An Explanation for the Increased Rate of First Marriage of the Cohort Born in the Year of the Fire Horse Using a Two Sex Model Based on the Concept of the "Encounter"

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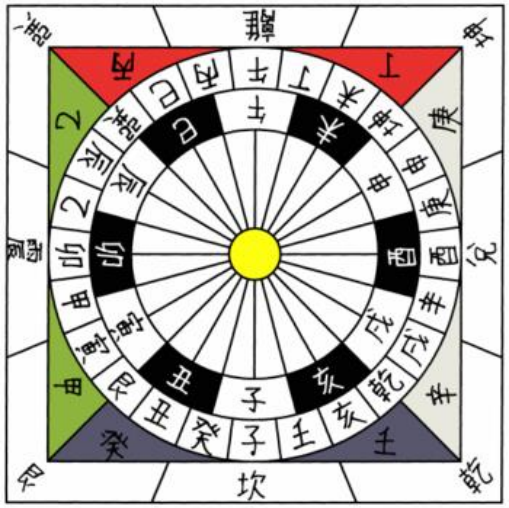
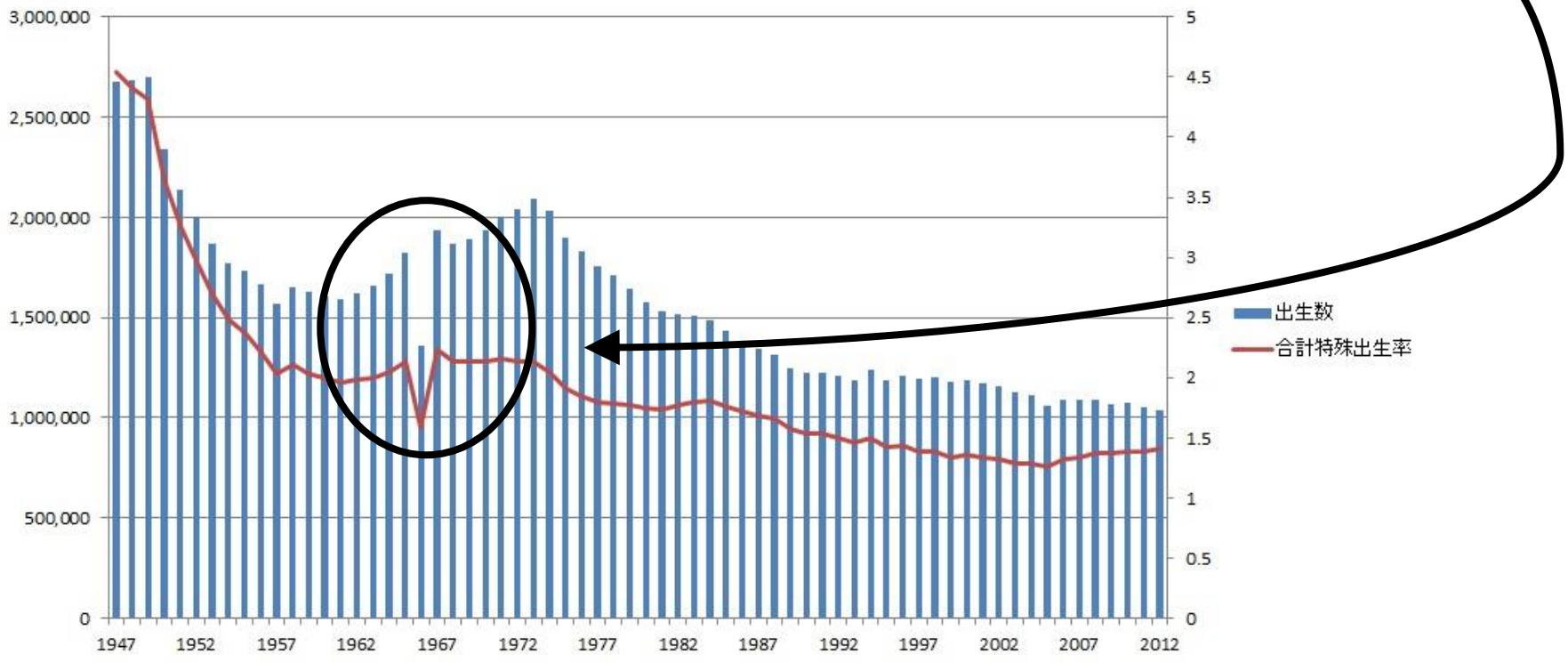


(From Wikipedia)

↑ It is a solar calendar of ancient China which has a unique world view.

