and the potential long-term implications of crime prevention policies, especially targeted towards vulnerable youth who are at a greater risk of being in contact with the criminal justice system. This paper identifies

a small group of young fathers who act as role models to their sons; characterized by lower criminal activity, higher household resources through labor income and more time spend together measured by cohabiting with the mother. This likely leads to higher human capital investments into the boys. Simultaneously, a group of girls received a comparably lower investments into their human capital with potentially long-term consequences.

# References


Adamou, A., Drakos, C. and Iyer, S. (2013), 'Missing women in the united kingdom', *IZA Journal of Migration* **2**(1), 1–19.

Almond, D. and Sun, Y. (2017), 'Son-biased sex ratios in 2010 us census and 2011–2013 us natality data', *Social Science & Medicine* **176**, 21–24.

Andersson, G., Hank, K., Rønsen, M. and Vikat, A. (2006), 'Gendering family composition: Sex preferences for children and childbearing behavior in the nordic countries', *Demography* **43**(2), 255–267.

Aspin, C. and Hutchings, J. (2007), 'Reclaiming the past to inform the future: Contemporary views of maori sexuality', *Culture, health & sexuality* **9**(4), 415–427.

Atkin, B. (2008), 'The legal world of unmarried couples: Reflections on de facto relationship in recent new zealand legislation', *Victoria U. Wellington L. Rev.* **39**, 793.

Baker, M. and Milligan, K. (2016), 'Boy-girl differences in parental time investments: Evidence from three countries', *Journal of Human Capital* **10**(4), 399–441.

Barcellos, S. H., Carvalho, L. S. and Lleras-Muney, A. (2014), 'Child gender and parental investments in india: Are boys and girls treated differently?', *American Economic Journal: Applied Economics* **6**(1), 157–89.

Becker, G. S. (1968), 'Crime and punishment: An economic approach', *Journal of Political Economy* **76:2**, 169–217.

Bellemare, M. F. and Wichman, C. J. (2020), 'Elasticities and the inverse hyperbolic sine transformation', *Oxford Bulletin of Economics and Statistics* **82**(1), 50–61.

Blumstein, A., Farrington, D. P. and Moitra, S. (1985), 'Delinquency careers: Innocents, desisters, and persisters', *Crime and justice* **6**, 187–219.

Corman, H., Noonan, K., Reichman, N. E. and Schwartz-Soicher, O. (2011), 'Life shocks and crime: A test of the "turning point" hypothesis', *Demography* **48**.

Dahl, G. B. and Moretti, E. (2008), 'The demand for sons', *The Review of Economic Studies* **75**, 1085–1120.

Doleac, J. L. and Hansen, B. (2020), 'The unintended consequences of "ban the box": Statistical discrimination and employment outcomes when criminal histories are hidden', *Journal of Labor Economics* **38**(2), 321–374.

Dustmann, C. and Landersø, R. (2021), 'Child's gender, young fathers' crime, and spillover effects in criminal behavior', *Journal of Political Economy* **129**(12), 3261–3301.

Edvardsson, K., Axmon, A., Powell, R. and Davey, M.-A. (2018), 'Male-biased sex ratios in australian migrant populations: a population-based study of 1 191 250 births 1999–2015', *International journal of epidemiology* **47**(6), 2025–2037.

Elkington, A. (2017), 'The everyday lives of young māori fathers: An explorative study', *Journal of Indigenous Wellbeing* **2:3**, 3–17.

García, J. L., Heckman, J. J. and Ziff, A. L. (2018), 'Gender differences in the benefits of an influential early childhood program', *European economic review* **109**, 9–22.

Larson, N. C., Hussey, J. M., Gillmore, M. R. and Gilchrist, L. D. (1996), 'What about dad? Fathers of children born to school-age mothers', *Families in Society* **77:5**, 279–289.

Lundberg, S., McLanahan, S. and Rose, E. (2007), 'Child gender and father involvement in fragile families', *Demography* **44**(1), 79–92.

Lundberg, S. and Rose, E. (2002), 'The Effects of Sons and Daughters on Men's Labor Supply and Wages', *The Review of Economics and Statistics* **84**(2), 251–268.

Mammen, K. (2008), 'The effect of children's gender on living arrangements and child support', *American Economic Review* **98**(2), 408–12.

