The Life Cycle of A Stereotype: Evidence from Blood-Type Discrimination in Japan

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Abstract

Most evidence on discrimination comes from stereotypes so old that only their long-run echoes are observable. I exploit a rare setting that lets us watch a bias from birth to economic consequence: Japan's late-20th century media craze portraying type-B blood holders as selfish. Using a nationally representative survey containing ABO data and cohort-by-blood-type exposure differences, I estimate the stereotype's first-generation effects. Men whose adolescence overlapped the craze are 33 percent less likely to marry and earn 21 percent less, while the population-wide marriage penalty is 7.9 percent, if their blood type is B. Complementary evidence of stereotype-congruent tardiness among cohorts exposed to the stereotype during adolescence reveals a self-fulfilling-prophecy mechanism, echoing cultural feedback loops emphasized in the scholarship of historical-persistence effects. An otherwise identical U.S. sample, where no stereotype exists, displays no blood-type differentials, confirming social construction rather than biology. To disentangle channels behind the low marriage rates, I develop a novel two-stage dating–marriage model that yields opposite predictions for the average attractiveness of married type-B individuals under direct, *taste-based* versus indirect, (labor-) *market-based* discrimination. The observed absence of quality sorting among married type-B individuals implies that both channels operate. The magnitude and speed of the stereotype diffusion that happens in a country with limited ethnic and cultural diversity implies that merely reducing observable diversity would not foster social cohesion.

Keywords: social construction, discrimination, blood type, self-fulfilling prophecies

JEL Codes: J12, J71

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1 Introduction

Social and economic biases often emerge from longstanding cultural beliefs, making it difficult to isolate their origins and trace precisely how they lead to discrimination in marriage and labor markets. Whether rooted in plough-based agriculture (Alesina et al. (2013)), legacies of slavery (Acharya et al. (2018)), or deeply entrenched gender identities (Bertrand et al. (2015)), many stereotypes have been reinforced by centuries of history. As a result, it is challenging to disentangle the moment a stereotype first takes shape from the mechanisms through which it eventually distorts economic outcomes. Existing empirical literature has made substantial progress by using historical shocks or natural experiments to capture moments when stereotypes intensify (e.g., Kaushal et al. (2007); Agan and Starr (2018)), yet few studies can observe an entire stereotype "life cycle," from an initial cultural phenomenon to tangible impacts on marriage and labor.

In this paper, I investigate a quintessential example of a newly formed, culturally arbitrary stereotype. The example is blood-type personality theory in Japan, and I show how it generated significant real-world consequences within a short time horizon. This blood-type stereotype emerged from pop-culture publications and casual media commentary in the late twentieth century, spreading rapidly through books, TV shows, and everyday talk. Despite having no scientific basis, the notion that people with type-B blood are *selfish*[1] and unwilling to adjust to others' pace (*my-pace*, a Japanese-made English term) became so pervasive and persistent that it could have affected both marriage and labor markets. Thus, this setting provides a rare opportunity to track the entire evolution of a stereotype: its origin in popular culture, its crystallization into a consistent negative perception, and its final manifestation in marriage rates and employment for individuals carrying the "stigmatized" blood type.

Using a nationally representative survey from Japan, I find that this bias indeed decreased the marriage rates of people with type-B blood. Approximately, the magnitude amounted to 7.9% (5.4 percentage points) lower marriage rates for type-B individuals compared to non-type-B individuals. This number is mostly driven by a 33.4% (12.7 percentage points) reduction in the marriage rates of type-B young men who experienced the stereotype during their adolescent periods. Meanwhile, this bias increases unemployment rates by approximately 126% (2 percentage points) and among Japanese men with type-B blood and 21.3% decrease in earnings (0.68 million yen) among young Japanese men with type-B blood. These effects are concentrated among men, consistent with the traditional role of men as primary breadwinners in Japan during the sample period and with our additional finding that women are more likely to believe in the stereotype.

To test the robustness of my results, I conduct a placebo analysis using the same survey conducted in the

[1] *wagamama* or *jikochu* in Japanese

United States. In the U.S., no such stereotype about blood types exists, thus providing a setting to assess whether similar patterns persist among a non-Asian population. I find no differences in marriage and labor market outcomes between individuals with type-B blood and those with other blood types, confirming the power of social construction.

The effects on marriage markets can arise either directly from preferences in the marriage market or indirectly through labor markets. On one hand, people's preferences over blood types may directly affect marriage outcomes. I call it a *taste-based* channel. On the other hand, negative effects on labor market outcomes may indirectly affect marriage prospects by decreasing the attractiveness of potential mates. I call this indirect channel as a *market-based* channel. The existing studies do not provide a straightforward way to determine which channel drives the discriminatory results in marriage markets.[2]

To confirm the presence of either channel, I introduce a novel approach based on a simple theoretical model that exploits the characteristics of *married* individuals. In my model, there are two stages: dating and marriage. I assume that blood type stereotypes affect only the dating stage. If market-based channels exist, type-B individuals' labor market measures are negatively affected by direct discrimination in the labor market. This would decrease type-B individuals' attractiveness as potential partners and shift the distribution of such attractiveness to the negative direction. Following the standard setup of reservation utility values below which one does not marry, this shift would not only discourage people to date and marry type-B individuals, but also lowers the average attractiveness of married type-B individuals compared to non-B-type married individuals. However, in the presence of the taste-based channel, with the assumption that the prejudice enters preferences in an additively separable manner, people have heterogeneous thresholds (or reservation utilities) of binary dating and marriage decisions by blood types of potential mates. The taste-based channel assumes that the negative stereotype against type-B individuals raises the bar for people to date type-B individuals. This will decrease the marriage rate of people with type-B blood, while the raised threshold will *increase* the average attractiveness of married type-B individuals. I found that the average attractiveness measures including employment, earnings, and education levels of married type-B individuals are not statistically different from those of married individuals with the other blood types, which implies the presence of both direct and indirect effects in the marriage market.

While I observe the presence of both taste-based and market-based channels, part of these effects may be driven by self-fulfilling prophecies. Glover et al. (2017) empirically demonstrate that bias against minorities can negatively affect their job performance. Although evidence is mixed in the literature, Sakamoto and Yamazaki (2004) and Tsuchimine et al. (2015), who use different datasets, also find self-fulfilling prophecy

[2] An exception is Hitsch et al. (2010), who have rich data on the characteristics and email "contact" actions of all potential mates in online dating settings. Their structural model allows one to disentangle the direct and indirect channels with precise magnitudes.

effects on the personalities of people with type-B blood. Using the same dataset that I use in this study, Nawata (2014) does not find differences in personalities among people with different blood types. Given the differences in survey questions on personalities among these studies, it is unfortunately difficult to test the findings of Sakamoto and Yamazaki (2004) with the survey questions that I use.[3]

To test the self-fulfilling prophecies, I examine a characteristic driven by the stereotype: tardiness. The association between blood type and personality has led to the stereotype that people with type-B blood are tardy[4] because they are "my-pace." Exploiting the timeframe of the stereotype's emergence and a survey question about procrastination during childhood, I find evidence of self-fulfilling prophecy effects on the personality traits—specifically, tardiness—of individuals with type-B blood.

By establishing robust evidence on the effects of the specific stereotypes through both direct and indirect channels, as well as self-fulfilling effects, these findings underscore the multifaceted ways that newly formed biases can distort economic outcomes. They speak to larger debates on stereotypes and discrimination.

First, my study uniquely captures the entire "life cycle" of a newly formed stereotype—from inception to final economic effects—something rarely observed in the literature on gender and racial discrimination. The literature typically examines well-established gender and racial biases that have been reinforced and interplayed with many other social factors through centuries of history. Even though some of the existing studies use rich data with field and natural experimental settings (e.g., Goldin and Rouse (2000); Bertrand and Mullainathan (2004); Fryer and Levitt (2004); Card et al. (2008); Agan and Starr (2018); Kline and Walters (2021); Kline et al. (2022); and Yamagishi and Sato (2025)), these studies see the effects of the late stages of old stereotypes that have been already woven into institutions, norms, and cultural identities. While these seminal studies shed light on entrenched prejudices that have evolved over centuries, my setting reveals how a pop-culture phenomenon can quickly become a potent bias, allowing me to observe its genesis, rapid diffusion, and real-time economic consequences.[5]

Second, thanks to the nature of the stereotype I study, my paper contributes to the long-standing debate about the relationship between innate, biological differences and discrimination. In the context of gender, hormonal differences, such as in testosterone levels, have been discussed (e.g., van Anders et al. (2015) and Luigi et al. (2023)). In the context of race, genetic differences between races are often highlighted, though within-race genetic variation is larger than between-race variation (e.g., Goodman (2000) and Ioannidis et al.

[3]Furthermore, the survey questions on personalities in Sakamoto and Yamazaki (2004) use yes-or-no binary responses, while the survey I use has 1-to-5-ranged multiple choice responses. Given the known tendency of Japanese people choosing mid-point scale more than other peoples in Asia (Shishido et al. (2009)), the response difference could induce the lack of the observation in differential personalities reported among people with different blood types.

[4]See, e.g., https://news.livedoor.com/article/detail/6613128/ and https://souken.shikigaku.jp/29139/. Retrieved on Oct 30, 2024.

[5]Strictly speaking, a "true" life-cycle analysis would require panel data following the same individuals from the stereotype's inception to the time they form marriages or enter the labor market. Nonetheless, I can approximate the life-cycle effect by leveraging cross-cohort comparisons.

(2004)). In my setting, microbiome composition differences among different blood type groups have been studied (Lopera-Maya et al. (2022); Qin et al. (2022); Sanna et al. (2022); and Yang et al. (2022)).[6] Although there exists such biological differences among blood types, the differences do not appear to be significant enough to affect economic and social markers as demonstrated by the null effects in the U.S. sample of my study.[7] Since blood type is biologically observable yet lacks any robust link to personality, it serves as an ideal "laboratory" to distinguish purely social constructions from any intrinsic differences. This clarifies that discrimination can arise and persist even absent credible biological underpinnings, an issue central to debates on gender or racial essentialism. Providing new evidence on the magnitude of discrimination without notable biological differences is significant, given the resurgence of essentialist views toward gender and racial discrimination due to the rise of recent populism (see, e.g., Norris and Inglehart (2019)).

My paper also contributes to the literature on stereotype formation. Traditional economic models of discrimination (Arrow (1973); Phelps (1972)) often treat stereotypes as exogenous beliefs, but recent work (Bordalo et al. (2016)) examines how they form and persist based on cognitive shortcuts that exaggerate group differences—especially if they contain a kernel of truth. In contrast, my paper addresses an entirely baseless stereotype, showing that even without a plausible core, stereotypes can become culturally salient and produce considerable economic harm. Empirically, some recent papers such as Carlana (2019) and Bohren et al. (2019) demonstrate how old stereotypes against women can be updated or mitigated. They focus on updating or mitigation of stereotypes, whereas I tackle a brand new stereotype. My paper complements these studies by providing evidence on how much a new stereotype without the kernel of truth can become viral and affect the discriminated. Furthermore, by providing comparisons between groups that are exposed early and late in the stages of life, I show that self-fulfilling prophecies matter particularly when people are exposed to the stereotype during adolescent periods.

In a similar manner, my paper contributes to the literature on identity economics and norm-based behavior. Much of the existing literature on norms and culture, following Nunn (2012) and Giuliano and Nunn (2021), highlights how historical shocks can generate deeply rooted values that persist for centuries.

[6] This difference might have resulted in the differences of vulnerability to COVID-19 by blood type, as documented by Liu et al. (2020).

[7] Tsuchimine et al. (2015) claims to find the effects of biological differences among blood types on the persistent characteristic of people with type-B blood in Japanese population. However, persistence is a known stereotype of type-B people induced because they are "my-pace" (see, e.g., https://www.p-a.jp/renaru/marriage/24795/. Retrieved on Oct 31, 2024.). Given the findings of this paper on self-fulfilling prophecy effects on tardiness, it is natural to think that the persistence difference is socially constructed rather than biologically induced. Furthermore, Hou et al. (2022) find evidence for assortative mating based on blood type in a sample of over one million pregnancies in China. While they do not pin down the mechanism behind this phenomenon, two channels might explain it. One is the influence of Japanese-made blood type association culture on China, as documented by Omura et al. (2009). The other channel is within-province variation. Although they control for province fixed effects, provinces in China are large—some even larger than Japan as a whole. Fujita et al. (1978) find regional differences in blood type distribution even within Japan. Therefore, local variation in the dominance of a particular blood type may exist within one province, resulting in assortative matching by blood type through geographic proximity. This could be exacerbated by the geographic concentration of the 56 ethnic groups in China. While the present survey does not contain data on partners' blood types and cannot address this question directly, the findings shed light on potential mechanisms behind their observations.