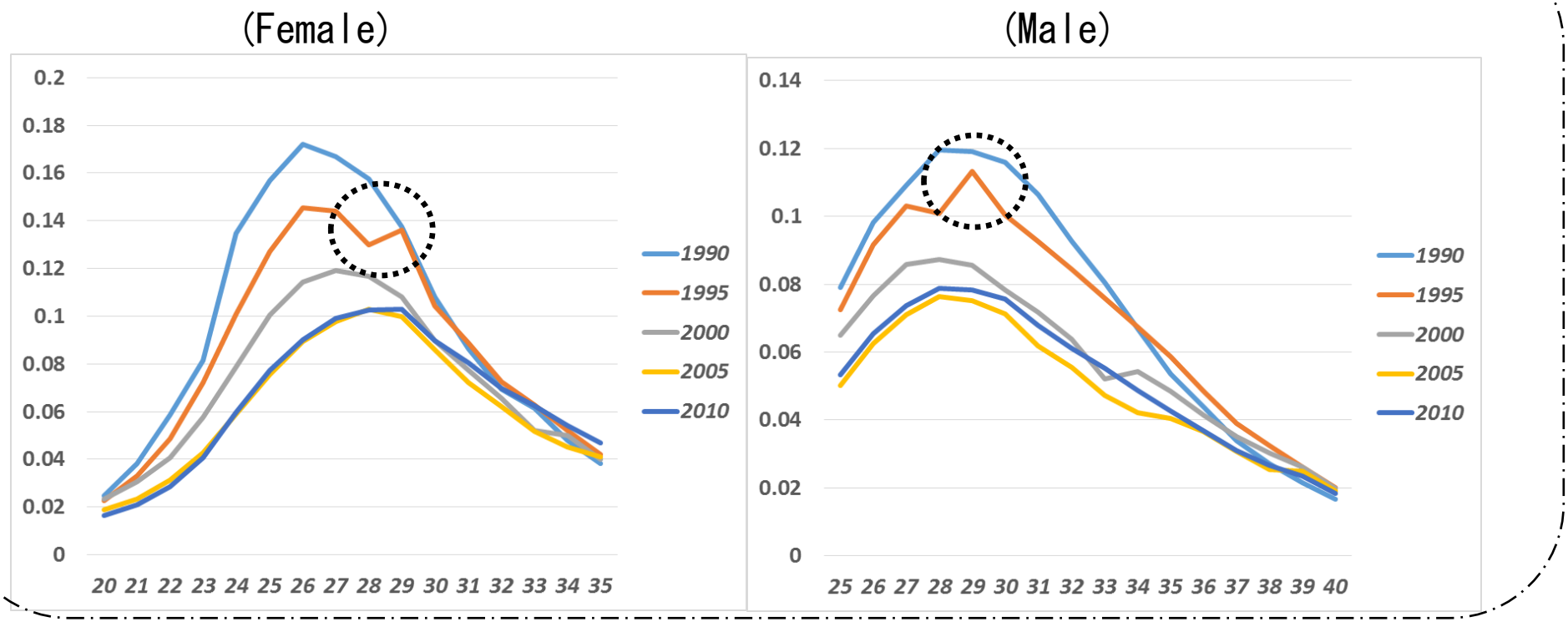
■In Japan, 1966 is *Year of Fire Horse*. Number of births is remarkably small due to superstition.



▶What was the marriage behavior of those born that year upon reaching adulthood?