Mancino, M. A., Navarro, S. and Rivers, D. A. (2016), 'Separating state dependence, experience, and heterogeneity in a model of youth crime and education', *Economics of Education Review* **54**, 274–305.

Massenkoff, M. and Rose, E. K. (2022), 'Family formation and crime', *Unpublished Working Paper: http://maximmassenkoff. com/FamilyFormationAndCrime. pdf* .

McIntosh, T. and Workman, K. (2017), *The Palgrave handbook of Australian and New Zealand criminology, crime and justice*, Palgrave Macmillan, Cham, chapter Māori and prison, pp. 725–735.

MoJ (2020), 'Children adopted', *Ministry of Justice* . Available at: https://www.justice.govt.nz/justice-sector-policy/research-data/justice-statistics/data-tables/processes.

Morgan, S. P., Lye, D. N. and Condran, G. A. (1988), 'Sons, daughters, and the risk of marital disruption', *American journal of sociology* **94**(1), 110–129.

Nagin, D. and Paternoster, R. (1991), 'On the relationship of past to future participation in delinquency', *Criminology* **29**(2), 163–189.

Nagin, D. and Paternoster, R. (2000), 'Population heterogeneity and state dependence: State of the evidence and directions for future research', *Journal of Quantitative Criminology* **16**(2), 117–144.

Pager, D. (2003), 'The mark of a criminal record', *American journal of sociology* **108**(5), 937–975.

Pratt, J. (2006), 'The dark side of paradise: Explaining new zealand's history of high imprisonment', *The British Journal of Criminology* **46:4**, 541–560.

Raphael, S. (2010), Improving employment prospects for former prison inmates: Challenges and policy, *in* 'Controlling crime: Strategies and tradeoffs', University of Chicago Press, pp. 521–565.

Ravallion, M. (2017), 'A concave log-like transformation allowing non-positive values', *Economics Letters* **161**, 130–132.

Roberts, J. V. (2003), 'Sentencing reform in new zealand: an analysis of the sentencing act 2002', *Australian & New Zealand Journal of Criminology* **36**(3), 249–271.

Sampson, R. J. and Laub, J. H. (1990), 'Crime and deviance over the life course: The salience of adult social bonds', *American Sociological Review* **55:6**, 609–627.

Simon-Kumar, R., Paynter, J., Chiang, A. and Chabba, N. (2021), 'Sex ratios and 'missing women'among asian minority and migrant populations in aotearoa/new zealand: a retrospective cohort analysis', *BMJ open* **11**(11), e052343.

StatsNZ (2019*a*), 'New zealand's population reflects growing diversity', *New Zealand Government* . Available at: https://www.stats.govt.nz/news/new-zealands-population-reflects-growing-diversity.

StatsNZ (2019*b*), 'Parenting and fertility trends in new zealand: 2018', *New Zealand Government* . Available at: https://www.stats.govt.nz/reports/parenting-and-fertility-trends-in-new-zealand-2018fathers.

StatsNZ (2020), 'Births and deaths: Year ended december 2010', *New Zealand Government* . Available at: http://archive.stats.govt.nz/browse_for_stats/population/births/Births-AndDeaths_HOTPYeDec10/Commentary.aspxgsc.tab=0.

Wanigaratne, S., Uppal, P., Bhangoo, M., Januwalla, A., Singal, D. and Urquia, M. L. (2018), 'Sex ratios at birth among second-generation mothers of south asian ethnicity in ontario, canada: a retrospective population-based cohort study', *J Epidemiol Community Health* **72**(11), 1044–1051.

Weinman, M. L., Smith, P. B. and Buzi, R. S. (2002), 'Young father: An analysis of risk behaviors and service needs', *Child and Adolescent Social Work Journal* **19:6**, 437–453.

Weinmann, C. M., Agurcia, C. A., Rickert, V. I., Berenson, A. B. and Volk, R. J. (2006), 'Child and adolescent social work journal', *Child and Adolescent Social Work Journal* **23:5–6**, 617–634.

Western, B., Kling, J. R. and F, W. D. (2001), 'The labor market consequences of incarceration', *Crime and Delinquency* **47:3**, 410–426.

