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Vittorio Addona and Philip A. Yates

Abstract

At young ages, a few extra months of development can make a big difference in size, strength, and athletic ability. A child who turns 5 years old in January will be nearly 20% older by the time a child born in December has their 5th birthday. In many sports, including hockey, children born in the early months of the calendar year get noticed by their coaches because of the superiority they demonstrate due to their age advantage. As a result, boys born early in the year are more likely to reach the professional ranks of the National Hockey League (NHL). The phenomenon just described has been labeled the relative age effect (RAE). Previous work studying the RAE in the NHL has focused on individual NHL seasons, often encompassing many of the same players across multiple seasons. We investigate the RAE using complete data on every player who has ever played in the NHL. We focus the majority of our analysis on Canadian born players and examine the RAE across hockey position and hall-of-fame status. For the first time, we provide strong evidence of when the RAE began to manifest itself in Canada. Our change point analysis indicates that the RAE began for players born since 1951. Finally, we make a case for what initiated this change in the way young hockey players develop, particularly in Canada, which produced over 90% of NHL players at that time.

KEYWORDS: relative age effect, change point, hockey, NHL

Author Notes: We would like to thank an anonymous referee for very useful comments which greatly helped improve our paper.

1 Introduction

For a young Canadian child, the dream of playing in the National Hockey League (NHL) often begins with their first organized games around the age of 5 or 6 years old. Wayne Gretzky, widely considered the greatest player to ever play in the NHL, began ice-skating before he was 3 years old. The road to the NHL for Wayne, as for any other young Canadian, is a long one involving years of training, countless hours of practice, and a determination to compete against the best players in the world. As in any sport, young hockey players need the good fortune of staying healthy throughout their development in order to make it to the professional ranks. One knee injury and the dream could be dashed; however, young athletes, including hockey players, share another element of luck in common with aspiring actors, musicians, and comedians. They need to get noticed.

For a promising entertainer, getting noticed is the difference between a career which stagnates and worldwide fame. It should come as no surprise then that hockey players, like any entertainer, need the good fortune of getting noticed to help them succeed. The difference, as it turns out, is that hockey players generally get noticed at a very young age, sometimes only a year or two after they have learned to skate. They get noticed for the obvious reasons. They skate better than the other kids; they shoot harder than the other kids; and their passes are more accurate. Until quite recently, however, no one had recognized that this process favored children born in the early months of the calendar year. Consider the following scenario: a 10 year-old boy plays with 8 year-old children and dominates his competition. As a result, the coach pulls him aside and asks whether he would be interested in some extra practice time, maybe even one-on-one sessions with the coach. Perhaps the coach invites the 10 year-old to a special summer hockey camp where he can develop his already superior skills. Clearly, anyone would object to this turn of events. The 10 year-old is not necessarily more talented than the 8 year-old children, he is dominating simply because he is older than they are. In fact, he is 25% older. Similarly, a 5 year-old born in January is almost 20% older than his 5 year-old adversary born in December. The children born in January will tend to skate faster, shoot harder, and pass more accurately than those born in the latter part of the year. Since many countries, most notably Canada, group youth hockey players by calendar year, the January children will get noticed. Consequently, these young children have, unwittingly, received a huge advantage, and they are just a little bit closer to achieving their dream of playing in the NHL.

The phenomenon just described is called the *relative age effect* (RAE). The RAE was not discovered until Barnsley, Thompson, and Barnsley (1985) used data from the 1982-83 NHL season to show that almost twice as many players were born in the first quarter of the year (32.0% in January-March) compared to the last quarter (16.2% in October-December). The RAE was even more dramatic in two Canadian junior leagues, the Ontario Hockey League (OHL) and the Western Hockey League (WHL), where more than triple of the players were born in the first quarter compared to the last quarter (Barnsley et al., 1985). Barnsley and Thompson (1988) found the RAE in the birthdays of players from the Edmonton Minor Hockey Association for the 1983-84 season. Daniel and Janssen (1987) first investigated whether the phenomenon has persisted over time. The authors found that no RAE was present in the 1961-62 NHL season, or from 1972 to 1975, but that in the 1985-86 season, 64% of Canadian players were born in the first half of the calendar year. Daniel and Janssen (1987) suggested that a potential transitional event which led to the RAE was the international hockey series between Canada and the Soviet Union in 1972. Unfortunately, this is not possible. If the RAE was present in the 1985-86 NHL season, then the vast majority of these players were born in the early 1960s, or earlier, and went through youth hockey before any effects of the 1972 series could have been experienced. We return to the question of the RAE origin in Section 3 and discuss its possible catalysts in Section 4.