Whether it is trust eroded by the slave trade (Nunn and Wantchekon (2011)), gender norms shaped by plough-based agriculture (Alesina et al. (2013)), or local democratic traditions influencing modern political beliefs (Giuliano and Nunn (2013)), these studies focus on contexts in which cultural evolution occurred gradually and the relevant events took place generations ago. In contrast, my paper examines a stereotype that has a distinctly short history which provides an unusual opportunity to observe the near-immediate, "first-generation" effects of an emerging belief system. By tracking how this newly formed norm influences economic outcomes such as marriage and employment, I offer insights into how norms can quickly take hold, rather than only studying their persistent legacy after centuries of development. In other words, my paper extends the literature to an emerging, short-lived group identity, illustrating how quickly such an identity can shape economic decisions even in the absence of deep historical roots.

Finally, blood-type discrimination occurred in Japan which is known to have limited ethnic and cultural diversity. According to the CIA World Fact Book, it is estimated in 2022 that the ethnic distribution is as follows: Japanese 97.5%, Chinese 0.6%, Vietnam 0.4%, South Korean 0.3%, other 1.2% (includes Filipino, Brazilian, Nepalese, Indonesian, American, and Taiwanese).[8] This highlights that even in societies with minimal ethnic diversity, entirely new biases can emerge with tangible impacts on marriage and labor outcomes. Hence, to foster social cohesion, policymakers must address the fundamental mechanisms of bias formation, rather than merely attempting to reduce observable diversity.

2 History of Blood Type Discrimination in Japan

The human ABO blood group system was discovered by Landsteiner (1900), but its use as a social label in Japan traces to psychologist Takeji Furukawa. Omura et al. (2008) states that in Furukawa (1927), Furukawa claimed, on the basis of a questionnaire administered to eleven relatives, that blood types were correlated with temperament (B and O: "extraverted"; A and AB: "introverted"). Subsequent replication attempts were mixed and the idea was formally dismissed by academics by 1933 (Sakamoto and Yamazaki, 2004).

While the boom faded away, in the 1970s and early 80s, writer Masahiko Nomi revitalized the idea by publishing a series of books that claimed to detail the relationship between blood types and personality traits (Uemura and Sato (2006); Ohmura (2012)). The idea of the blood-type-personality association became viral by the mid 1980s, evidenced by the number of books and magazine articles on blood types and personality presented at Table B1.

In general, Takuma and Sato (1994) report that people with type-A blood are believed to be scrupulous, nervous, and serious; those with type-B blood are cheerful but selfish; those with type-O blood are broad-

[8]See https://www.cia.gov/the-world-factbook. Retrieved on April 11, 2025.

minded; and those with type-AB blood have a dual personality. Surprisingly, large-scale surveys soon found that roughly 60-70 percent of adults believed at least loosely in the stereotype (Sato and Watanabe, 1992; Wu et al., 2005). A *Newsweek* article in 1985 well described this phenomenon:[9]

> The Japanese have found a new way to 'typecast' people. It's not astrology; it's not studying the bumps on people's heads. It's blood typing.... There is absolutely no scientific basis for typecasting by blood, of course, but that hasn't stopped many Japanese from applying it to everything from love affairs to employment interviews.

According to Uemura and Sato (2006), the blood-type-theory boom comes roughly once every 10 years, which took place in the mid-80s, 90s, and 2000s. Some scholars report that in the early 1990s, people have even more negative prejudice toward people with type-A blood than type-B blood (Kamise and Matsui (1991); Sato et al. (1991)). However, this has significantly improved ever since the late 1990s when the media started using the term "genius" rather than "weirdo" to describe type-AB blood (Yamaoka (2011)).[10]

In contrast, Yamaoka (2011) documents that the stigma against type-B people has been consistently harsh since the 1970s. Over time, people persistently have the most negative prejudice toward type-B people, and type-B people were discriminated and bullied at the highest frequencies in 2005 and 2009. Yamaoka (2011) claims that the boom in the mid-2000s was due to the TV shows. The TV shows further exacerbated discrimination against type-B people, leading to the "request" by the Broadcasting Ethics and Program Improvement Organization (BPO) to terminate programs that induce such discrimination in Japan.[11] Yamaoka (2011) shows that many more people were influenced by TV shows regarding blood type stereotypes than readings, implying that the discrimination was most prevalent from the early 2000s to the mid 2000s when the BPO made the request to stop the spread of stereotypes in the end of 2004. Given that the boom took place in the mid 1980s, 1990s, and 2000s, I shall look at those who spend adolescent period during these periods (i.e., under 40 years old in my sample) separately from those above 40 years old.

Given the severity of the phenomenon, the prejudice might have affected economic outcomes such as marriage- and labor-market measures. Conducting a survey experiment on college students, Ose and Takigawa (2010) show that the subjects (both explicitly and conjointly) report that type-B and type-AB people are the least potential romantic partners and tend to be the least favorable job candidates. Indeed, the Ministry of Labor and Welfare in Japan reports cases in which job candidates were required to report their blood types in their applications or at job interviews, leading to the request not to discriminate by blood

[9] Excerpt from Sakamoto and Yamazaki (2004) who used the article by J. Treen and Y. Hoshiai published on April 1, 1985 at Newsweek (vol. 105, page 50).

[10] While I discuss it later, I test the robustness of the main results excluding the type-AB individuals from my sample, and the results remain unchanged.

[11] See, https://www.bpo.gr.jp/?p=5125. Retrieved on Oct 1, 2024.

types at work.[12] Such cases include the ones in which job candidates were explicitly told that they were rejected due to their blood type being B.[13] The fact that these cases were reported after 2000s when the boom has already gone implies the frequency of such incidents from the 1980s through 2000s in Japan.[14]

While there is no statistics about the proportion of Japanese firms asking blood types for screening, there is one in South Korea. Until recently, Japanese pop culture significantly affected Taiwan, Korea, and China.[15] Hlasny (2009) reports that among 326 private firms in his sample, approximately 25% ask blood types of applicants in their application forms for job positions. In Japan, *Asahi Newspaper*, one of the largest newspaper, published an article in 1990 reporting that Mitsubishi Electronics, a large electronics company under Mitsubishi conglomerates, gathered only those with type-AB blood to make a project team.[16] The tone of the news article was surprisingly in favor of the company for trying to create new business ideas, as documented in Takuma and Sato (1994).[17] This implies how prevalent the use of blood type stereotypes was in business.

3 Data

This study uses the Japan Household Panel Survey on Consumer Preferences and Satisfaction (JHPS-CPS), an annual panel survey that is nationally representative of Japan's resident population. The JHPS-CPS is stratified based on two key criteria: geographical region and city size.[18] The survey data are collected through self-administered paper questionnaires, which are hand-delivered and retrieved from the homes of participating households.[19] The survey is administered annually during the months of January and February. The details of the survey can be found in Appendix A including the actual questions from the survey that are used for analysis in this paper.

Among 17 waves, only waves of year 2005, 2006, and 2017 ask respondents about their blood types. As Table A1 shows, the survey adds new respondents once in a while to retain the sample size over time. Due to budget cutbacks, the survey was not able to add new respondents between 2010 and 2021. Since respondents age, by the time of wave 2017, few respondents between age of 20 and 30 remain in the sample. For this

[12] See, e.g., https://jsite.mhlw.go.jp/tokyo-hellowork/content/contents/000723446.pdf and https://jsite.mhlw.go.jp/fukuoka-roudoukyoku/content/contents/001519018.pdf. Retrieved on Oct 1, 2024.

[13] See, e.g., https://www.j-cast.com/kaisha/2011/08/23105091.html?p=all in 2011, https://www.bengo4.com/c_5/n_1928/ in 2014, and https://www.nikkei.com/article/DGKDZO68704120S4A320C1TZ1000/. Retrieved on Oct 1, 2024.

[14] Hasegawa (1985) introduces cases in which some kindergartens divide students into different classes by blood type.

[15] See, e.g., Wu et al. (2005) discussing how the blood-type-personality association is believed in Asia.

[16] From an *Asahi Newspaper* article published on November 21, 1990.

[17] See p. 139 of Takuma and Sato (1994).

[18] All municipalities are divided into 40 strata, consisting of 10 geographical areas and 4 categories based on population size. The sample size within each stratum is proportional to the population of residents aged 20–69 years. Sampling within each stratum is conducted using random systematic sampling of census units. The sampling weights are computed based on seven geographic groups and five age groups. I use the sampling weights throughout the paper, although I provide robustness checks without sampling weights in Appendix B.

[19] Participants receive a cash voucher of JPY 1,500 (approximately US$15) upon completing the survey.

reason, I focus on wave 2005 and 2006 for main analyses. I also exclude around 1% of respondents who did not provide a response to a question asking blood types.

Table 1 summarizes descriptive statistics of the data used in this paper. Panel (a) corresponds to unweighted summary statistics and (b) corresponds to weighted ones by sample weights. The details of the sample weights can be found in Appendix A. For this table, I restrict the sample from wave 2005 and 2006 to be unique across the two waves. The first row of Table 1 demonstrates the distribution of blood types in the sample. According to the Japanese Red Cross, the ratio of blood type A, O, and B to blood type AB is roughly speaking 4:3:2:1.[20] The nationally representative sample of the JHPS-CPS follows this distribution. The age of respondents also represents the population overall, while the age of type-B respondents is slightly lower than the other blood type respondents. The sex of respondents is slightly lower than 50%, reflecting the fact that women tend to live longer in Japan. Slightly more male type-B respondents take the survey compared with the other blood types. The status of being married is lower for type-B respondents compared with the other types. The income level data comes from survey responses to income range questions. Other than the bottom (0) and top (over 14 million yen) coding, I take the median of each income range. As for the top coding issue, I use Tobit regression approach when outcomes are the income levels of either respondents themselves or their partners.

Table 1: Descriptive Statistics

(a) Descriptive Statistics without Sample Weights

	Blood Type				
	A	B	AB	O	Total
N	1,623 (38.5%)	929 (22.0%)	405 (9.6%)	1,258 (29.8%)	4,215 (100.0%)
Age	49.83 (13.15)	48.52 (13.14)	49.83 (13.27)	49.66 (13.18)	49.49 (13.18)
Male (0/1)	0.48 (0.50)	0.46 (0.50)	0.48 (0.50)	0.47 (0.50)	0.47 (0.50)
Married (0/1)	0.78 (0.41)	0.75 (0.43)	0.82 (0.39)	0.78 (0.42)	0.78 (0.42)
Unemployed (0/1)	0.02 (0.13)	0.02 (0.15)	0.02 (0.14)	0.02 (0.12)	0.02 (0.13)
Housewife(husband) (0/1)	0.29 (0.45)	0.30 (0.46)	0.30 (0.46)	0.32 (0.47)	0.30 (0.46)
Income (10,000 yen)	275.99 (303.46)	272.00 (312.28)	263.05 (305.35)	276.88 (311.39)	274.13 (307.89)
Years of Education	12.80 (2.21)	12.88 (2.27)	12.81 (2.26)	12.80 (2.19)	12.82 (2.22)

(b) Descriptive Statistics Weighted by Sample Weights

	Blood Type				
	A	B	AB	O	Total
N	51,056,255 (38.3%)	30,482,487 (22.8%)	12,441,087 (9.3%)	39,463,791 (29.6%)	133,443,620 (100.0%)
Age	45.28 (15.23)	43.50 (15.04)	45.99 (15.23)	45.38 (15.10)	44.97 (15.16)
Male (0/1)	0.51 (0.50)	0.50 (0.50)	0.49 (0.50)	0.50 (0.50)	0.51 (0.50)
Married (0/1)	0.68 (0.47)	0.62 (0.49)	0.75 (0.44)	0.68 (0.47)	0.67 (0.47)
Unemployed (0/1)	0.02 (0.13)	0.02 (0.14)	0.02 (0.14)	0.02 (0.14)	0.02 (0.14)
Housewife(husband) (0/1)	0.26 (0.44)	0.25 (0.43)	0.27 (0.45)	0.27 (0.44)	0.26 (0.44)
Income (10,000 yen)	266.82 (289.23)	258.76 (290.10)	245.22 (288.66)	265.69 (296.26)	262.61 (291.43)
Years of Education	13.05 (2.22)	13.13 (2.28)	12.93 (2.20)	13.02 (2.20)	13.05 (2.23)

[20]See, e.g., https://www.bs.jrc.or.jp/kk/hyogo/donation/m2_02_01_00_bloodtype.html, retrieved on Sep 27, 2024. Furukawa (1932) reports that the proportion of the blood type distribution in Japan was 38.2%, 31%, 21.2%, and 9.6% for A, O, B, and AB, respectively.