# Supplementary Appendix

# Disclaimer

The results in this paper are not official statistics, they have been created for research purposes from the Integrated Data Infrastructure (IDI), managed by Statistics New Zealand. The opinions, findings, recommendations, and conclusions expressed in this paper are those of the authors, not Statistics NZ.

The results are based in part on tax data supplied by Inland Revenue to Statistics NZ under the Tax Administration Act 1994. This tax data must be used only for statistical purposes, and no individual information may be published or disclosed in any other form, or provided to Inland Revenue for administrative or regulatory purposes. Any person who has had access to the unit record data has certified that they have been shown, have read, and have understood section 81 of the Tax Administration Act 1994, which relates to secrecy. Any discussion of data limitations or weaknesses is in the context of using the IDI for statistical purposes, and is not related to the data's ability to support Inland Revenue's core operational requirements.

Access to the anonymised data used in this study was provided by Statistics NZ in accordance with security and confidentiality provisions of the Statistics Act 1975. Only people authorised by the Statistics Act 1975 are allowed to see data about a particular person, household, business, or organisation, and the results in this paper have been confidentialised to protect these groups from identification. Careful consideration has been given to the privacy, security, and confidentiality issues associated with using administrative and survey data in the IDI.

Further detail can be found in the Privacy impact assessment for the Integrated Data Infrastructure available from www.stats.govt.nz.

# A Additional tables and figures

Table A1: Child-gender distribution

| | Mother's age at child's birth | | |
|---|---|---|---|
| | 17-21 | 22-39 | $p-$value |
| **Panel A: *All mothers*** | | | |
| Share of son | 0.515 | 0.516 | 0.702 |
| | (0.003) | (0.001) | |
| $N$ | 28 203 | 171 000 | |
| **Panel B: *Mothers of NZ European ethnicity*** | | | |
| Share of son | 0.518 | 0.513 | 0.307 |
| | (0.004) | (0.001) | |
| $N$ | 103 896 | 11 250 | |

*Notes:* The table shows the share of sons compared to all life birth (excluding multiple births) of all first-time mothers with a birth in the years 2005-10 and aged between 17 and 39. Standard errors in parentheses. The $p-$value refers to the t-test between young mothers and mothers aged 22 and above. Panel (A) includes mothers of all ethnicity and Panel (B) only mothers of NZ European ethnicity.

Table A2: Fatherhood recognition

| | All mothers (I) | NZ European mothers (II) |
|---|---|---|
| Son | 0.002 | 0.001 |
| | (0.001) | (0.001) |
| Young mother (17-21) | -0.080*** | -0.097*** |
| | (0.002) | (0.002) |
| Son × Young mother | 0.002 | 0.004 |
| | (0.003) | (0.003) |
| Māori | -0.061*** | - |
| | (0.001) | |
| Pasifika | -0.058*** | - |
| | (0.002) | |
| Asian | 0.012*** | - |
| | (0.002) | |
| Other | 0.005* | - |
| | (0.003) | |
| mean | 0.951 | 0.971 |
| $N$ | 199 203 | 115 146 |

*Notes:* The table shows the probability (in percenage points) that a father is listed on the DIA birth register for all live births (excluding multiple births) delivered by women aged between 17 and 39 in the period 2005-10. The regression model also controls for birth month and year fixed effects. standard errors in parentheses, significance level: *** p<0.01, ** p<0.05, * p<0.1.

Table A3: Likelihood to decease after child's birth

| | Months from birth of first child | | | | | | |
|---|---|---|---|---|---|---|---|
| | 12 | 24 | 36 | 48 | 60 | 96 | 120 |
| Son | 0.000 | 0.001 | -0.000 | -0.000 | -0.001 | -0.002 | -0.002 |
| | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) | (0.003) | (0.003) |
| Son × Pre-birth | 0.001 | 0.004 | 0.001 | 0.002 | 0.004 | 0.003 | 0.004 |
| conviction | (0.005) | (0.006) | (0.007) | (0.007) | (0.008) | (0.008) | (0.009) |
| Share of deceased | 0.003 | 0.005 | 0.006 | 0.006 | 0.007 | 0.010 | 0.012 |
| $N$ | 5 487 | 5 424 | 5 367 | 5 322 | 5 259 | 5 184 | 5 187 |

*Notes:* The table shows the child-gender related difference (boy vs. girl) and the interaction effect between child-gender and pre-birth conviction based on OLS regressions to decease after child birth. Each coefficient corresponds to a separate regression. Robust standard errors in parentheses, significance level: *** p<0.01, ** p<0.05, * p<0.1.