Other work has proposed solutions to the RAE problem, including an 8-year cycle where teams are formed so that each child spends time as the oldest, youngest, and middle-aged in his/her cohort (Hurley, Lior, and Tracze, 2001). To the best of our knowledge, however, nothing has been implemented to combat the RAE. This phenomenon has been observed in other sports (Baseball: Thompson, Barnsley, and Stebelsky (1991); Basketball: Delorme and Raspaud (2009); Soccer: Barnsley, Thompson, and Legault (1992); Helsen, Starkes, and Winckel (1999); Glamser and Vincent (2004); Jiménez and Pain (2008); Cobley, Schorer, and Baker (2008b); School sports: Cobley, Abraham, and Baker (2008a)), with respect to academic performance (Barnsley, 1988), in the business world (Du, Gao, and Levi, 2009), and even with regards to suicide (Thompson, Barnsley, and Dyck, 1999). A nice review of the RAE in sports can be found in Musch and Grondin (2001), and a popularized version of some RAE sports research is given by Gladwell (2008).

All previous work on the RAE in the NHL has examined individual seasons, with the same players present across multiple seasons. We extend the RAE hockey literature by analyzing an expanded set of players: every player who ever played in the NHL. We investigate the RAE by comparing NHL birth month proportions to a uniform birth distribution and, for Canada, to national birth rates. Although we present some findings for players born in various countries, our primary focus will be Canadian born players. By proceeding in this way, we avoid the confounding potential of differences in youth hockey systems around the world. We study whether different NHL positions are equally affected by the RAE and whether membership in the NHL's hall-of-fame is subject to the RAE. Finally, we determine *when* the RAE began to appear, and we posit reasons for *why* it began.

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The paper is organized as follows: In Section 2, we describe our data. This includes information on every player to play in the NHL's regular season. Section 3 presents the results of our analysis. We use chi-square goodness-of-fit tests (and Fisher's exact test, if needed) to detect the RAE and a change point analysis to determine when the RAE first manifested itself. In Section 4, we provide a discussion of our findings, in particular, an explanation of what we believe led to the start of the RAE. Section 5 gives some brief concluding remarks.

2 Data and Methods

Hockey-Reference.com has in depth information on every player to ever play in the NHL. We gathered data for all players appearing in at least one NHL regular season game from the start of the league through the 2008-09 season. Relevant variables recorded were their primary position, their month, day, and year of birth, and whether they had been elected to the hockey hall-of-fame. Information was verified using The Internet Hockey Database (www.hockeydb.com), and any missing data from Hockey-Reference.com was filled if it was available in this database. The number of errors discovered was very small, and these were corrected by examining other sources. The data were then augmented with each player's country of birth using databaseHockey.com. In total, our dataset includes information on 6,407 players. We were unable to determine the birthdays for 16 players, only 2 of which played beyond 1927, and none of which played beyond 1945. We also gathered national birth rates in Canada, by month, from UN Statistics for the following years: 1970-1971, 1973-1990, 1992-1997, 1999-2005.

We compare the observed birth month distributions to a uniform birth distribution using a goodness-of-fit test (for Canada, we also account for observed birth rates in the years gathered). Using the annual birth month proportions of Canadian NHL players, a change point analysis is then performed to determine when the RAE began. This information is of primary importance in establishing why the RAE started to appear. We also verify whether the RAE exists across position played and hall-of-fame membership status.

3 Results

Table 1 presents the birth month distribution for all 6391 birthdays. Although a clear decreasing trend by month is evident, Table 1 represents players born in 40 different countries, each with potentially different youth hockey systems. We thus

Month	Absolute Frequency	Relative Frequency
January	668	10.45 %
February	589	9.22 %
March	625	9.78 %
April	602	9.42 %
May	572	8.95 %
June	528	8.26 %
July	500	7.82 %
August	467	7.31 %
September	497	7.78 %
October	478	7.48 %
November	441	6.90 %
December	424	6.63 %

Table 1: Birth month frequencies for all 6391 NHL players since league's inception

separate the births into 8 country categories: Canada, USA, Czech Republic, Sweden, Soviet Union, Finland, Slovakia, and Other. The countries represented in the first 7 categories encompass just over 97% of the players (see Table 2). Table 3 presents the absolute birth frequencies stratified by country.