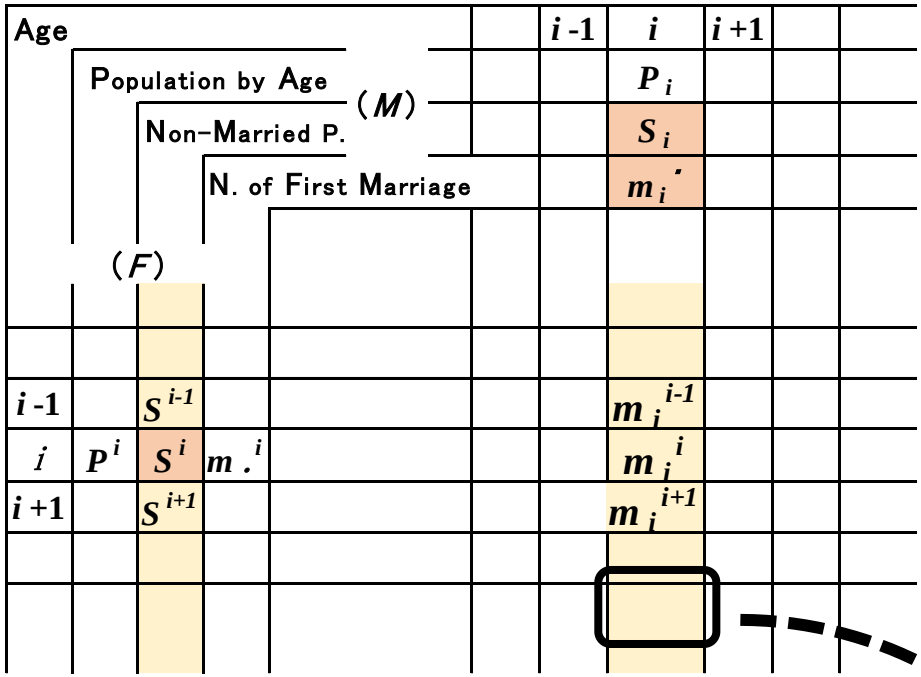
■In 1995, Cohort born in 1966 Reached age 29.
Their Prob. of First Marriage is quite High .

The number of first marriages (both F and M) / Non-married population (1990—2010)



▶Is the decision to marry especially passionately ?
…Absolutely Not ! Then WHY?

■Should Cohort of *Possible Marriage Partners of Opposite Sex* be controlled ?



In the Indicator, Number of First M. (m_i˙) ／Non-married Population. (S_i),

m_i˙= …+ m_i^{i-1}+ m_i^{i}+ m_i^{i-1}+….

Therefore, …, S^{i-1}, S^{i+1}, … also Affect m_i˙.

▶Must be controlled for *both females and males*. What is the best method ?

■First, in a Single Cell, For Example, 5 Females and 7 Males… …This is Related to Two-Sex Problem.

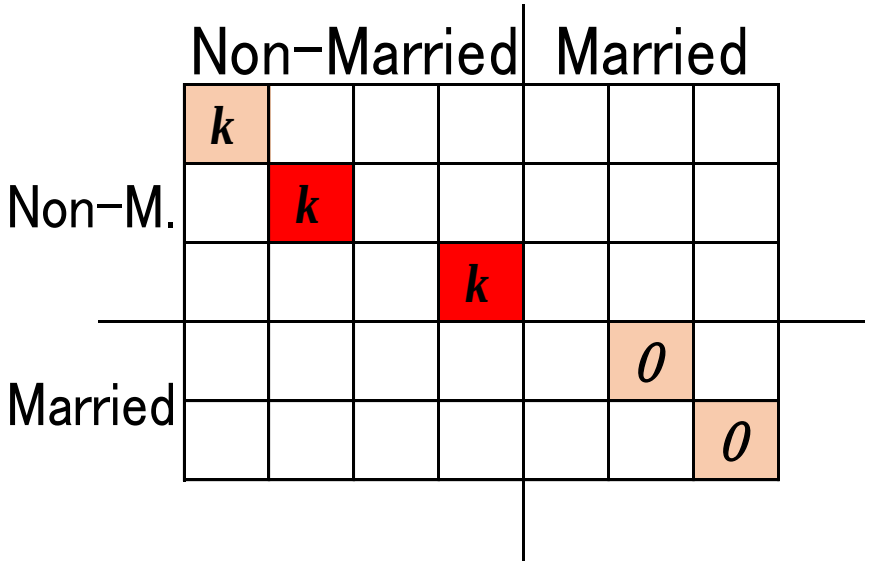
"A marriage function in a two-sex, age-structured marriage model gives the number of marriages between men and women at given age combinations." (Matthews 2012), "The issue of two-sex models has been a topic of interest in demography and related disciplines for over half a century…" (Murphy 2008).