Table A4: Pre-birth characteristics for Māori

| | NZ European | | | Māori | | |
|---|---|---|---|---|---|---|
| | daughter | son | $p-$value | daughter | son | $p-$value |
| Employed | 0.696 | 0.687 | 0.666 | 0.533 | 0.535 | 0.763 |
| | (0.457) | (0.455) | | (0.498) | (0.498) | |
| W&S | 7.527 | 7.557 | 0.164 | 7.347 | 7.370 | 0.330 |
| | (0.684) | (0.661) | | (0.807) | (0.799) | |
| Benefits | 0.130 | 0.133 | 0.610 | 0.172 | 0.172 | 0.935 |
| | (0.337) | (0.342) | | (0.378) | (0.378) | |
| Offence | 0.023 | 0.024 | 0.598 | 0.034 | 0.043 | 0.103 |
| | (0.149) | (0.156) | | (0.228) | (0.264) | |
| Married | 0.017 | 0.019 | 0.589 | 0.006 | 0.005 | 0.398 |
| | (0.128) | (0.135) | | (0.077) | (0.069) | |
| $N$ | 2 646 | 2 904 | | 4 473 | 4 836 | |

*Notes:* Robust standard errors in parentheses, significance level: *** p<0.01, ** p<0.05, * p<0.1.

Table A5: Criminal behavior and labor market performance after child's birth of Māori

| | Months to/from birth of first child | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | -6 | 12 | 24 | 36 | 48 | 60 | 96 | 120 |
| **Panel A:** ***Number of convictions*** | | | | | | | | |
| Son | -0.009 | 0.004 | -0.009 | -0.003 | 0.002 | -0.000 | -0.004 | -0.000 |
| | (0.012) | (0.009) | (0.012) | (0.015) | (0.017) | (0.018) | (0.022) | (0.023) |
| Son × Pre-birth | | 0.023 | 0.039 | 0.003 | -0.003 | 0.007 | 0.020 | 0.025 |
| conviction | | (0.028) | (0.035) | (0.039) | (0.042) | (0.043) | (0.048) | (0.051) |
| mean | 0.796 | 0.492 | 0.951 | 1.405 | 1.810 | 2.201 | 3.273 | 3.920 |
| *N* | 9 309 | 9 171 | 8 943 | 8 700 | 8 496 | 8 631 | 8 094 | 8 058 |
| **Panel B:** ***Number of imprisonment/home detention*** | | | | | | | | |
| Son | -0.006 | -0.004 | -0.013** | -0.013* | -0.012 | -0.011 | -0.011 | -0.020 |
| | (0.007) | (0.004) | (0.006) | (0.007) | (0.009) | (0.010) | (0.013) | (0.014) |
| Son × Pre-birth | | 0.025 | 0.025 | -0.001 | 0.013 | 0.002 | 0.005 | 0.016 |
| conviction | | (0.019) | (0.025) | (0.030) | (0.033) | (0.035) | (0.041) | (0.044) |
| mean | 0.081 | 0.072 | 0.125 | 0.172 | 0.211 | 0.248 | 0.351 | 0.401 |
| *N* | 9 309 | 9 171 | 8 943 | 8 700 | 8 496 | 8 631 | 8 094 | 8 058 |
| **Panel C:** ***Number of months receiving earnings from wages & salaries*** | | | | | | | | |
| Son | -0.001 | 0.002 | 0.001 | 0.007 | -0.019 | -0.021 | -0.028 | -0.022 |
| | (0.015) | (0.014) | (0.016) | (0.018) | (0.019) | (0.019) | (0.020) | (0.020) |
| Son × Pre-birth | | -0.018 | -0.016 | -0.022 | -0.018 | -0.021 | -0.045 | -0.048 |
| conviction | | (0.033) | (0.039) | (0.043) | (0.045) | (0.047) | (0.050) | (0.051) |
| mean | 16.07 | 9.00 | 15.96 | 22.62 | 29.09 | 38.54 | 55.24 | 68.60 |
| *N* | 8 451 | 7 698 | 7 971 | 7 974 | 7 929 | 7 905 | 7 821 | 7 839 |
| **Panel D:** ***Accumulated earnings from wages & salaries*** | | | | | | | | |
| Son | -0.014 | -0.005 | -0.004 | -0.002 | -0.033 | -0.018 | -0.022 | -0.010 |
| | (0.028) | (0.031) | (0.032) | (0.032) | (0.033) | (0.033) | (0.033) | (0.032) |
| Son × Pre-birth | | -0.063 | -0.027 | -0.039 | -0.050 | -0.074 | -0.093 | -0.096 |
| conviction | | (0.073) | (0.077) | (0.078) | (0.078) | (0.080) | (0.081) | (0.080) |
| | 28,524 | 21,181 | 39,451 | 58,468 | 77,914 | 98,885 | 170,835 | 226,684 |
| *N* | 8 451 | 7 698 | 7 971 | 7 974 | 7 929 | 7 905 | 7 821 | 7 839 |
| **Panel E:** ***Number of months receiving benefits*** | | | | | | | | |
| Son | 0.005 | 0.009 | 0.023 | -0.001 | 0.011 | 0.012 | 0.034 | 0.037 |
| | (0.022) | (0.023) | (0.029) | (0.032) | (0.035) | (0.037) | (0.041) | (0.042) |
| Son × Pre-birth | | 0.002 | -0.032 | -0.013 | 0.024 | 0.040 | -0.020 | -0.002 |
| conviction | | (0.050) | (0.059) | (0.063) | (0.066) | (0.068) | (0.071) | (0.073) |
| mean | 3.77 | 2.92 | 5.93 | 9.16 | 12.55 | 16.96 | 25.12 | 30.88 |
| *N* | 9 309 | 9 171 | 8 943 | 8 700 | 8 496 | 8 631 | 8 094 | 8 058 |