If we assume a uniform birth distribution, then every month with 31 days is expected to contain 8.5% of the births, months with 30 days should contain 8.2% of the births, and February should contain 7.7% of the births. For Canadian players, the observed birth month distribution is significantly different from a uniform birth distribution (p=9.36e-14) using a chi-square goodness-of-fit test. This departure holds for American players (p=0.0039) although, unlike with Canada, there is no obvious decreasing trend. The chi-square test does not reach statistical significance in the other countries, although this may be due to smaller sample sizes. If we combine the Czech Republic, Sweden, the Soviet Union, Finland, and Slovakia, the test is indeed significant (p=1.5e-04). Henceforth, we focus exclusively on Canadian players. This circumvents the issue of differing youth hockey systems, while centering attention on the country which has produced, by far, the most NHL players.

The assumption of uniform births throughout the calendar year is suspect. Figure 1 displays boxplots of the proportion of births by month in Canada for the years 1970-1971, 1973-1990, 1992-1997, 1999-2005. We have also designated with asterisks, in Figure 1, the expected proportion of births for each month as-

Country	Absolute Frequency	Relative Frequency
Canada	4594	71.70 %
USA	847	13.22 %
Czech Republic	212	3.31 %
Sweden	202	3.15 %
Soviet Union	177	2.76 %
Finland	154	2.40 %
Slovakia	46	0.72 %
Other	175	2.73 %

Table 2: Birth countries of 6407 NHL players since league's inception

Month	Canada	USA	Czech Republic	Sweden	Soviet Union	Finland	Slovakia	Other
January	456	103	22	20	22	13	7	25
February	427	66	25	18	19	12	5	17
March	424	93	23	28	20	20	3	14
April	442	64	15	21	18	15	4	23
May	419	77	14	15	15	14	5	13
June	388	61	22	14	12	18	1	12
July	353	67	9	19	20	15	2	15
August	340	66	13	16	10	10	1	11
September	360	63	23	12	9	11	4	15
October	340	70	13	14	12	8	8	13
November	330	57	14	9	8	11	5	7
December	300	60	19	16	12	6	1	10

Table 3: Absolute frequency of birth month by country of all 6391 NHL players

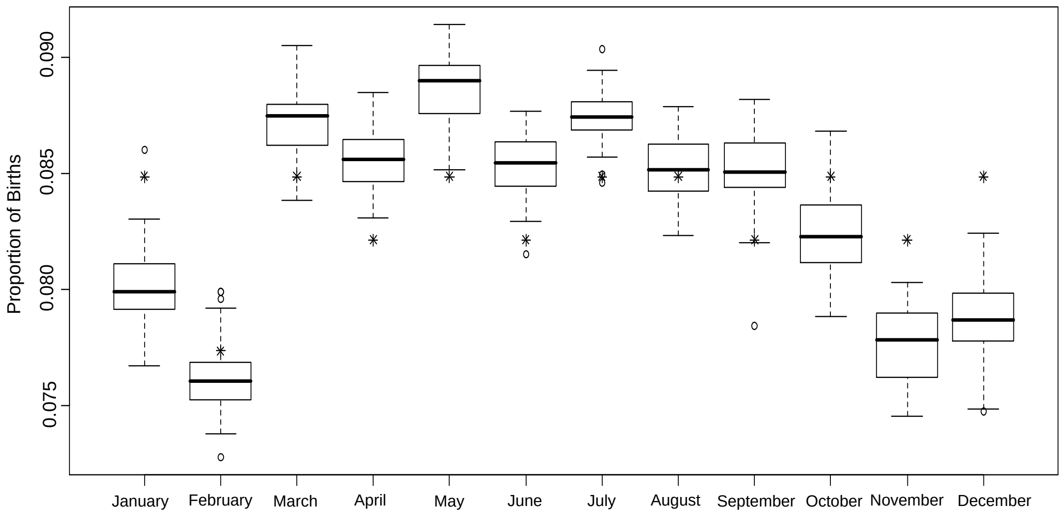

Figure 1: Proportion of births by month, in Canada, for the years 1970-1971, 1973-1990, 1992-1997, 1999-2005