■Exam., when F=5, M=7, m=2, what is marriage function $P(5, 7, k)$=2 ? …However, now, we seek method of driving k from 5, 7, and 2.

▶Marriage Prob.

＝ Prob. of encounter at a given point in time

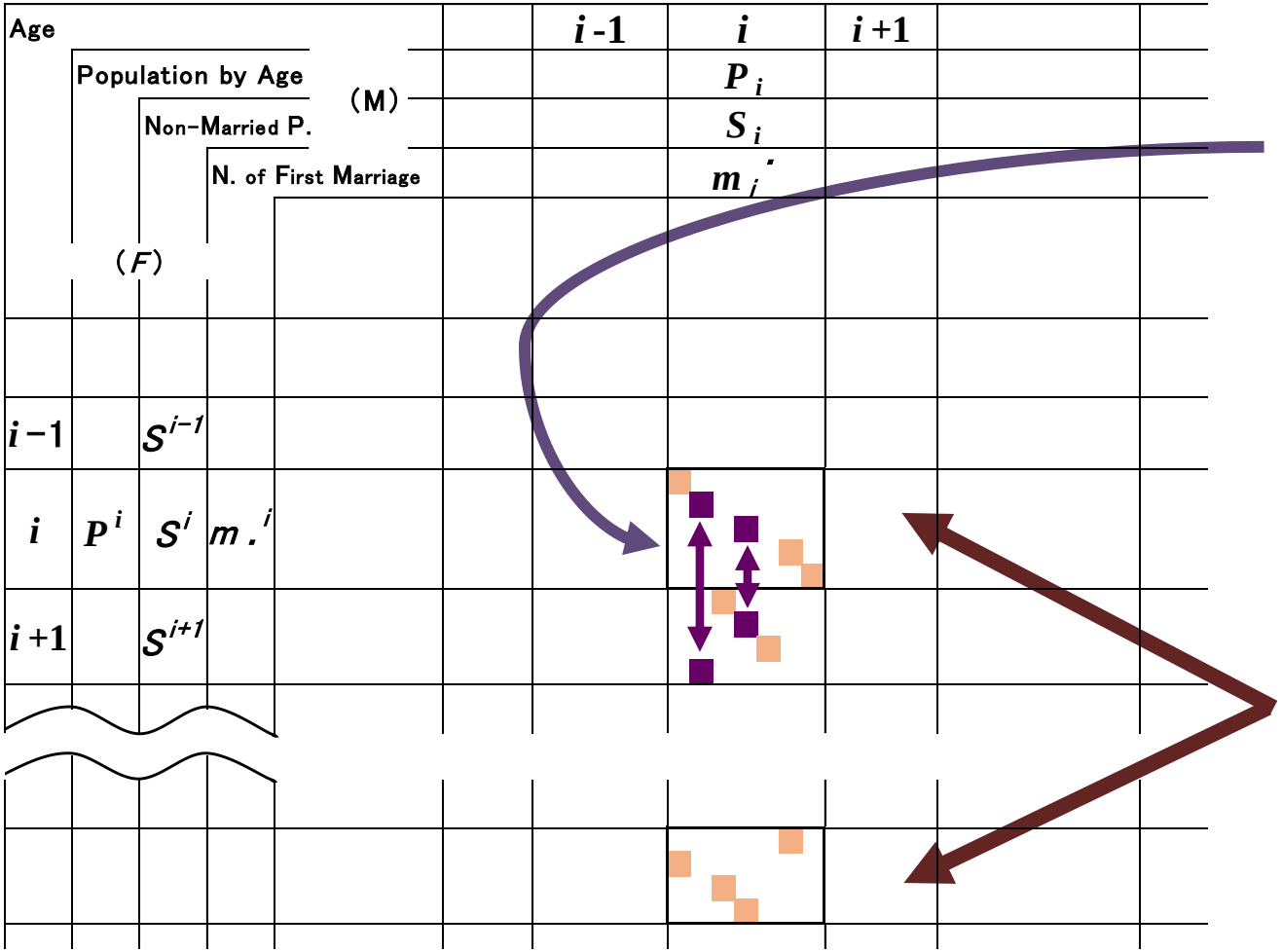
× Prob. k of the encounter leading to marriage.



←F-M encounters at a given points = 5. 7!/(7-5)! =5040 arrays exist.
(7-1)!/(7-5)!=720 arrays for a specific pair exist.