The response and survivor rates of the survey are potential sources of selection biases, if the social stigma affect marriage and labor markets. As Tables 2 shows, housewives are likely to remain in the succeeding wave of the survey, and thus, housewives may likely respond to the survey more frequently than other populations. Note that, in Japan, women are expected to quit jobs and become housewives, potentially with some part-time job, once married, a phenomenon called "kotobukitaisha" (Guo et al. (2024)). This practice is not applied to men. Given that we do not find effects on the marriage and unemployment rates of women with type-B blood, the stigma is not expected to differentiate the response rates among women with different blood types.

However, the stigma does affect those rates of men with type B blood. Panel (b) of Table 2 shows that those respondents who are older and married tend to remain in the subsequent wave, whereas the unemployment rates do not influence. Then, it may be the case that those married men tend to respond to the survey, possibly asking their wives to fill in the survey questions for them.

For these reasons, for analyses on marriage rates, I do not use the panel structure of the survey and only use unique samples in the two waves. As for labor market outcomes, since the unemployment rates and income levels of respondents themselves are not different between the survivors and non-survivors of the survey, I exploit the panel structure and include responses of the survivors in the second wave to have more variation and increase power while clustering errors at the respondent level to address serial correlations.

As for the heterogeneous effects of the stereotype against type-B respondents, I expect a differential effect by gender, since women are expected to be more superstitious than men.[21] In fact, the present sample shows this tendency. The 2008 wave of the survey includes two questions: The first question asks if "you believe in superstition" and the other one asks if "one can tell someone's personality by that person's blood type." The answers are measured on a scale of 1 to 5, where 1 is "strongly agree," 2 is "somewhat agree," 3 is "neutral," 4 is "somewhat disagree," and 5 is "strongly disagree." To check if the difference is induced by actually the greater proportion of those who believe in these norms, I construct a binary variable if a response lies in 1 or 2 out of 1 to 5 scale. Table 3 demonstrates that, in the sample of respondents to the 2005 or 2006 waves, women indeed tend to believe in superstition and the blood-type-personality association more than men. This is actually a remarkable difference given the known tendency of Japanese people choosing mid-point scale more than other peoples in Asia (Shishido et al. (2009)). Therefore, at least at marriage markets, I expect a greater degree of discrimination on men. This tendency should be reinforced by the fact that men tend to put greater weight on physical attractiveness of partners than women (see, e.g., Fisman et al. (2006)), which implies that men might care less about the personality, and thus, blood types of potential mates than women do.

[21] See, e.g., Blum (1976); Maqsood et al. (2018); and Shahid (2023).

Table 2: Characteristics of Survivors of 2005 Respondents

(a) All

	(1) Non-survivor	(2) Survivor	(3) (1) vs. (2), p-value
Age	49.24	50.29	0.07
Male (0/1)	0.51	0.46	0.02
Married (0/1)	0.73	0.81	0.00
Unemployed (0/1)	0.02	0.02	0.70
Housewife(husband) (0/1)	0.26	0.32	0.00
Income (10,000 yen)	277.88	273.09	0.75
Years of Education	12.70	12.76	0.54

(b) Male Respondents

	(1) Non-survivor	(2) Survivor	(3) (1) vs. (2), p-value
Age	49.92	51.49	0.06
Married (0/1)	0.74	0.82	0.00
Unemployed (0/1)	0.02	0.02	0.89
Housewife(husband) (0/1)	0.07	0.05	0.24
Income (10,000 yen)	443.70	456.56	0.58
Years of Education	12.99	12.94	0.76

(c) Female Respondents

	(1) Non-survivor	(2) Survivor	(3) (1) vs. (2), p-value
Age	48.52	49.27	0.36
Married (0/1)	0.71	0.80	0.00
Unemployed (0/1)	0.02	0.01	0.74
Housewife(husband) (0/1)	0.45	0.56	0.00
Income (10,000 yen)	119.55	122.24	0.83
Years of Education	12.38	12.60	0.08

Notes: "Non-survivor" indicates those respondents who responded to 2005 but not 2006 wave, while "Survivor" indicates those respondents who responded to both 2005 and 2006 waves.

Lastly, to test the self-fulfilling prophecy effects, I also look at different age cohorts. The main survey question to test the self-fulfilling prophecy effects asks how respondents have done homework during holiday seasons when they are a child. The response ranges from 1 (finishing homework in the beginning of the holiday seasons) to 5 (finishing homework toward the end of the holiday seasons). I use this question as a proxy for procrastination and thus tardiness during childhood. As mentioned above, the first boom of the blood-type stereotypes has occurred in the mid-1980s. Then, given that mandatory schooling ends at junior high school in Japan and that I use 2005 and 2006 survey samples, I use 40-years old as the cut-off to test

Table 3: Differential Degree of Belief in Superstition and Blood-type-Personality Association

	(1) Female	(2) Male	(3) (1) vs. (2), p-value
Belief in Superstition (1/5 scale)	3.15	3.58	0.00
Belief in Bloodtype (1/5 scale)	3.09	3.31	0.00
Strong or Moderate Belief in Superstition (0/1)	0.22	0.12	0.00
Strong or Moderate Belief in Bloodtype (0/1)	0.25	0.22	0.06

Notes: For the 1/5 scale questions, 1 indicates strongly agree, 2 indicates somewhat agree, 3 indicates neutral, 4 indicates somewhat disagree, and 5 indicates strongly disagree.

the self-fulfilling prophecy effects. Since I observe significant differences in procrastination, I also perform the age-subsample analysis for all the other outcomes.

4 Model

4.1 Illustrative One-sided, Two-Stage Matching Model

I shall introduce a simple illustrative one-to-one matching model that involves two stages: dating and marriage. Since blood type stereotype is a belief that can be corrected after dating and getting to know someone, the prejudice is assumed to not affect marriage decisions conditional upon dating. However, the prejudice does affect dating decision before spending costs of dating. To formalize this process, I introduce reservation utilities at the dating stage and marriage stage. The former depends on blood types, while the latter does not. I assume that conditional upon blood types, the reservation utility for dating is always lower than that for marriage since the cost of dating is in general lower than that of marriage.

For the illustrative model, the focus is restricted to one-sided matching or partial equilibrium analyses. In particular, given that women tend to believe in the blood-type stereotype more than men, I focus on the perspective from women's point of view for illustration. That is, women care and decide whether to date men, but men accept all feasible dates. The model can be extended to a two-sided matching model with general equilibrium analysis, which I explore in Appendix C.[22]

There are two channels that affect dating decision and thus marriage decision. One is an indirect *market-based* channel. This channel captures how labor market discrimination reduce a man's attractiveness on the marriage market. For example, poor employment prospects make him a "less desirable" partner in the eyes of potential spouses.

The other channel is a direct *taste-based* channel. This captures direct preferences or aversions toward

[22]Note that the illustrative model has two stages only for the sake of a clear exposition. Indeed, the model with only marriage decision is isomorphic to the two-stage model. I shall explain this further in Appendix C.

a mate's trait including blood types. This is where a potential spouse's "reservation utility" of marrying someone from a certain blood type group shifts because they directly hold a preference "for or against" that group.

Suppose a notable marriage rate difference between type-B men and non-type-B men. If there is a market-based channel, then the distribution of the attractiveness of type-B men is shifted to the negative value. In the absence of the taste-based channel, because of the reservation utility, the average value of the attractiveness of married type-B men must be lower than that of non-type-B married men. However, if there is a taste-based channel as well, this raises the bar for type-B men to date women. This works as an increase in the cut-off for dating and thus marriage to type-B men. The raised bar selects only highly attractive type-B men among all type-B men. This will increase the average value of those married men with type-B blood. Therefore, the net effects may not be even negative but rather neutral or even positive, depending on which channel dominates.

4.2 Model Setup

I consider a continuum of agents with a set of men M, partitioned into M^B (blood type B) and $M^{\neg B}$ (non-B) and with a set of women W. Each man $m \in M$ possesses a scalar trait $x_m \in X \subseteq \mathbb{R}$, drawn independently from a common atomless distribution F_X, and each woman $w \in W$ has a scalar trait $y_w \in Y \subseteq \mathbb{R}$, drawn independently from a common atomless distribution F_Y. Denote by $B_m \in \{A, B, O, AB\}$ as the blood type of man m. In this model, there are two stages before the decision of marriage. The first stage is dating decision.

4.2.1 Stage 1: Dating Decision

For woman w, the utility of dating man m is given by:

$$U^D_{mw} = f(x_m, y_w),$$

where I assume that f is continuously differentiable and is strictly increasing in x_m for a fixed y_w value, meaning that every woman prefers a more attractive man to a less attractive one. For the simplicity, I assume a unidimensional trait.

Each woman is endowed with an idiosyncratic selectiveness parameter a_w, independently drawn from an atomless distribution F_A. I assume that a_w is independent of x_m and B_m. Her dating threshold is given by:

$$R^D_w = a_w + \beta \mathbf{1}_{B_m = B}.$$

Note that $\beta \mathbf{1}_{B_m=B}$ captures the taste-based channel, and I call β taste-based discrimination parameter. Woman w will date man m if and only if her utility from dating him exceeds her reservation utility:

$$U_{mw}^D \geq R_w^D.$$

4.2.2 Stage 2: Marriage Decision

For individuals who are dating, the utility of marrying is given by:

$$U_{mw}^M = g(x_m, y_w),$$

where I assume that g is continuously differentiable and is strictly increasing in x_m for a fixed y_w value.

The reservation utility for marriage is

$$R_w^M = c_w,$$

where c_w is an idiosyncratic selectiveness parameter, independently drawn from an atomless distribution F_C. I assume that c_w is independent of x_m and B_m. I also assume that c_w is independent of a_w and $c_w > a_w$ for all w. This means that the reservation utility for marriage is always higher than that for dating. Furthermore, to ensure no ties, F_X, F_A, and F_C have strictly positive continuous densities on their supports. Notice that R_w^M does not depend on blood types.

Woman w will choose to marry man m if and only if:

$$U_{mw}^M \geq R_w^M.$$

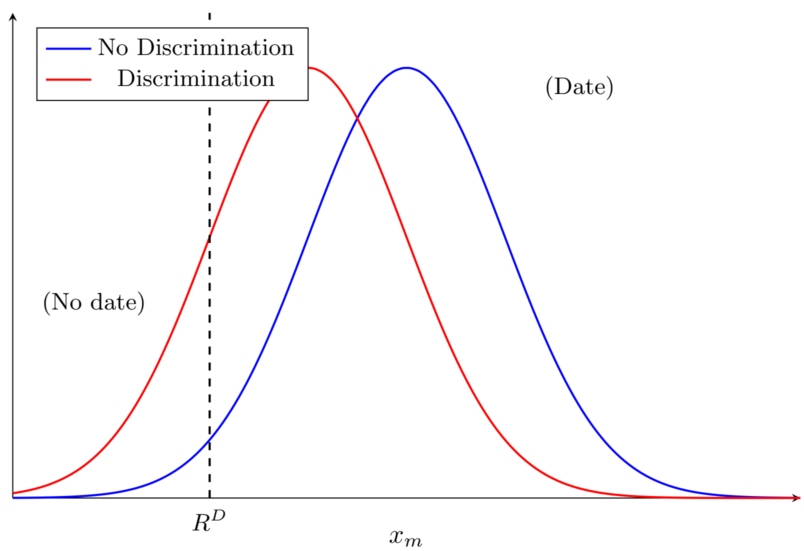
Notice that blood type discrimination does not enter the marriage decision making stage. This is because once one dates someone, she or he would know her or his or her partner's personality well, which eliminates the prejudice.