suming a uniform birth rate. We notice that the winter months generally have lower birth proportions than would be expected under the uniform birth assumption, while summer months tend to have higher than expected birth proportions. We thus reran the chi-square test for the 1,184 Canadian players born since 1970, using the observed mean birth proportions for the years 1970-1971, 1973-1990, 1992-1997, and 1999-2005, to obtain the expected number of births in each month. The results are summarized in Table 4. After accounting for the non-uniform birth rate, it is certainly still true that more players have birthdays early in the calendar year compared to what would be expected (chi-square test yields p=1.11e-07).

Therefore, all evidence indicates that the RAE is present for Canadian born players, regardless of whether we use a uniform birth distribution or adjust for the actual birth distribution. A natural sequel to the question of existence of the RAE is whether this phenomenon has always been present. If the RAE has not always existed, we might wonder *when* it started and *what* triggered its initiation. A previous attempt at addressing this question focused on a few individual NHL seasons sprinkled over a couple of decades. Our data allow us to track the magnitude of the RAE over time, since the beginnings of the NHL. There are many ways in which we can quantify the magnitude of the RAE. Several authors have compared the first quarter of the year to the last quarter. This reduces the noise that would result from considering single months, while leaving a six month age gap between the groups being compared. We thus track the percentage of Canadian NHL players born in

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Month	**Observed**	**Expected**	**% Difference**	**% Difference** (if births uniform)
January	127	94.79	+33.98	+26.38
February	116	90.32	+28.43	+26.67
March	117	103.17	+13.41	+16.43
April	127	101.54	+25.07	+30.59
May	118	105.09	+12.29	+17.42
June	110	100.99	+8.92	+13.11
July	88	103.49	-14.97	-12.43
August	74	100.82	-26.60	-26.36
September	84	100.98	-16.81	-13.62
October	79	97.67	-19.12	-21.39
November	75	91.86	-18.36	-22.88
December	69	93.29	-26.03	-31.34

Table 4: Adjusting for actual birth rate in Canada for the years 1970-1971, 1973-1990, 1992-1997, 1999-2005

the first and last quarters of the calendar in five-year increments, starting in 1901. Using five-year increments further reduces noise and will help identify a discrepancy between the two quantities (see Figure 2). We see that for players born in 1951 onwards, there is a distinct gap between first and fourth quarter births. This provides a nice graphical procedure for determining when the RAE began. Note that the early birth years did not contain very many players, so small discrepancies are consistent with no difference between the two groups. In each year from 1945 to 1985, there were at least 50 future Canadian NHL players born, thus there were at least 250 players in each category during that stretch.

More formally, we performed a change point analysis on the yearly difference in proportion of first and last quarter births from 1930 to 1987. We chose to disregard years before 1930 and after 1987 because of the small number of players born in these periods. Specifically, we follow work on testing for, and dating of, one or more structural changes (i.e. change points) in the coefficients of a linear regression model. A special case of this work is determining whether (and if so, when) the mean of a variable has changed over time. For more theoretical details see, for example, Bai (1997), Bai and Perron (1998), and Sullivan (2002). Zeileis, Kleiber, Kr*ä*mer, and Hornik (2003) implemented the dynamic programming algorithm of Bai and Perron (2003) for estimation, and dating, of the change point(s) in the *R* package *strucchange*. In particular, the function *breakpoints* allows the selection of