Therefore, prob. of an encounter = 720/5040 =1/7.
Because marriage with married People is impossible, the number of encounters = 1/7{5・7・(1-2/5)(1-3/7)}. Thus, marriages increase at a given point, $\dot{m} = k \cdot \min(F, M)(1-m/F)(1-m/M)$,
or $k = \dot{m} / \{ \min(F, M)(1-m/F)(1-m/M) \}$.

■Let's Extend to Multiple Cells. Two Issues,



1) Can a person experience multiple encounters at a point in time ?

2) Can every cell yield encounters equally ?

▶ (1) Select cells, as encounters Not Overlapping. ➡ Assuming that encounters and marriage occur in these cells, Calculate k. ➡ Select different cells and calculate k, using Reduced Numbers of Non-Married ➡ Repeat process.

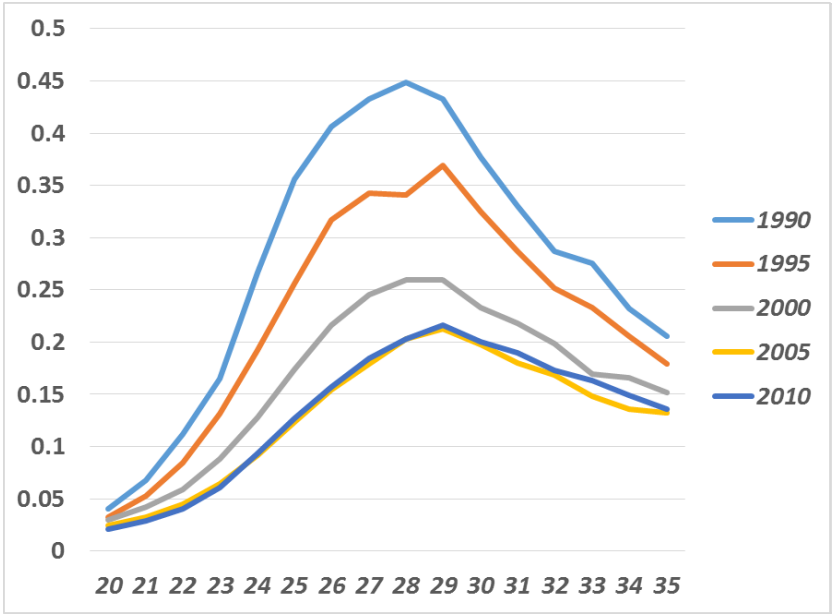
▶ (2) Select in order from High Prob. of Encounter

Age	P. by Age (F)	Non-Married (M)	First Marriage									
					$i-1$	i	$i+1$					
						P_i						
						S_i						
						m_i'						
				5	3	1	2	4	6	8	10	12
				7	5	3	1	2	4	6	8	10
				9	7	5	3	1	2	4	6	8
$i-1$		S^{i-1}		11	9	7	5	3	1	2	4	6
i	P^i	S^i	$m_{\cdot}{}^i$	13	11	9	7	5	3	1	2	4
$i+1$		S^{i+1}		15	13	11	9	7	5	3	1	2
				17	15	13	11	9	7	5	3	1
				19	17	15	13	11	9	7	5	3
				21	19	17	15	13	11	9	7	5
				23	21	19	17	15	13	11	9	7

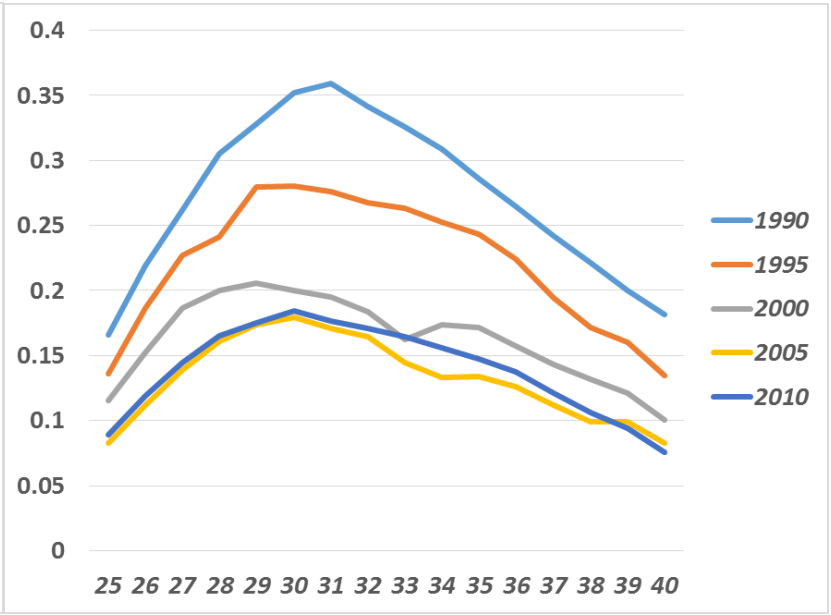
■For Date Shown First, Calculate Σk_i and $\Sigma k_{\cdot}{}^{i}$.