Finally, in this one-sided matching model, the stability of a matching outcome is essentially welfare-maximizing outcome for women. For the sake of completeness, define a stable outcome as an outcome in which (1) every woman who meets her threshold R_w^D for some man is either matched with that man (if he is still free) or else unmatched because all men who meet her threshold are already taken, and (2) there is no woman who could improve her payoff by unilaterally switching to a free man above her threshold.

4.2.3 Intuition of Model Prediction

Suppose discrimination by blood type exists in the labor market for men. This shifts the distribution of x_m to the left. Then, as portrayed by Figure 1, fewer type-B men can get married. If $\beta = 0$ meaning that reservation utility of potential dates does not shift, then this will lead to the decrease in the mean of the attractiveness of type-B men who are married.

Figure 1: Dating Market without Prejudice



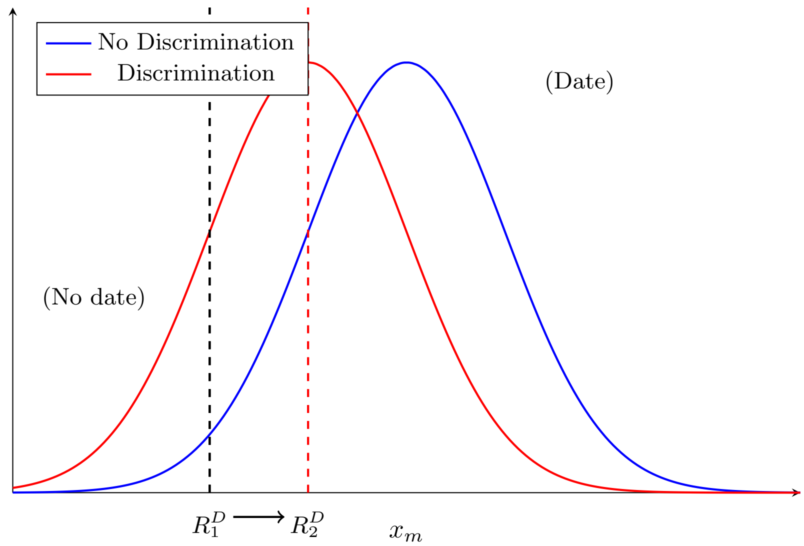
On the other hand, if $\beta > 0$ meaning that the reservation utility at dating shifts to the right as depicted by Figure 2, then the average attractiveness of married type-B men may not decrease. We can test this hypothesis by examining the attractiveness measures including employment, wage, and years of education type-B men who are married. If only the attractiveness shifts due to labor market discrimination that does not involve shifts in the reservation utility level, then the attractiveness measures should also decrease. If discrimination takes place not just through this market-based channel but also through the taste-based channel coming from the direct route of preference structure, the reservation utility shift implies the possible zero net change or even increase in the attractiveness measures of type-B men.

4.2.4 Formal Proof

In this section, I prove the model prediction more formally. Readers can safely skip this section to understand empirical analyses based on the model predictions.

Consider discrimination against type-B men. The proof for discrimination against type-B women is similar. First, I shall formally define what I mean by a shift in the distribution of x_m. Recall that $x_m \sim F_x$ represent the distribution of the trait for men and $y_w \sim F_y$ for women. Let F_x^B represent the distribution of

Figure 2: Dating Market with Prejudice



x_m for type-B men and $F_x^{\neg B}$ represent that for non-type-B men. Further let $F_x^{B,\text{date}}$ and $F_x^{\neg B,\text{date}}$ represent the distribution of x_m for type-B men and non-type-B men who successfully date, respectively, and $F_x^{B,\text{marry}}$ and $F_x^{\neg B,\text{marry}}$ that for type-B men and non-type-B men who successfully marry, respectively. I assume that each of these distributions has strictly positive continuous densities on its supports.

Due to labor market discrimination, assume that men with type-B blood have a distribution of a scalar trait F_x^B that is shifted to the left compared with the distribution $F_x^{\neg B}$ for men without type-B blood. That is, I assume the first-order stochastic dominance (FOSD):

Assumption 1. *If there is discrimination against people with type-B blood at the labor market, F_x^B is first-order stochastically dominated by $F_x^{\neg B}$*

To prove that the higher bar for dating leads to more selective mate selection, I introduce a threshold function $T_w(a_w, y_w; \beta)$ at the dating stage. For given $\beta \geq 0$, we can define the dating threshold $T_w(a_w, y_w; \beta)$ implicitly by

$$f\big(T_w(a_w, y_w),\, y_w; \beta\big) \;=\; a_w + \beta \mathbf{1}_{\{B_m = B\}}.$$

Then, the following lemma is immediate by the implicit function theorem.

Lemma 1. *For a given taste-based discrimination parameter $\beta \geq 0$ and trait y_w, there is a unique threshold, and $T_w(\cdot, y_w; \beta)$ is strictly increasing in a_w. Similarly, for a_w and y_w, there is a unique threshold, and $T_w(\cdot, y_w; \beta)$ is strictly increasing in β.*

Proof. Fix y_w and β and set $\Phi(x, a) = f(x, y_w) - a$, where $a = a_w + \beta \mathbf{1}_{\{B_m = B\}}$. Strict monotonicity in x implies $\partial \Phi / \partial x = f_x(x, y_w) > 0$ on X, so for each a there is a unique solution $x = T_w(a_w, y_w; \beta)$ to

$\Phi(x, a) = 0$. Applying the implicit-function theorem,

$$\frac{\partial T_w}{\partial a_w}(a_w, y_w; \beta) \;=\; -\frac{\partial \Phi / \partial a_w}{\partial \Phi / \partial x} \;=\; \frac{1}{f_x\big(T_w(a_w, y_w; \beta), y_w\big)} \;>\; 0,$$

since $f_x > 0$. Therefore, the threshold rises whenever the selectiveness parameter a_w increases. The exact same proof works for the latter part of the lemma and is thus omitted from the text. □

Proposition 1. *Suppose that there is discrimination against people with blood type B in the labor market and that Assumption 1 holds true. Suppose a stable (welfare-maximizing) outcome. If $\beta = 0$, then*

$$\mathbb{E}[x_m \mid x_m \sim F_x^{B,marry}] < \mathbb{E}[x_m \mid x_m \sim F_x^{\neg B,marry}].$$

If $\beta > 0$, then

$$\mathbb{E}[x_m \mid x_m \sim F_x^{B,marry}, \beta = 0] < \mathbb{E}[x_m \mid x_m \sim F_x^{B,marry}, \beta > 0].$$

Proof. Suppose $\beta = 0$ first. Men with attributes $x_m \sim F_x^B$ must meet the dating threshold R_w^D to proceed to the marriage stage. That is, for each woman w the acceptance set for both blood-type groups is

$$S_w = \big\{x_m : f(x_m, y_w) \geq a_w\big\} = [T_w(a_w, y_w; \beta), \infty),$$

where T_w is increasing in a_w by Lemma 1. Truncation by the same threshold family preserves FOSD, hence Assumption 1 implies that the expected value of x_m for type-B individuals who pass the dating stage is less than the expected value for non-type-B individuals:

$$\mathbb{E}[x_m \mid x_m \sim F_x^{B,\text{date}}] < \mathbb{E}[x_m \mid x_m \sim F_x^{\neg B,\text{date}}].$$

Men who pass the dating stage proceed to the marriage stage if they meet the marriage threshold R_m^M. Importantly, R_m^M is the same for blood type B and non-B individuals.

Because $F_x^{B,\text{date}}$ has a lower mean than $F_x^{\neg B,\text{date}}$ and the marriage threshold does not differentiate by blood type, F_x^B is still first-order stochastically dominated after marriage selection. Thus:

$$\mathbb{E}[x_m \mid x_m \sim F_x^{B,\text{marry}}] < \mathbb{E}[x_m \mid x_m \sim F_x^{\neg B,\text{marry}}].$$

As for the second part, by Lemma 1, an increase in β increases threshold $T_w(a_w, y_w; \beta)$. The stricter threshold implies that smaller acceptance set S_w. Therefore, the reduced acceptance set implies

$$\mathbb{E}[x_m \mid x_m \geq T_w(a_w, y_w; \beta > 0)] > \mathbb{E}[x_m \mid x_m \geq T_w(a_w, y_w; \beta = 0)].$$

Since the marriage reservation utility R_w^M is unaffected by blood type, the stricter dating threshold directly translates to a higher conditional mean x_m among type-B men who marry:

$$\mathbb{E}[x_m \mid x_m \sim F_x^{B,\text{marry}}, \beta > 0] > \mathbb{E}[x_m \mid x_m \sim F_x^{B,\text{marry}}, \beta = 0].$$

$\square$

Note that the sign of the net effects of discrimination in both labor and marriage markets is ambiguous. If the effects through the taste-based channel are small, then the effects through the market-based channel may dominate and the average value of the traits of married men with type-B blood may be lower than married men with another blood type. However, if the effects through the taste-base channel are comparable to those of the market-based channel, the sign of the net effects may even be *positive*. This is left for empirical analysis in later sections.

4.3 Extension to Two-sided Matching

The model above is easily generalizable to a two-sided matching setting. Since the model predictions and insights I can get from this extension are the same as those of the illustrative one-sided matching model above, I explore this extension in Appendix C.

5 Econometric Framework

To estimate the discrimination effects of blood types on labor and marriage markets, I assume that blood types do not biologically affect labor and marriage markets but affect the markets only through social stigma attached to blood types. I validate this assumption later using the U.S. sample of the same survey as a placebo setting.

To mitigate the potential downward bias induced by selection biases discussed in section 3, for analyses on marriage rates, I do not use the panel structure of the survey and only use unique samples in the two waves. As for labor market outcomes, given the absence of statistically significant correlation between survivorship and unemployment rates, I exploit the panel structure and include the both responses of the survivors to increase power. For labor market outcomes, I focus on the working age population between 15 and 64 years old. Moreover, as explained above, to test self-fulfilling prophecies, I conduct subsample analyses by two age groups with the cutoff of 40 years old not only for the homework survey question but also for all the other outcomes. Given these, I estimate the following equation:

$$y_{iwp} = \delta_w + \kappa_p + \beta BloodtypeB_i + \epsilon_{iwp}, \tag{1}$$

where y_{iwp} is an outcome of respondent i based in prefecture p from wave $w \in \{2005, 2006\}$, and $BloodtypeB_i$ is an indicator that equals 1 if respondent i is type-B blood and 0 otherwise. Note that I do not include controls such as age and sex, due to the selection issue discussed above. The inclusion of these variables leads to the "bad control" issue discussed in Angrist and Pischke (2009). Whenever I use the panel structure and do not restrict samples to be unique, I cluster standard errors at the respondent level to address the potential serial correlation within a respondent. Otherwise, I use Huber–White heteroskedasticity consistent standard errors, following the recommendation by Solon et al. (2015). I also provide results without sampling weights as suggested by Solon et al. (2015) in Appendix.

Outcomes for individual respondents include the status of marriage, the status of unemployment, annual earnings both conditional and unconditional upon working, years of education, and the measure for self-fulfilling prophecies. Given the presence of many housewives/husbands and that unemployment does not necessarily indicate zero earnings, I analyze unconditional earnings to shed light on the entire distribution of individual traits and investigate earnings conditional upon wage employment to examine the presence of wage differences at companies as intensive-margin measures.

6 Results

6.1 Marriage Market

First, I shall examine the effects of the negative stereotype against type-B people in marriage and labor markets. Table 4 demonstrates that being type-B decreases the marriage rate. Each column of Table 4 demonstrates the effects of the stereotype using different samples: the first column is the entire sample, the second is restricted to all men, the third is restricted to all women, the fourth is individuals under 40 years old, the fifth column is men under 40 years old, the sixth column is women under 40 years old, the seventh column is individuals of 40 years old or above, the eighth is men of 40 years old or above, and the ninth is women of 40 years old or above. All the tables throughout this paper follow this format.