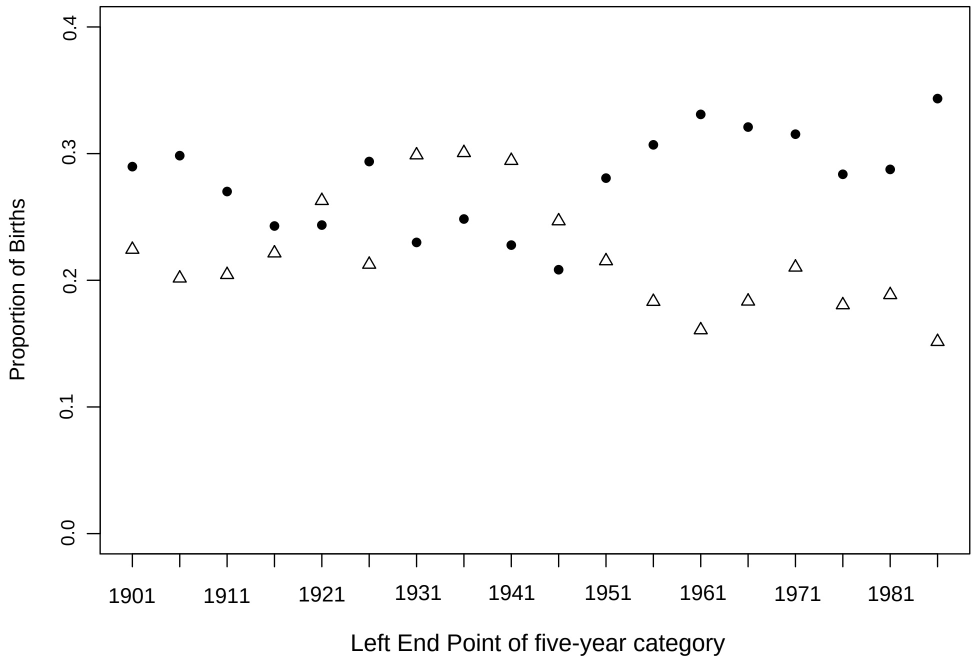

Figure 2: Proportion of Canadian NHLers born in first (solid circles) and fourth (triangles) quarter in five-year increments (1901-1905, 1906-1910, ..., 1986-1990)

the optimal $(m+1)$-segment partition (m change points) model by minimizing the Bayesian Information Criteria (BIC). Bai and Perron (2003) argued that Akaike's information criterion (AIC) often overestimates the number of change points. Figure 3 shows that the BIC selects a model with one change point. Figure 4 displays a scatterplot of the difference in proportion between first and fourth quarter births over time, along with the results of the one change point model. The lone estimated change point, obtained via least squares, occurs at 1951 (vertical dashed line). To illustrate our results, we add to Figure 4 a step function representing the estimated 2-segment piecewise constant regression model, with a change point at 1951. Under certain assumptions, Bai (1997) established the consistency of the change-point estimator, and derived its asymptotic distribution in order to arrive at a confidence interval estimator. In our example, the 95% confidence interval for the location of the true change point is [1948,1957], as shown in Figure 4.

This confirms the conclusion from our visual inspection of Figure 2. As a further robustness check, we performed a Bayesian change point analysis based on the work of Barry and Hartigan (1993), which is implemented in the *R* package *bcp* (Erdman and Emerson, 2007). We omit the complete results (which are available upon request), but note that this Bayesian procedure returns 1951 as the year with, by far, the highest posterior probability of being a change point.

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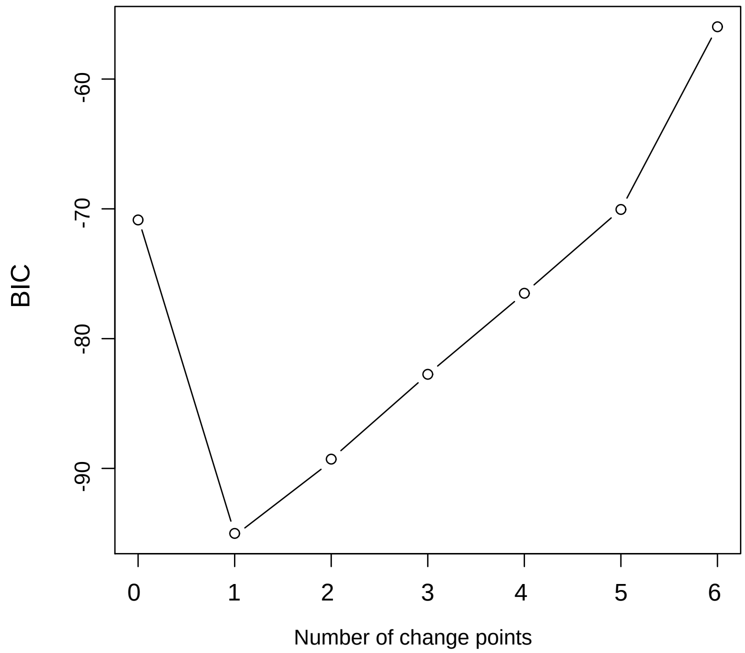