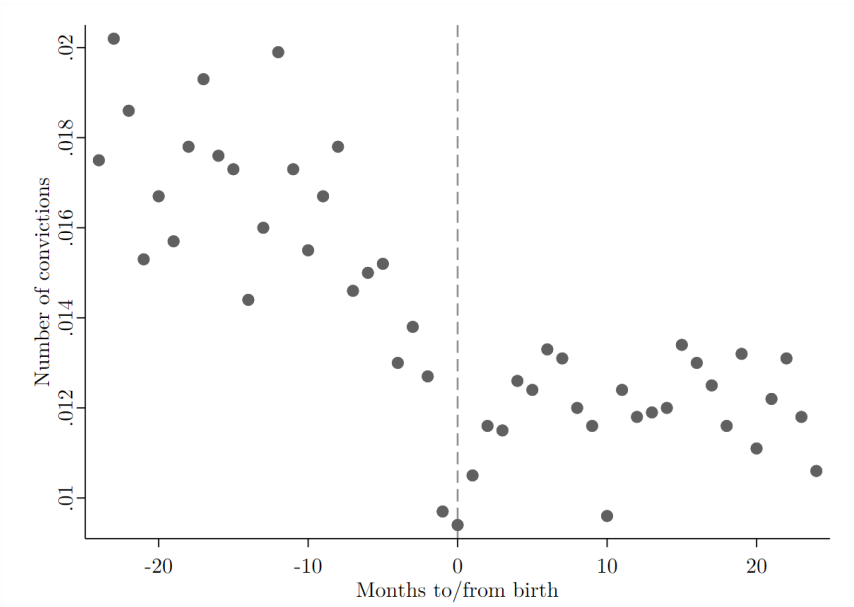
*Notes:* The table shows the child-gender related difference (boy vs. girl) and the interaction effect between child-gender and pre-birth conviction based on OLS regressions of total convictions (Panel A) and convictions that lead to imprisonment or home detention (Panel B) before and after child birth. Each coefficient corresponds to a separate regression. Count refers to the log-transformed accumulated number of convictions (+1). The pre-period starts 36 months before and stops at 6 months before the birth of the first child, which is the time when the gender of the child can first be identified. Robust standard errors in parentheses, significance level: *** p<0.01, ** p<0.05, * p<0.1.