As the first column of Table 4 shows, the stigma on type-B people decreased the marriage rate by 5.4 percentage points or approximately 7.9% lower than the average of the other types (the weighted mean of the other types is 68.6%). As the rest of the columns show, this decrease is driven mostly by young adults and in particular young men below 40 years old (the fourth column) with 12.7 percentage-point decrease or 33.4% lower than the average of the other types (the weighted mean of the other types is 38.0%).

Table 4: Marriage Market Results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Blood Type B	-0.054*	-0.065	-0.046	-0.085*	-0.127*	-0.080	0.006	0.003	0.011
	(0.023)	(0.033)	(0.030)	(0.037)	(0.056)	(0.053)	(0.016)	(0.022)	(0.023)
Observations	4201	1996	2205	1051	446	596	3150	1544	1606
Sex	Both	Male	Female	Both	Male	Female	Both	Male	Female
Age	All	All	All	Under 40	Under 40	Under 40	Over 40	Over 40	Over 40

Notes: Huber–White heteroskedasticity consistent standard errors in parentheses. Fixed effects for calendar years (or survey waves) and prefectures are included. * $p < 0.05$, ** $p < 0.01$.

6.2 Labor Market

Next, let us look at the differences in labor market outcomes between type-B and non-B respondents. Table 5 shows the results of labor market outcomes including unemployment, annual earnings unconditional upon working, annual earnings conditional upon wage employment, and years of education. Panel (a) and (d) of Table 5 are based on ordinary least squares (OLS) regressions, while panel (b) and (c) of Table 5 are estimated by Tobit regressions. Panel (b) uses annual earnings measures unconditional upon working, which include zeros as valid values, while panel (c) uses annual earnings conditional upon wage employment, both in 10,000-yen unit with upper limit to be the survey top-coding value of 14,000,000 yen. To address the top-coding issue, I conduct standard Tobit regressions on earnings outcomes. Note that as demonstrated by Figure B1 and B2 in Appendix B, the earnings outcomes (especially conditional earnings) are not highly-skiewed, in part due to the top-coding issue and in part due to the fact that the survey contains fewer unemployed people than the population. Given the distributions and the problem involving logs with zeros pointed out by Chen and Roth (2024), I do not take the natural logarithm of these outcomes.

Panel (a) shows the results of the unemployment outcome. One can see that men's unemployment rates increase by 2 percentage points, which amounts to around 126% increase given that the weighted unemployment rate of the non-B type working-age men is approximately 1.6%. On the other hand, no discerning effects are found on women's unemployment rates. The results are consistent with the marriage market discrimination concentrated on men. As for both unconditional and conditional annual earnings, panel (b) and (c) demonstrate that the effects on earnings are concentrated on young men but no effects on the other populations. The effects on young men reach 680,000-yen (or 21.3%) reduction and almost 520,000-yen (or 13.7%) reduction for unconditional and conditional annual earnings, respectively. In contrast, panel

(d) finds no evidence of differences in years of education between type-B and non-B respondents.

Table 5: Labor Market Results

(a) Unemployment

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Blood Type B	0.006	0.020*	-0.003	0.006	0.023	-0.009	0.009	0.020	-0.001
	(0.006)	(0.009)	(0.006)	(0.011)	(0.018)	(0.015)	(0.006)	(0.011)	(0.005)
Observations	5359	2435	2924	1509	628	876	3850	1804	2046
Sex	Both	Male	Female	Both	Male	Female	Both	Male	Female
Age	All	All	All	Under 40	Under 40	Under 40	Over 40	Over 40	Over 40

(b) Annual Earnings

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Blood Type B	-2.742	-12.205	-0.980	-22.294	-68.099**	4.228	12.695	24.910	-3.365
	(13.066)	(23.430)	(9.597)	(15.279)	(25.981)	(14.624)	(19.089)	(26.711)	(12.298)
Observations	4870	2145	2725	1379	569	810	3491	1576	1915
Sex	Both	Male	Female	Both	Male	Female	Both	Male	Female
Age	All	All	All	Under 40	Under 40	Under 40	Over 40	Over 40	Over 40

(c) Annual Earnings Conditional upon Wage Employment

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Blood Type B	0.533	8.616	-7.676	-22.590	-51.693*	4.344	22.203	31.788	-52.611
	(18.139)	(24.808)	(17.115)	(16.886)	(25.688)	(17.621)	(24.930)	(27.662)	(31.861)
Observations	2280	1530	750	739	435	304	1541	1095	446
Sex	Both	Male	Female	Both	Male	Female	Both	Male	Female
Age	All	All	All	Under 40	Under 40	Under 40	Over 40	Over 40	Over 40

(d) Years of Education

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Blood Type B	0.040	0.154	-0.026	-0.151	0.140	-0.274	0.107	0.114	0.121
	(0.102)	(0.161)	(0.117)	(0.165)	(0.290)	(0.190)	(0.109)	(0.173)	(0.128)
Observations	5345	2431	2914	1505	627	872	3840	1800	2040
Sex	Both	Male	Female	Both	Male	Female	Both	Male	Female
Age	All	All	All	Under 40	Under 40	Under 40	Over 40	Over 40	Over 40

Notes: Standard errors clustered at the respondent level in parentheses. Panel (a) and (d) are based on OLS regressions, while panel (b) and (c) are estimated by Tobit regressions. Panel (b) uses annual earnings measures unconditional upon working, which include zeros as valid values, while panel (c) uses annual earnings conditional upon wage employment, both in 10,000-yen unit with upper limit to be the survey top-coding value of 14,000,000 yen. * $p < 0.05$, ** $p < 0.01$.

6.3 Tests of Taste-based And Market-based Channels

With the presence of labor-market discrimination, I now examine whether the marriage market results are driven by the taste-based or market-based channel, or both. To do so, as explained in the model prediction, we can look at the average values of characteristics for married individuals. Fisman et al. (2006) find that men place more emphasis on physical attractiveness while women prioritize intelligence and ambition. Unfortunately, the survey data does not provide data over physical attractiveness of respondents. Nevertheless, I shall look at labor market outcomes and education levels of married respondents to shed light on the presence of discrimination in people's preferences over blood types.

Table 6 examines the differences in the labor and education measures between married type-B respondents and married non-type-B respondents. It shows the lack of statistically significant differences in unemployment rates (panel (a)), unconditional earnings (panel (b)), earnings unconditional upon wage employment (panel (c)), and years of education (panel (d)). Based on the theoretical predictions of my model, these results imply the presence of both taste- and market-based channels driving the reduced marriage rates of type-B individuals.

Table 6: Differences in the Characteristics of Married Respondents

(a) Unemployment Status

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Blood Type B	0.000	-0.005	0.005	0.001	-0.008	0.007	-0.000	-0.005	0.004
	(0.003)	(0.004)	(0.003)	(0.005)	(0.009)	(0.007)	(0.003)	(0.005)	(0.004)
Observations	4154	1877	2277	813	295	514	3340	1578	1762
Sex	Both	Male	Female	Both	Male	Female	Both	Male	Female
Age	All	All	All	Under 40	Under 40	Under 40	Over 40	Over 40	Over 40

(b) Annual Earnings

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Blood Type B	8.306	20.109	1.852	-48.136	-52.807	-17.257	19.848	29.812	12.239
	(17.492)	(24.124)	(10.513)	(30.199)	(41.958)	(16.341)	(20.945)	(27.835)	(12.814)
Observations	3787	1641	2146	754	265	489	3033	1376	1657
Sex	Both	Male	Female	Both	Male	Female	Both	Male	Female
Age	All	All	All	Under 40	Under 40	Under 40	Over 40	Over 40	Over 40

(c) Annual Earnings Conditional upon Wage Employment

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Blood Type B	3.120	8.068	-12.943	-61.983	-82.877	-24.589	16.972	18.060	-8.217
	(22.939)	(26.206)	(29.047)	(35.111)	(44.679)	(32.891)	(26.508)	(28.914)	(36.597)
Observations	1649	1206	443	327	219	108	1322	987	335
Sex	Both	Male	Female	Both	Male	Female	Both	Male	Female
Age	All	All	All	Under 40	Under 40	Under 40	Over 40	Over 40	Over 40

(d) Years of Education

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Blood Type B	0.006	0.051	-0.014	-0.222	0.080	-0.450	0.116	0.088	0.197
	(0.106)	(0.173)	(0.122)	(0.238)	(0.486)	(0.259)	(0.118)	(0.187)	(0.137)
Observations	4137	1869	2268	808	292	512	3328	1573	1755
Sex	Both	Male	Female	Both	Male	Female	Both	Male	Female
Age	All	All	All	Under 40	Under 40	Under 40	Over 40	Over 40	Over 40

Notes: Standard errors clustered at the respondent level in parentheses. Panel (a) and (d) are based on OLS regressions, while panel (b) and (c) are estimated by Tobit regressions. Panel (b) uses annual earnings measures unconditional upon working, which include zeros as valid values, while panel (c) uses annual earnings conditional upon wage employment, both in 10,000-yen unit with upper limit to be the survey top-coding value of 14,000,000 yen. * $p < 0.05$, ** $p < 0.01$.

6.4 Robustness Checks

6.4.1 Excluding Type-AB individuals

As explained above, type-AB people were also discriminated in the beginning of the norm formation. The stereotype against type-AB people, however, turned to a rather positive stereotype starting the late 1990s. As Table 1 demonstrates, the marriage rate of type-AB respondents appears to be higher than that of the other blood types. Then, to check if the results are driven by the positive effects of the positive stereotype toward type-AB people rather than the negative effects of the negative stereotype against type-B individuals, I conduct the same analyses above excluding type-AB respondents from my sample. The results shown in Appendix B.5 confirm that all the results above are robust to the exclusion of type-AB respondents, .

6.5 Placebo Tests: US survey

In this section, I conduct a placebo analysis using the 2005 counterpart of the survey conducted in the United States that asks essentially the same questions. Unfortunately, the 2006 counterpart does not ask about blood types. Many of the respondents in the United States do not know about their blood types since it is not customary to test blood types unless one is hospitalized and needs blood or somehow tests blood types perhaps for precautionary reasons. Naturally, those who know their blood types are significantly different from those who do not know, as demonstrated by Table 7.

Table 7: Balance Test by Knowledge of Blood Types

	Know	Not Know	Difference	Std. Error	N
Age	48.22	45.12	3.09**	(0.51)	4865
Male	0.43	0.48	-0.05**	(0.01)	4939
Annual Earnings (US)	33487.17	28376.78	5110.39**	(953.39)	4689
Firm Employee #	0.12	0.09	0.03**	(0.01)	4960
White Race	0.81	0.77	0.04**	(0.01)	4960

Firm Employee indicates the number of employees at the firm respondents work. * $p < 0.05$, ** $p < 0.01$.

Nevertheless, I conduct a placebo test using only the subsample who know their blood types. Given the regional and racial variation in blood types, I take out states-by-race fixed effects. The results are shown at Table 8. I do not find any effects of being blood type B on the marriage and unemployment rates in the United States.