Figure 3: Minimum BIC values for m=0, 1, 2, ..., 6 change points in the difference in proportion between first and fourth quarter births

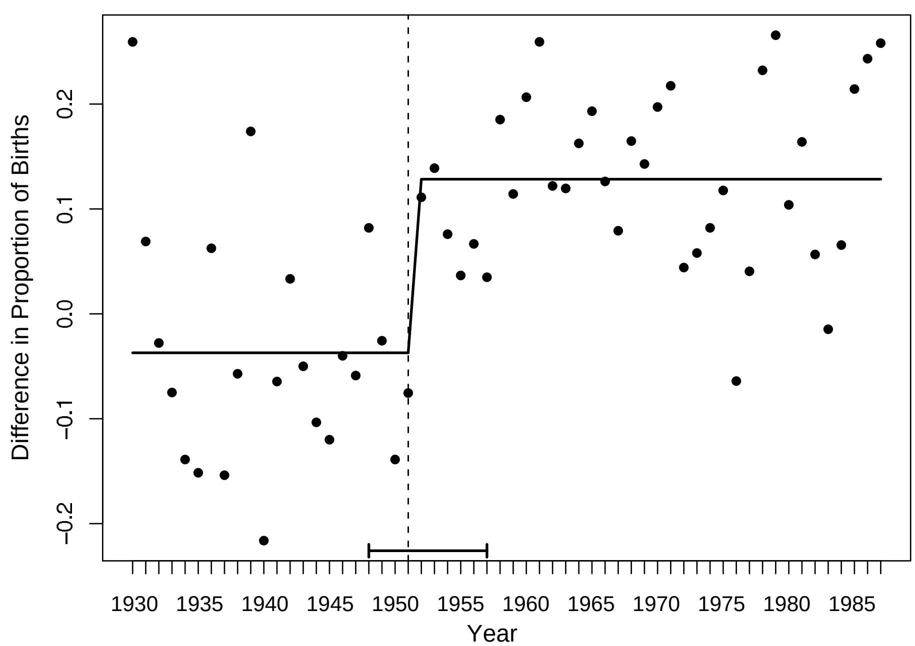

Figure 4: Difference in proportion of first and last quarter births with change point

Month	**Relative Frequency** (before 1951)	**Relative Frequency** (since 1951)
January	9.26 %	10.42 %
February	7.44 %	10.56 %
March	8.60 %	9.69 %
April	8.05 %	10.71 %
May	8.05 %	9.87 %
June	8.16 %	8.68 %
July	8.99 %	6.87 %
August	7.94 %	7.09 %
September	8.49 %	7.45 %
October	8.32 %	6.84 %
November	8.49 %	6.37 %
December	8.21 %	5.46 %

Table 5: Birth month distribution for all Canadian players before/since 1951

To demonstrate how dramatic the RAE has been for Canadian players born since 1951, Table 5 displays the relative birth frequencies, with players born before/since 1951 listed separately. There is no statistically significant RAE before 1951 (p=0.98, using uniform birth distribution). After 1951, the effect is extremely strong (p<2.2e-16), with the first quarter easily containing more than 1.5 times the number of birthdays compared to the last quarter. We discuss reasons for the breakpoint occurring in the early 1950s in Section 4.

Another interesting question is whether the RAE affects players of all positions similarly, or whether there is a different phenomenon for defensemen, say, compared to goalies and forwards. Having established that the RAE has only taken effect for players born since 1951, we restrict ourselves to Canadian players in this subset in Table 6. As is evident from examining Table 6, it does not matter which position one plays, they are advantaged by being born early in the year (Forwards: p<3.60e-15, Defensemen: p=0.00013, Goalies: p=0.0010, using uniform birth distribution). For comparative purposes, Table 7 shows the birth month breakdown for Canadian players born before 1951, and there is no departure from the uniform distribution (Forwards: p=0.92, Defensemen: p=0.52, Goalies: p=0.63).