Σ[The number of first marriages(both F and M) / The number of encounters]

(Female)



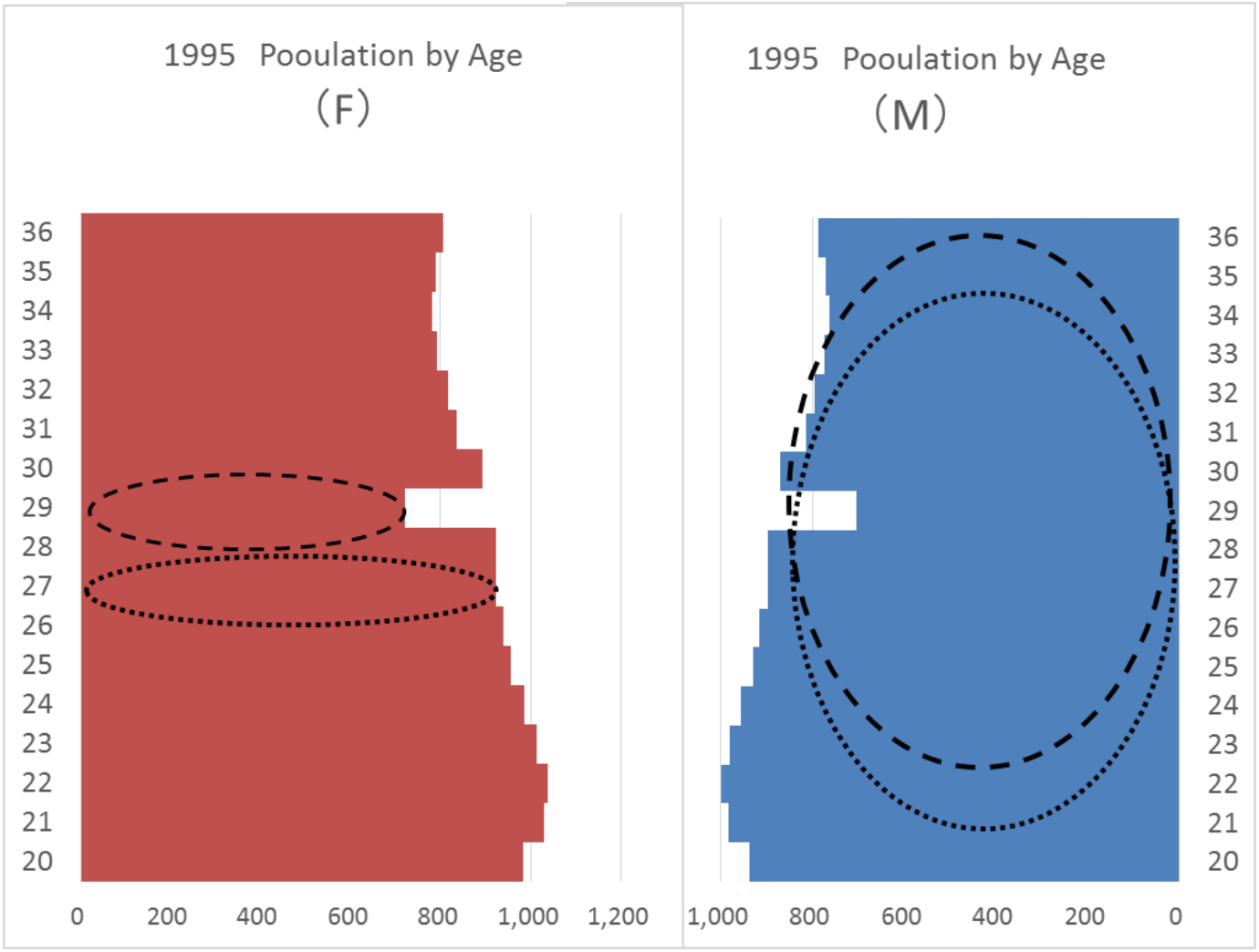
(Male)