Table 8: Placebo Test with US Sample

(a) Marriage Rate

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
married									
Blood Type B	0.124	0.038	0.151	0.224	0.574	0.013	0.016	-0.229	0.147
	(0.132)	(0.198)	(0.178)	(0.220)	(0.372)	(0.287)	(0.171)	(0.257)	(0.233)
Observations	2406	1070	1323	801	315	472	1592	723	821
Sex	Both	Male	Female	Both	Male	Female	Both	Male	Female
Age	All	All	All	Under 40	Under 40	Under 40	Over 40	Over 40	Over 40

(b) Unemployment

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
unemployed									
Blood Type B	0.352	0.570	0.416	-0.041	0.930	-0.345	0.570	0.556	0.747
	(0.303)	(0.480)	(0.385)	(0.612)	(1.053)	(0.864)	(0.363)	(0.554)	(0.468)
Observations	2221	690	1071	448	99	227	1407	440	547
Sex	Both	Male	Female	Both	Male	Female	Both	Male	Female
Age	All	All	All	Under 40	Under 40	Under 40	Over 40	Over 40	Over 40

(c) Annual Earnings

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Blood Type B	879.819	5849.675	-2671.340	627.891	3635.722	-2941.308	1083.895	7698.808	-3940.237
	(2293.058)	(3973.281)	(2575.463)	(2913.956)	(5103.429)	(3363.184)	(3278.034)	(5098.711)	(3830.705)
Observations	1954	848	1106	780	318	462	1174	530	644
Sex	Both	Male	Female	Both	Male	Female	Both	Male	Female
Age	All	All	All	Under 40	Under 40	Under 40	Over 40	Over 40	Over 40

(d) Annual Earnings Conditional upon Wage Employment

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Blood Type B	-895.314	9213.540	-3733.959	-1771.258	4484.086	-6619.383	1749.021	11955.622	-3051.279
	(2777.925)	(4932.215)	(3021.990)	(3538.283)	(5444.251)	(4672.686)	(4413.619)	(6627.625)	(4972.633)
Observations	1094	496	598	440	196	244	654	300	354
Sex	Both	Male	Female	Both	Male	Female	Both	Male	Female
Age	All	All	All	Under 40	Under 40	Under 40	Over 40	Over 40	Over 40

(e) Years of Education

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Blood Type B	0.096	0.070	0.111	0.118	0.049	0.115	0.161	0.179	0.175
	(0.140)	(0.219)	(0.182)	(0.250)	(0.371)	(0.326)	(0.170)	(0.271)	(0.223)
Observations	2419	1081	1336	810	328	479	1608	747	856
Sex	Both	Male	Female	Both	Male	Female	Both	Male	Female
Age	All	All	All	Under 40	Under 40	Under 40	Over 40	Over 40	Over 40

Notes: Huber–White heteroskedasticity consistent standard errors in parentheses. State-by-race fixed effects are included. Annual earnings measures are in US$ with upper limit to be the survey top-coding value of USD 140,000, and Tobit regressions are used for these outcomes. * $p < 0.05$, ** $p < 0.01$.

6.6 Self-fulfilling Prophecies

While we just observed that all men appear to be discriminated in the labor market, I shall test the presence of self-fulfilling prophecy effects of the blood-type stereotype. As mentioned above, the association between blood type and personality has led to the stereotype that people with blood type B are tardy because they are "my-pace." I exploit the timeframe of the stereotype's emergence and a survey question about procrastination during childhood by examining the degree of procrastination of assignments at school.

Table 9 demonstrates the self-fulfilling prophecy effects. We can see that there is a statistically significant difference in assignment procrastination between type-B individuals and those of the other types, which is driven by the effects on individuals less than 40 years old. Given that the stereotype began in the beginning of the 1980s, this result supports the presence of self-fulfilling prophecies.

It is important to note that while all the main results above are robust to regressions without sample weights, the regressions of homework submission timing are not robust as evidenced by the results in Table B4. This is most likely because of age-cohort heterogeneity in the effects of the stereotype due to an educational policy change in 1992. Starting 1992, the Japanese government directed school teachers to focus more on less knowledge-based educational materials so that students were not overwhelmed by school workload (the so-called *Yutori*).[23] Since the "Yutori" generation is known to have less school work and thus homework, I expect smaller effects on respondents between 20 and 30 years old than those above 30 but under 40 years old. Indeed, Table B5 shows larger effects on individuals between 31 and 39 years old that are almost significant at the five-percent significance level (p-value = 0.066). This justifies the use of sample weights that include age cohorts in the construction procedure.

Table 9: Procrastination in Assignments at School

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Blood Type B	0.141*	0.150	0.106	0.291*	0.317	0.146	0.014	0.032	0.003
	(0.058)	(0.079)	(0.075)	(0.113)	(0.176)	(0.149)	(0.057)	(0.079)	(0.079)
Observations	4095	1946	2149	1030	434	587	3065	1506	1559
Sex	Both	Male	Female	Both	Male	Female	Both	Male	Female
Age	All	All	All	Under 40	Under 40	Under 40	Over 40	Over 40	Over 40

Notes: Huber–White heteroskedasticity consistent standard errors in parentheses. Fixed effects for calendar years (or survey waves) and prefectures are included. The response ranges from 1 (finishing homework in the beginning of the holiday seasons) to 5 (finishing homework toward the end of the holiday seasons). * $p < 0.05$, ** $p < 0.01$.

7 Limitations

7.1 Marriage Premium versus Labor Market Discrimination

Note that there may be "marriage premium" effects on the labor market outcomes. However, the unemployment rate difference is observed among the entire working-age type-B men. Despite the absence of statistical significance (p-value being slightly above 0.05), the tendency is observed those between 40 and 64 years old men who do not experience lower marriage rates than non-type B men. Indeed, the logistic regression results in Appendix B find statistically significant results for the age range through the efficiency gain of the

[23]See, e.g., https://diamond.jp/articles/-/6831.

nonlinear model. This implies that marriage premium effects are not large enough to explain all the labor market results.

Furthermore, I demonstrated the absence of differences in the partners' characteristics. If the marriage premium effects explain all the labor market results, this implies that the labor market results are driven indirectly by the taste-based channel. That is, the increased threshold solely decreases the marriage rates and affects only those below the threshold who could not marry in the labor markets through the marriage premium. This means that the distributional shift in the attractiveness of type-B individuals does not occur for those (married) type-B individuals who are above the cutoff. My theory then predicts a higher value in the average of the attractiveness of the partners of type-B individuals. We do not observe this, and thus, there must have been a shift in the entire distribution including those married individuals. With that said, I humbly admit the difficulty of quantifying how much of the labor market results are driven by direct discrimination in the labor markets.

7.2 Survey Nonresponse and Selection Bias

Like many household surveys, the data may suffer from nonresponse issues, particularly among the unemployed. Those who are unemployed or in unstable labor market positions may be less inclined or able to respond. This nonrandom participation could bias the estimated effects if, for instance, unemployed individuals with blood type B are systematically underrepresented. Notice, however, that given the absence of statistically significant biological effects on social markers, such a systematic difference by blood types is itself *evidence* of socially constructed influence on type-B individuals.

7.3 Magnitude of Taste-Based Versus Market-Based Channels in Marriage

While the theoretical and empirical analyses indicate the presence of taste-based discrimination and an indirect, market-based channel through reduced earnings potential and self-fulfilling prophecies, the precise magnitudes of each channel remain elusive. Consequently, although both mechanisms appear to be at work, their relative importance is difficult to pin down.

8 Conclusion

In conclusion, this study demonstrates that culturally arbitrary markers—exemplified by the negative stereotype associated with type-B blood in Japan—can quickly evolve into potent drivers of economic discrimination. Using nationally representative data, I show that individuals, particularly young men with type-B blood, face significant disadvantages in both marriage and labor markets. These findings reveal that these outcomes are the product of both direct, taste-based discrimination in the dating stage and indirect, market-based effects that influence labor market performance and personality of individuals through self-fulfilling prophecy effects. A placebo analysis using U.S. data further confirms that these disparities are not rooted in biology but in the rapid social construction of bias. The findings on the life cycle of the stereotype illuminate how rapidly new forms of prejudice can emerge and embed themselves in economic systems, thus broadening our understanding of discrimination and highlighting important avenues for policy intervention.

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Appendices

A Survey Details

A.1 Survey Response Rates

Table A1 shows the response rates of survey waves and years when new respondents were added.

Table A1: Survey Response Rates

Year	Survey Date	Total Surveys Distributed		Valid Responses Collected		Response Rate (%)	
		All	New	All	New	All	New
2003	2003/01/28-2003/02/17	2000	2000	1418	1418	71.1	71.1
2004	2004/01/29-2004/02/25	6002	4600	4224	3161	70.4	68.7
2005	2005/02/09-2005/03/10	4145	0	2987	0	72.1	–
2006	2006/02/10-2006/02/28	4879	2000	3763	1396	77.1	69.8
2007	2007/01/18-2007/02/13	3660	0	3112	0	85.0	–
2008	2008/01/18-2008/02/12	3048	0	2731	0	89.6	–
2009	2009/02/27-2009/03/16	8683	6000	6181	3704	71.2	61.7
2010	2010/01/14-2010/02/15	6134	0	5386	0	87.8	–
2011	2011/01/13-2011/02/14	5316	0	4934	0	92.8	–
2012	2012/01/12-2012/02/13	4887	0	4588	0	93.9	–
2013	2013/01/11-2013/02/12	4544	0	4341	0	95.5	–
2016	2016/01/15-2016/02/15	3186	0	2948	0	92.5	–
2017	2017/01/13-2017/02/13	2207	0	2114	0	95.8	–
2018	2018/01/12-2018/02/12	1736	0	1696	0	97.7	–
2021	2021/01/14-2021/02/10	3437	0	2733	0	79.5	–
2022	2022/01/12-2022/02/10	5841	2500	3427	822	58.7	32.9
2023	2023/01/11-2023/02/10	3444	0	2921	0	84.8	–

A.2 Survey Questionnaire Items

A.2.1 Blood Type

Your BLOOD TYPE is ... (**X ONE Box**)	1	☐ A
	2	☐ B
	3	☐ AB
	4	☐ 0
	5	☐ Not sure

A.2.2 Marriage

What is your marital status?

(**X ONE Box**)

1	☐	Now married	2	☐	Never married
3	☐	Divorced/Separated	4	☐	Widowed

A.2.3 Unemployment

What are you and your spouse's occupations? (**X ONE Box For EACH**)

		Yourself		Your Spouse
No spouse	+			☐
Office worker (office clerks, sales persons)	01	☐	01	☐
Shop worker (running retail shops, shop persons or door-to-door salesman, etc.)	02	☐	02	☐
Managerial post (manager of government employees or a company's employees, or directors, etc.)	03	☐	03	☐
Specialists / Technical posts (teachers, doctors, technical experts, or artists, etc.)	04	☐	04	☐
Worker in the Service industry (barbers/hairstylists, waiters/waitresses, taxi drivers or security guards, etc.)	05	☐	05	☐
Field worker (carpenters, repairmen or factory workers, etc.)	06	☐	06	☐
Agriculture, forestry and fisheries industry	07	☐	07	☐
Housewives/Househusbands (part-time workers)	08	☐	08	☐
Housewives/Househusbands (unemployed)	09	☐	09	☐
Student	10	☐	10	☐
Retired (excluding housewives/househusbands)	11	☐	11	☐
Unemployed (excluding housewives/househusbands)	12	☐	12	☐
Other (Specify): ____________________		☐		☐

A.2.4 Earnings: Conditional And Unconditional

What is the type of your employment? (**X ONE Box**)

1 ☐ Company employee/Organization staff
2 ☐ Government employee
3 ☐ Businessman/Director
4 ☐ Self-employed
5 ☐ Family business employee (in self-employed business)

Give this question, I use the following question:

Approximately how much was the annual earned income of you and your spouse before taxes, with bonuses included (and also business income) for 2004? If you prefer answering in terms of monthly income or hourly wage, please write in the amount on the appropriate line. (**X ONE Box**)

		Yourself	**Your Spouse**
No spouse	+		☐
None	01	☐	☐
Less than $10,000	02	☐	☐
$10,000 to less than $20,000	03	☐	☐
$20,000 to less than $40,000	04	☐	☐
$40,000 to less than $60,000	05	☐	☐
$60,000 to less than $80,000	06	☐	☐
$80,000 to less than $100,000	07	☐	☐
$100,000 to less than $120,000	08	☐	☐
$120,000 to less than $140,000	09	☐	☐
More than $140,000	10	☐	☐
Monthly income (Specify):	$ ______		$ ______
Dollars per hour (Specify):	$ ______		$ ______

A.2.5 Self-fulfilling Prophecy Measure: Assignment

Thinking about when you were a child and you were given an assignment in school, when did you usually do the assignment? (**X ONE Box**)

1. ☐ Got it done right away
2. ☐ Tended to get it done early, before the due date
3. ☐ Worked on it daily up until the due date
4. ☐ Tended to get it done toward the end
5. ☐ Got it done at the last minute

A.3 Sample Weights

A.3.1 Method

The sampling weights for this survey are created by calculating the number of people represented by one respondent through dividing the population into groups by birth cohorts and regions.