Finally, one might wonder whether the RAE leads not only to higher chances of entry into the NHL but also to elite performance once there. We investigated hall-of-fame (HOF) membership as our measure of exceptional career success. Tables 8 and 9 show, respectively, birth month versus HOF status for Canadian players

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Month	Forwards	Defensemen	Goalies
January	178	79	31
February	190	71	31
March	164	81	23
April	176	86	34
May	169	79	25
June	137	67	36
July	112	61	17
August	119	56	21
September	138	46	22
October	122	50	17
November	98	56	22
December	97	45	9

Table 6: Birth month by position for all Canadian players born since 1951

born since, and before, 1951. We find no evidence of the RAE. For players born before 1951, the chi-square test yields a p-value of 0.15. For those born since 1951, the chi-square test is not advisable because of the small numbers of players elected to the HOF. Instead, Fisher's exact test results in a p-value of 0.71.

4 Discussion

We have found very strong evidence of the RAE for players born in Canada. The RAE persists whether we assume a uniform birth rate throughout the year, or if we adjust for observed Canadian birth rate data. Moreover, the RAE is even detectable when performing an overall analysis which lumps together data from every year since 1879. As a more thorough examination, we performed a change point analysis and found that the RAE started for Canadian players born in the early 1950s. Indeed, there is no evidence of any departure from a uniform birth distribution for players born before 1951. The question remains: *Why* did the RAE begin to appear around this time period?

A December 31 cut-off date between Canadian youth hockey levels would create an environment where players born earlier in the year would, on average, be superior to those born later in the year, especially for very young children. This cutoff is a main component of the RAE, but the RAE would not result unless there was a sorting of players at an early age. That is, for the RAE to exist, the "good"

Month	**Forwards**	**Defensemen**	**Goalies**
January	107	46	15
February	80	40	15
March	84	52	20
April	94	38	14
May	97	36	13
June	97	39	12
July	94	46	23
August	90	40	14
September	103	37	14
October	98	31	22
November	93	48	13
December	100	35	14

Table 7: Birth month by position for all Canadian players born before 1951

Month	**HOF No**	**HOF Yes**
January	285	3
February	289	3
March	266	2
April	292	4
May	271	2
June	237	3
July	186	4
August	194	2
September	204	2
October	184	5
November	176	0
December	149	2

Table 8: Birth month versus HOF status for Canadian players born since 1951

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Month	HOF No	HOF Yes
January	147	21
February	117	18
March	144	12
April	140	6
May	134	12
June	138	10
July	151	12
August	131	13
September	142	12
October	139	12
November	143	11
December	130	19

Table 9: Birth month versus HOF status for Canadian players born before 1951

(older) children need to get noticed. So, we believe that the question might better be phrased as: *Why were young players being more scrutinized in Canada starting for those born in the early 1950s?* Babies born between 1951 and 1956 would not start playing hockey until the late 1950s or early 1960s, between 1956 and 1961, say. To determine what led to higher scrutiny for these young players, we consider what was happening in the hockey world at that time.

Consider the following two facts: (1) The Soviet Union first entered the World Hockey Championships in 1954 and won gold (Canada had won 9 of the first 11 gold medals in World Hockey Championship's that they participated in), and (2) The Soviet Union entered the Olympic hockey tournament for the first time in 1956 and won gold (Canada had won 6 of the first 7 gold medals in Olympic history. They won silver in the 1936 Olympics, losing out to Great Britain, whose team was comprised mostly of players with strong Canadian ties).

We conjecture that this, rather sudden, strong competition from the Soviet Union drove Canada to seek measures to maintain its hockey dominance. Canada's search for great hockey talent is a natural starting point for the RAE. Consider the following passage on the history of hockey, taken from the International Ice Hockey Federation (IIHF) website (IIHF, 2008):

> There is no question that 1954 was the start of the modern era of international hockey. Prior to the World Championship in Stockholm,

> Sweden, that year, Canada ruled the ice lanes uncontested. Indeed, from 1920 to 1954, it lost only two significant games, one to the United States at the 1933 World Championship and one to Great Britain at the 1936 Olympics.
>
> But in 1954, the Soviet Union made its first appearance in international hockey, and it did so in a blaze of glory. The Soviets had only started playing "Canadian hockey" (as opposed to European bandy) in 1946, and just eight years later that nation's top players and managers believed they were ready to play against the world and win.