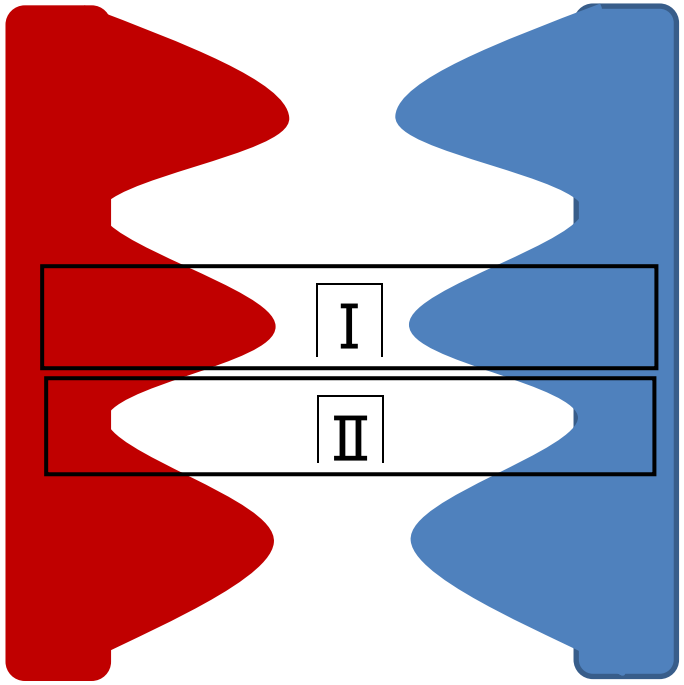
▶The Distortions are almost eliminated！

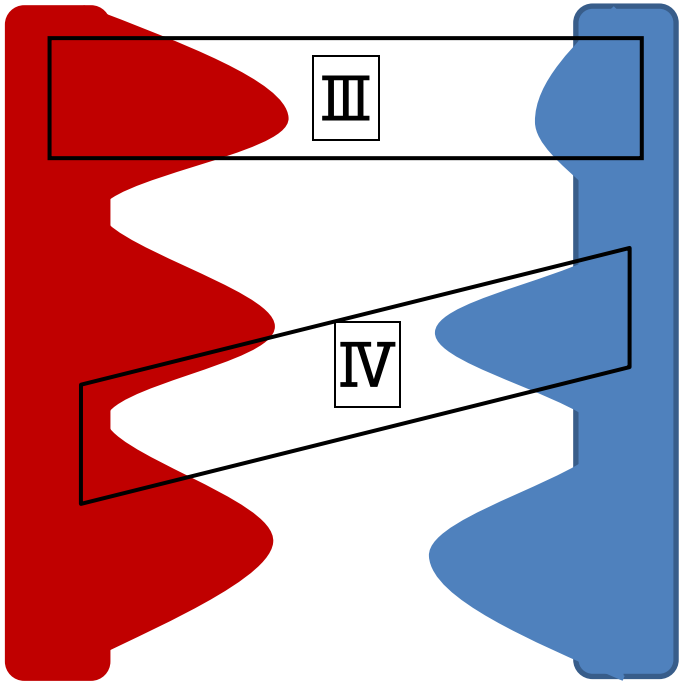
➡This supports the population of possible marriage partners and theoretical model(two-sex model).

■In Conclusion, Potential Marriage Partners do Not Change Much. Encounters is Neither Small, Nor First Marriages.



▶If the 20s-30s Age Groups is Small⇒Orientation to Marriage Appears Misleadingly(← Ⅱ "O-Shi-Chi Effect", Ⅰ Vice Versa). (Ⅲ Sex-Ratio Imbalance and Ⅳ Marriage Squeeze.)





▶Do NOT Confuse "O-Shi-Chi" with Period Effect!

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