The regions are classified into seven groups, some of which are merged from the 10 regions used for sample stratification. To construct sampling weights that correspond to the decrease in respondents due to the continuation of the panel survey, regions with significant sample decline were merged with neighboring region groups.

B Additional Results and Robustness Checks

B.1 History of Blood-type Discrimination

Table B1: Number of Publicized Books and Magazine Articles on Blood Types and Personality

Year	Book	Article	Total
1972	1	2	3
1973	6	4	10
1974	5	7	12
1975	5	7	12
1976	8	7	15
1977	1	8	9
1978	7	8	15
1979	7	7	14
1980	17	4	21
1981	12	9	21
1982	22	17	39
1983	19	24	43
1984	51	66	117
1985	59	28	87
1986	16	13	29
1987	9	28	37
1988	16	9	25
1989	2	6	8
1990	17	12	19
1991	14	20	34
1992	26	1	27
1993	2	0	2

Notes: These values are excerpted from Sakamoto and Yamazaki (2004) who used the values from Mizoguchi (1994).

B.2 Histograms of Annual Earnings

Figure B1: Annual Earnings

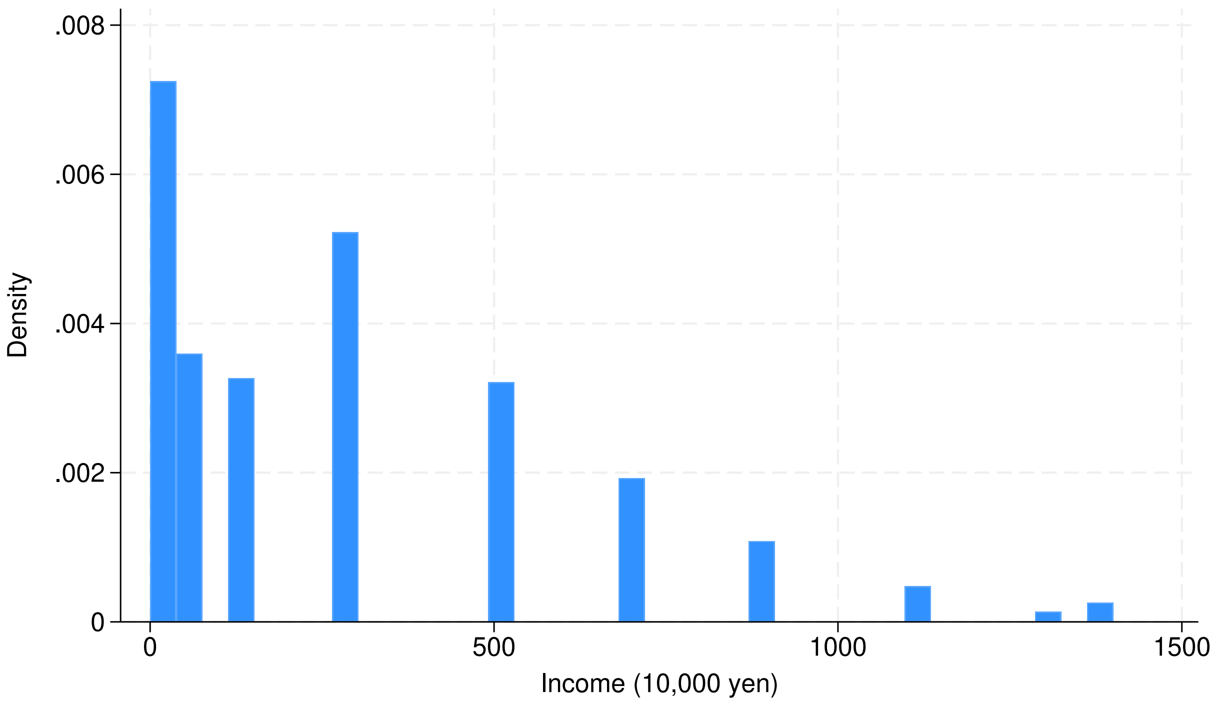
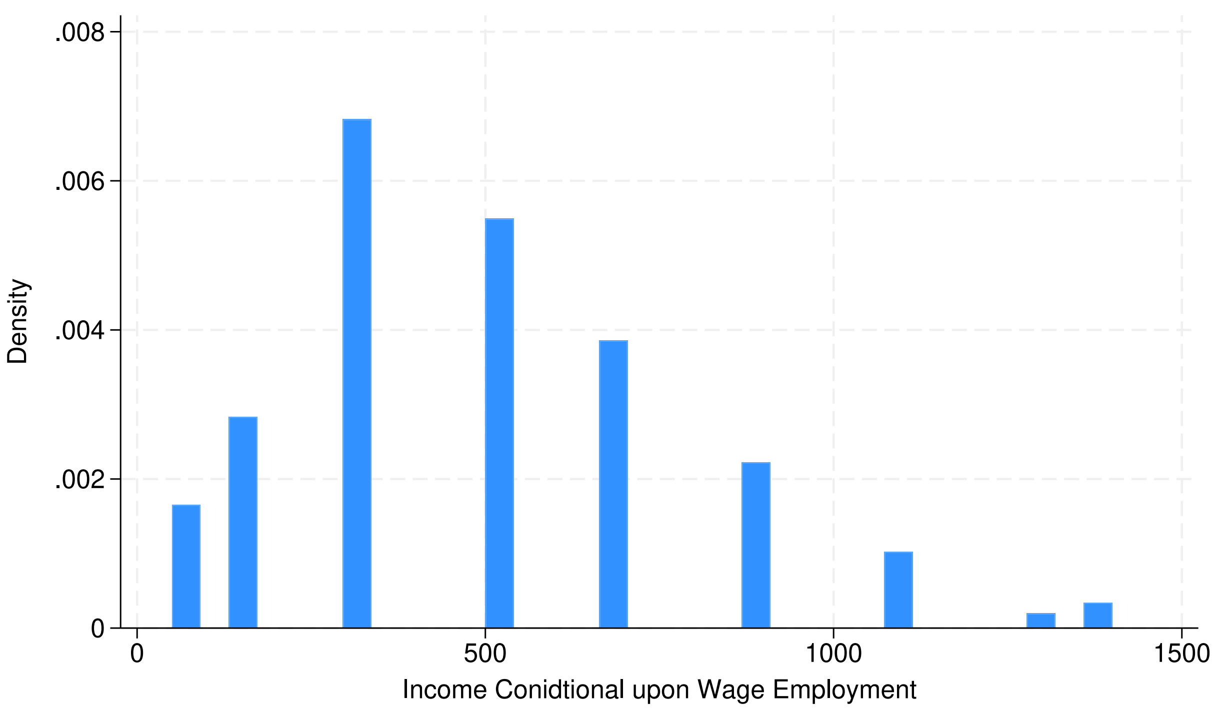


Figure B2: Annual Earnings Conditional upon Wage Employment



B.3 Unweighted Results

Table B2: Marriage Market Results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Blood Type B	-0.028	-0.032	-0.023	-0.113**	-0.145*	-0.110*	0.012	0.007	0.019
	(0.016)	(0.023)	(0.022)	(0.037)	(0.059)	(0.049)	(0.015)	(0.021)	(0.021)
Observations	4201	1996	2205	1051	446	596	3150	1544	1606
Sex	Both	Male	Female	Both	Male	Female	Both	Male	Female
Age	All	All	All	Under 40	Under 40	Under 40	Over 40	Over 40	Over 40

Notes: Huber-White heteroskedasticity consistent standard errors in parentheses. Fixed effects for calendar years (or survey waves) and prefectures are included. * $p < 0.05$, ** $p < 0.01$.

Table B3: Labor Market Results

(a) Unemployment

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Blood Type B	0.007	0.020*	-0.002	0.005	0.026	-0.009	0.009	0.019	-0.000
	(0.005)	(0.009)	(0.005)	(0.010)	(0.019)	(0.012)	(0.006)	(0.011)	(0.005)
Observations	5359	2435	2924	1509	628	876	3850	1804	2046
Sex	Both	Male	Female	Both	Male	Female	Both	Male	Female
Age	All	All	All	Under 40	Under 40	Under 40	Over 40	Over 40	Over 40

(b) Annual Earnings

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Blood Type B	-1.197	-0.360	-6.540	-30.714	-79.673**	-7.649	10.146	24.777	-5.636
	(13.836)	(21.518)	(9.337)	(16.176)	(26.804)	(14.174)	(18.134)	(25.866)	(11.778)
Observations	4870	2145	2725	1379	569	810	3491	1576	1915
Sex	Both	Male	Female	Both	Male	Female	Both	Male	Female
Age	All	All	All	Under 40	Under 40	Under 40	Over 40	Over 40	Over 40

(c) Annual Earnings Conditional upon Wage Employment

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Blood Type B	4.925	14.195	-28.541	-27.053	-53.764*	-9.441	19.381	28.652	-59.337*
	(18.659)	(22.625)	(17.969)	(17.693)	(26.183)	(16.193)	(24.247)	(26.569)	(29.482)
Observations	2280	1530	750	739	435	304	1541	1095	446
Sex	Both	Male	Female	Both	Male	Female	Both	Male	Female
Age	All	All	All	Under 40	Under 40	Under 40	Over 40	Over 40	Over 40

(d) Years of Education

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Blood Type B	0.035	0.101	-0.001	-0.164	-0.049	-0.208	0.094	0.130	0.086
	(0.086)	(0.146)	(0.101)	(0.149)	(0.281)	(0.169)	(0.103)	(0.170)	(0.122)
Observations	5345	2431	2914	1505	627	872	3840	1800	2040
Sex	Both	Male	Female	Both	Male	Female	Both	Male	Female
Age	All	All	All	Under 40	Under 40	Under 40	Over 40	Over 40	Over 40

Notes: Standard errors clustered at the respondent level in parentheses. Panel 3(a) and 3(d) are based on OLS regressions, while panel 3(b) and 3(c) are estimated by Tobit regressions. Panel 3(b) uses annual earnings measures unconditional upon working, which include zeros as valid values, while panel 3(c) uses annual earnings conditional upon working, both in 10,000-yen unit with upper limit to be the survey top-coding value of 14,000,000 yen. * $p < 0.05$, ** $p < 0.01$.

Table B4: Procrastination in Assignments at School

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Blood Type B	0.043	0.050	0.042	0.168	0.159	0.115	-0.005	0.027	-0.020
	(0.048)	(0.070)	(0.066)	(0.103)	(0.170)	(0.134)	(0.055)	(0.078)	(0.076)
Observations	4095	1946	2149	1030	434	587	3065	1506	1559
Sex	Both	Male	Female	Both	Male	Female	Both	Male	Female
Age	All	All	All	Under 40	Under 40	Under 40	Over 40	Over 40	Over 40

Table B5: Procrastination in Assignments at School: Only Above 30 But under 40 Years Old

	(1)
Blood Type B	0.257
	(0.139)
Observations	604
Sex	Both
Age	31-39 Years Old

B.4 Logistic Results

In this section, I report marginal effects of logistic regressions of binary outcomes in Table B6 and B7.

Table B6: Marriage Rate: Logistic

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Blood Type B	-0.053*	-0.063*	-0.045	-0.087*	-0.135*	-0.079	0.006	0.003	0.012
	(0.022)	(0.031)	(0.028)	(0.038)	(0.059)	(0.051)	(0.016)	(0.021)	(0.024)
Observations	4201	1986	2205	1049	434	596	3123	1485	1579
Sex	Both	Male	Female	Both	Male	Female	Both	Male	Female
Age	All	All	All	Under 40	Under 40	Under 40	Over 40	Over 40	Over 40

Notes: Huber-White heteroskedasticity consistent standard errors in parentheses. Fixed effects for calendar years (or survey waves) and prefectures are included. * $p < 0.05$, ** $p < 0.01$.

Table B7: Unemployment: Logistic

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Blood Type B	0.007	0.023*	-0.006	0.011	0.061	-0.030	0.010	0.025*	-0.003
	(0.006)	(0.009)	(0.012)	(0.018)	(0.036)	(0.052)	(0.007)	(0.013)	(0.013)
Observations	4507	1867	1791	837	209	297	2940	1200	878
Sex	Both	Male	Female	Both	Male	Female	Both	Male	Female
Age	All	All	All	Under 40	Under 40	Under 40	Over 40	Over 40	Over 40

Notes: Standard errors clustered at the respondent level in parentheses. Fixed effects for calendar years (or survey waves) and prefectures are included. * $p < 0.05$, ** $p < 0.01$.