Table A6: Effect heterogeneity by labor market attachment, 10 years after child's birth

| | Fathers w pre-birth convictions (1) | Fathers w/o pre-birth convictions (2) |
|---|---|---|
| Son | -0.052 | -0.263** |
| | (0.065) | (0.101) |
| Son × Share of months' employed | 0.023 | 0.149 |
| | (0.072) | (0.156) |
| Mean | 1.164 | 6.242 |
| *N* | 4 053 | 1 068 |

*Notes:* The table shows the child-gender related difference (boy vs. girl) and the interaction effect between child-gender and pre-birth conviction based on OLS regressions of total convictions 10 years after child birth. Father and mother have been receiving earnings from wages & salaries in two or less months of the time window 18 to 12 months before child birth. Robust standard errors in parentheses, significance level: *** p<0.01, ** p<0.05, * p<0.1.

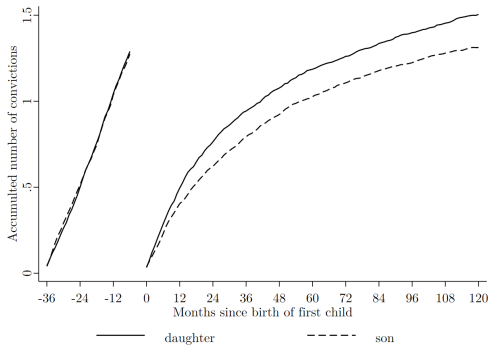
Figure A1: Convictions and child birth



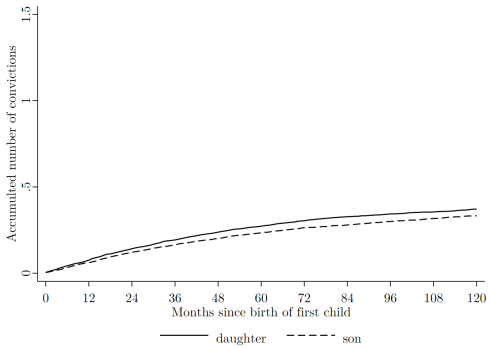

*Notes:* The graph shows the number of log transformed number of convictions (+1) for each month for the period 24 months to and from the child's birth (using the offence date) of fathers born between 1983-93 and of NZ European ethnicity and who were between 19 and 21 at child's birth. The dashed vertical line refers to the child's birth.

Figure A2: Child-gender related conviction rates by pre-birth convictions

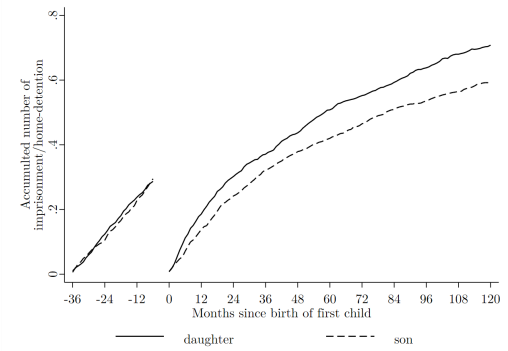
(a) Convictions (w pre convictions)



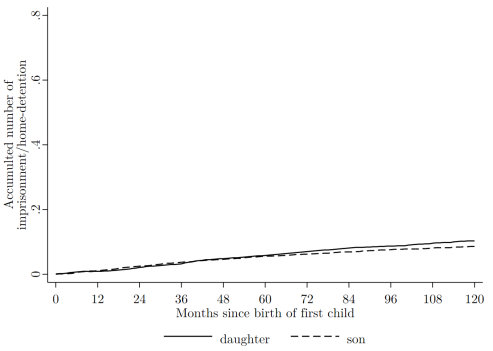

(b) Convictions (w/o pre convictions)




(c) Imprisonment/home detention (w pre convictions)




(d) Imprisonment/home detention (w/o pre convictions)




*Notes:* The graph shows the accumulated log number of convictions (+1) by gender of the first child for the pre- and post-birth period. The pre-period starts 36 months before and stops at 6 months before the birth of the first child, which is the time when the gender of the child can first be identified. (a) refers to the number of convictions of fathers with a pre-birth conviction, (b) refers to the number of convictions of fathers without a pre-birth conviction, (c) refers to the number of convictions that include imprisonment or home detention of fathers with a pre-birth conviction, (d) refers to the number of convictions that include imprisonment or home detention of fathers without a pre-birth conviction.