And then, just two short paragraphs later:

> Canada was represented, as always, by a club team, and in 1954 that was the East York Lyndhursts ... The Soviet team consisted of the best 17 players in the country, and although this was their first international tournament, they were overpowering. They jumped into the early lead, poured it on in the second period, and shut down any Canadian hopes for a comeback in the third. The result was a shocking 7-2 win and a gold medal in their first try.
>
> This was not only an improbable and impressive victory, though. It hailed the start of hockey's first great rivalry. Out of Canada-Soviet Union came heightened interest in the game. Other countries started to develop a serious program for the sport, and Canada rose to the challenge by sending better and better teams to compete against their adversary. As a result, the Soviet victory in 1954 was the start of a new era in international hockey.

Finally, consider this passage, regarding the 1955 World Hockey Championships (Wikipedia, 2010), and its importance in Canada following the defeat to the Soviets in 1954:

> The 1955 World Championship was held in West Germany, and the two teams [Canada and Soviet Union] again met in the final game of the tournament. The game was so high profile in Canada that announcer Foster Hewitt flew to Germany to provide play-by-play coverage. Both teams were undefeated and Canada, represented by the Penticton Vees, defeated the Soviets 5-0 to reclaim the World Championship.

One might liken the emergence of the Soviet Union as a hockey power, and its effects in Canada, to the launching of Sputnik 1 and Sputnik 2, and its effects

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in the United States. When the Soviet Union launched Sputnik 1 and Sputnik 2 in 1957, it spurred the United States to increase government spending on Mathematics and Science education, leading to the eventual creation of NASA.

Clearly, over the years, other factors have had to contribute for the RAE to continue in Canada. Nevertheless, all signs point to the series of events surrounding the Soviets' emergence on the international hockey scene in the early 1950s as the initial catalyst for the RAE. The circumstances that led to the RAE were meant to lead to the discovery of the best hockey talent in Canada but, unfortunately, because of the RAE, a lot of genuine hockey ability is wasted.

That the RAE does not hold for HOF membership, or is not different depending on position, is not surprising. First, there is no reason to believe that the process of being noticed is different for young goalies, say, compared to defensemen or forwards. What is important in getting noticed is the demonstration of superiority at a young age. This is what leads to extra attention and practice, and the opportunity for specialized training. Moreover, once in the NHL, there is no reason to believe that players with early calendar year birthdays will excel at a higher rate than those born late in the year. All players in the NHL, regardless of their birthday, have reached an equal ability level, on average. Early calendar year births merely reach that level more frequently than late year births. So, for example, it may be true that we notice more early birth month HOF players in absolute terms, only because there are more early birth month players overall.

5 Concluding Remarks

Our approach analyzes a much more complete dataset than past work. Furthermore, we have focused on the birth month of individual players, not on single NHL seasons, so as not to count players multiple times across seasons.

The RAE is shown to exist amongst Canadian hockey players, whether we assume a uniform distribution of births across the year or account for the actual distribution of births in Canada. The change point analysis showed 1951 to be the birth year where the RAE starts to take affect, with a 95% confidence interval for this change point being [1948, 1957]. This suggests that the Soviet Union's emergence onto the international ice hockey scene forced Canada to take a different approach to its hockey development program. This can be seen as analogous to the launching of Sputnik 1 and Sputnik 2 by the Soviet Union, which spurred the United States to increase government spending on Mathematics and Science education, and led to the eventual creation of NASA.

The RAE was present across all of the positions in ice hockey; however, when it comes to HOF hockey players, the RAE did not exist. Once in the NHL, The RAE was present across all of the positions in ice hockey; however, when it comes to HOF hockey players, the RAE did not exist. Once in the NHL, elite players will stand out regardless of their birth month.

The question of whether or not the RAE is good for the development of more quality hockey players seems to have an obvious answer. Although there is no RAE with respect to HOF membership, the current format in youth hockey does not optimally draw from a country's talent pool. Daniel and Janssen (1987) may have said it best:

"It implies that the minor hockey development system is considerably sub-optimal with respect to bringing the nation's hockey talent to the fore, and this has significance for Olympic and National Teams."

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