B.5 Results without type-AB individuals

In this section, I conduct the same analyses as the main results in the main text excluding type-AB people since their marriage rates appear to look higher than the other blood types and possibly drive the main results. For binary outcomes, I conduct logit analyses.

Table B8: Marriage Market Results without Type-AB Respondents

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Blood Type B	-0.044*	-0.053	-0.037	-0.071	-0.119*	-0.062	0.008	0.004	0.017
	(0.022)	(0.032)	(0.029)	(0.038)	(0.059)	(0.052)	(0.016)	(0.022)	(0.024)
Observations	3797	1788	1993	949	389	538	2821	1323	1427
Sex	Both	Male	Female	Both	Male	Female	Both	Male	Female
Age	All	All	All	Under 40	Under 40	Under 40	Over 40	Over 40	Over 40

Notes: Huber–White heteroskedasticity consistent standard errors in parentheses. Fixed effects for calendar years (or survey waves) and prefectures are included. * $p < 0.05$, ** $p < 0.01$.

Table B9: Labor Market Results without Type-AB Respondents

(a) Unemployment

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Blood Type B	0.006	0.023*	-0.008	0.011	0.072	-0.032	0.010	0.025	-0.006
	(0.007)	(0.010)	(0.013)	(0.020)	(0.045)	(0.056)	(0.007)	(0.013)	(0.013)
Observations	4014	1693	1595	735	166	266	2657	1081	799
Sex	Both	Male	Female	Both	Male	Female	Both	Male	Female
Age	All	All	All	Under 40	Under 40	Under 40	Over 40	Over 40	Over 40

(b) Annual Earnings

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Blood Type B	-2.742	-12.205	-0.980	-22.294	-68.099**	4.228	12.695	24.910	-3.365
	(13.066)	(23.430)	(9.597)	(15.279)	(25.981)	(14.624)	(19.089)	(26.711)	(12.298)
Observations	4870	2145	2725	1379	569	810	3491	1576	1915
Sex	Both	Male	Female	Both	Male	Female	Both	Male	Female
Age	All	All	All	Under 40	Under 40	Under 40	Over 40	Over 40	Over 40

(c) Annual Earnings Conditional upon Wage Employment

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Blood Type B	0.533	8.616	-7.676	-22.590	-51.693*	4.344	22.203	31.788	-52.611
	(18.139)	(24.808)	(17.115)	(16.886)	(25.688)	(17.621)	(24.930)	(27.662)	(31.861)
Observations	2280	1530	750	739	435	304	1541	1095	446
Sex	Both	Male	Female	Both	Male	Female	Both	Male	Female
Age	All	All	All	Under 40	Under 40	Under 40	Over 40	Over 40	Over 40

(d) Years of Education

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Blood Type B	0.012	0.091	-0.022	-0.235	0.050	-0.324	0.121	0.101	0.139
	(0.103)	(0.164)	(0.119)	(0.167)	(0.295)	(0.197)	(0.110)	(0.175)	(0.131)
Observations	4846	2191	2655	1360	568	785	3486	1618	1868
Sex	Both	Male	Female	Both	Male	Female	Both	Male	Female
Age	All	All	All	Under 40	Under 40	Under 40	Over 40	Over 40	Over 40

Notes: Standard errors clustered at the respondent level in parentheses. Table 5(a) and 5(d) are based on OLS regressions, while Table 5(b) and 5(c) are estimated by Tobit regressions. Table 5(b) uses annual earnings measures unconditional upon working, which include zeros as valid values, while Table 5(c) uses annual earnings conditional upon working, both in 10,000-yen unit with upper limit to be the survey top-coding value of 14,000,000 yen. * $p < 0.05$, ** $p < 0.01$.

Table B10: Procrastination in Assignments at School without Type-AB Respondents

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Blood Type B	0.141*	0.152	0.091	0.299*	0.333	0.115	0.019	0.046	-0.004
	(0.059)	(0.081)	(0.077)	(0.116)	(0.181)	(0.154)	(0.058)	(0.080)	(0.080)
Observations	3703	1760	1943	930	391	529	2773	1362	1411
Sex	Both	Male	Female	Both	Male	Female	Both	Male	Female
Age	All	All	All	Under 40	Under 40	Under 40	Over 40	Over 40	Over 40

Notes: Huber–White heteroskedasticity consistent standard errors in parentheses. Fixed effects for calendar years (or survey waves) and prefectures are included. The response ranges from 1 (finishing homework in the beginning of the holiday seasons) to 5 (finishing homework toward the end of the holiday seasons). * $p < 0.05$, ** $p < 0.01$.

C Generalized Model

In this section, I extend the one-sided illustrative model in the main text to a two-sided generalized one.

C.1 Isomorphism Between Two-Stage and One-Stage Models

Before delving into the extension to general equilibrium analysis, I demonstrate that the two-stage model of dating and marriage is isomorphic to a one-stage stable matching model with a feasibility constraint. The equivalence holds under the assumption that preferences in the marriage stage depend only on traits and are unaffected by additional information from the dating stage.

The two-stage model above can be recast as a single-stage stable matching model by defining an *effective surplus function* that incorporates the dating threshold as a feasibility constraint. In particular, construct an effective surplus function $\widetilde{S}(x_m, y_w)$ that incorporates this feasibility constraint:

$$\widetilde{S}(x_m, y_w) = \begin{cases} g(x_m, y_w), & \text{if the pair is feasible (passes dating stage),} \\ -\infty, & \text{otherwise.} \end{cases}$$

Then, solve a single-stage stable matching problem using $\widetilde{S}(x_m, y_w)$. The stable matching condition ensures that no feasible pair (m, w) can block the outcome by matching with each other instead of their current partners.

Proposition 2. *The set of pairs (m, w) who marry in any stable outcome of the one-stage model with $\widetilde{S}(x_m, y_w)$ coincides exactly with the set of pairs who pass the dating stage and marry in the two-stage model.*

Proof. In the two-stage model, any pair (m, w) that fails the dating stage is infeasible for marriage. This infeasibility is directly encoded in the one-stage model by assigning a surplus of $-\infty$ to such pairs in $\widetilde{S}(x_m, y_w)$. Thus, no such pair can be part of a stable matching. Among pairs that pass Stage 1, the marriage decision in the two-stage model depends on the surplus $g(x_m, y_w)$. This is precisely the surplus used for feasible pairs in the one-stage model. Therefore, the stable matching conditions in the one-stage model replicate the pairwise decisions in Stage 2 of the two-stage model. Since the one-stage model eliminates infeasible pairs and reproduces the stable matching conditions among feasible pairs, the outcomes of the two models are identical.

□

C.2 Two-sided Matching Model

Given the isomorphism, let us explore the general equilibrium analysis. In this paper, although I assume transferable utility for simplicity and exposition, the extension to non-transferable utility case is straightforward and thus omitted. I follow the standard set-ups of the literature initiated by Becker (1973). The total (household) surplus generated when man m matches with woman w is denoted by $S(x_m, y_w)$, which is assumed to be strictly supermodular:

$$S(x, y) + S(x', y') > S(x, y') + S(x', y), \quad \forall x' > x,\, y' > y.$$

Strict supermodularity ensures that higher-x men and higher-y women generate more surplus together, supporting positive assortative matching and ensuring the uniqueness of a stable matching. Furthermore, I make the standard continuity and regularity assumptions on the surplus function. First, the joint surplus function $S(x, y)$ is continuously differentiable on $X \times Y$, where X and Y are the respective trait spaces of men and women. Next, the trait spaces X and Y are closed intervals in $\mathbb{R}$, such that:

$$X = [\underline{x}, \overline{x}], \quad Y = [\underline{y}, \overline{y}].$$

This ensures the problem is well-posed and avoids issues with unbounded traits or surplus.

A matching function μ is defined as the standard matching function in one-to-one matching. That is, $\mu : M \cup W \longrightarrow M \cup W \cup \{\varnothing\}$ such that for each man m, $\mu(m) \in W \cup \{\varnothing\}$, and for each woman w, $\mu(w) \in M \cup \{\varnothing\}$. For the stability of a matching, I employ the standard definition.

Definition 1. *A matching μ is stable if*

1. *No man or woman is matched to more than one partner.*
2. *There is no blocking pair: no unmatched man–woman pair who could both do strictly better by matching with each other.*

I model women's prejudice against blood type B men by introducing a parameter β.

Definition 2. *For type-B men, let $T(\beta)$ be the unique number satisfying $F_X^B(T(\beta)) = 1 - \alpha(\beta)$, where $\alpha(\beta)$ is the fraction of type-B men admitted to the dating pool.*

By this definition, if man m is of type-B blood and has $x_m < T(\beta)$, he is excluded from the marriage market. Second, by the similar logic as in the one-sided matching model, $T(.)$ is strictly increasing in its argument. The effective surplus for a man m with type-B blood and x_m is then

$$\tilde{S}^B(x_m, y_w) = \begin{cases} -\infty, & \text{if } x_m < T(\beta), \\ S(x_m, y_w), & \text{otherwise.} \end{cases}$$

Thus, when $\beta = 0$, almost all B-type men are admitted to the matching pool, whereas for $\beta > 0$, only men of blood type B with $x \geq T(\beta)$ are eligible to match. Finally, notice that the feasible set

$$\mathcal{M}(\beta) \;=\; M^{\neg B} \;\cup\; \bigl\{\, m \in M^B : x_m \geq T(\beta) \bigr\}$$

is geometrically a rectangle plus a right-hand vertical strip, which implies that the lattice is satisfied. Then, with the strict supermodularity, continuity, and regularity assumptions above, the following lemma is immediate from Gretsky et al. (1999), and thus, the proof is omitted.

Lemma 2. *A unique, stable matching μ exists. This μ features positively assortative matching.*

Let $\mu_\beta(M^B)$ denote the set of matched B-type men under the stable matching μ_β. Now, we are ready to prove the following proposition:

Proposition 3. *Let Assumption 1 hold. Under a unique stable matching μ_β, the following two statements hold.*

1. *If $\beta = 0$, then*

$$\mathbb{E}[x_m \mid m \in \mu_\beta(M^B)] < \mathbb{E}[x_m \mid m \in \mu_\beta(M^{\neg B})].$$

2. *If $\beta > 0$, then*

$$\mathbb{E}[x_m \mid m \in \mu_\beta(M^B), \beta = 0] < \mathbb{E}[x_m \mid m \in \mu_\beta(M^B), \beta > 0].$$

Proof. First, by Lemma 2, we know that there exists a unique stable matching. Next, we know that

$$\mu_\beta(M^B) \subseteq \{m \in M^B : x_m \geq T(\beta)\}.$$

Thus, the average trait x_m of matched men with blood type B satisfies:

$$\mathbb{E}[x_m \mid m \in \mu_\beta(M^B)] \geq T(\beta).$$

Given Assumption 1, we know that

$$\Pr\left(x_m \leq t \mid m \in M^B\right) \geq \Pr\left(x_m \leq t \mid m \in M^{\neg B}\right),$$

which implies

$$\Pr\left(x_m \leq t \mid m \in M^B, x_m \geq T(0)\right) \geq \Pr\left(x_m \leq t \mid m \in M^{\neg B}, x_m \geq T(0)\right),$$

due to the preserved FOSD by the common-threshold truncation. Therefore,

$$\Pr\left(x_m \leq t \mid m \in \mu_\beta(M^B)\right) \geq \Pr\left(x_m \leq t \mid m \in \mu_\beta(M^{\neg B})\right).$$

Thus,

$$\mathbb{E}[x_m \mid m \in \mu_\beta(M^B)] < \mathbb{E}[x_m \mid m \in \mu_\beta(M^{\neg B})].$$

As for the second part, since $T(\beta)$ is strictly increasing in β, $\mathbb{E}[x_m \mid i \in \mu_\beta(M^B)]$ is strictly increasing in β. In particular, for $\beta' > \beta$:

$$\mathbb{E}[x_m \mid m \in \mu_{\beta'}(M^B)] > \mathbb{E}[x_m \mid m \in \mu_\beta(M^B)].$$

$\square$