F. VAN POPPEL AND F. WILLEKENS

THE DECREASE IN THE AGE AT FIRST MARRIAGE IN THE NETHERLANDS AFTER THE SECOND WORLD WAR: A LOG-LINEAR ANALYSIS

1. INTRODUCTION

Until the beginning of the Seventies, marriage was one of the most important transitions in the life-cycle of European males and females. The age at which this transition took place determined to a large extent the timing of other events in the familial career such as the establishment of a household, the birth of the first child, the termination of participation in the labour force and so on. Consequently, it is not surprising that the sharp drop in age at marriage (1) for both men and women that characterized nearly the whole of Western and Northern Europe after the Second World War attracted the attention of a lot of demographers, sociologists and others. However, this attention has not produced a clear insight into the determinants of the decline in age at marriage.

Macro-sociological processes such as the rise of income levels, further urbanization, secularization and the extension of social security were mentioned

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(1) In terms of averages, the age at marriage of women dropped for instance from 26-27 to 24-25 years in most Scandinavian countries and England and Wales, and from 27-28 to 24-25 years in the Federal Republic of Germany and Switzerland (UN, 1975).
in this context but because of the lack of empirical data, only tentative or speculative conclusions could until now be drawn.

In principle one could try to trace the social forces underlying the change in age at marriage in two ways: by way of time comparisons of aggregated observations of the age at marriage and of the possible explanatory variables, and by way of differential analysis (2). Time-series analyses of marriage rates were among others published for England by Ermisch (1981) for the period 1952-76 and for Australia by Withers (1979) for the period 1954-1974. Both based their analysis on Becker's (1973) Theory of Marriage.

An alternative for time-series analysis can be found in differential analysis: the analysis of the development of the differences in age at marriage between sub-groups of a population during a particular period. For, considering that the theoretical explanations for the changes in age at marriage imply that sub-groups in the population studied react differently to the process which is regarded as the explanation, explanatory schemes could be deduced in a fruitful manner from differences in the way that the age at marriage changes in these sub-groups (Sweet, 1977). In addition, it is possible, by decomposition, to attribute the changes in age at marriage to changes in the composition of the population by sub-groups with different ages at marriage

(2) Analyses of the relationship between social changes and age at marriage should, ideally, be a combination of an intensive interviewing approach (to trace the decision-making process at the individual level), a survey among individual respondents (which yields information about behaviour patterns, exposure to new ideas etc.) and cross-cultural or time comparisons of correlations of aggregate observations (to trace the underlying forces of social change) (McDonald, 1981).
on the one hand and changes in the ages at marriage of these sub-groups on the other.

Differential analyses of age at marriage do exist for Western and Northern Europe (for an overview see Frinking and Van Poppel, 1979), though they are generally restricted to data concerning one moment in time (which means that changes are not analysable) while they also break down on the same shortcomings which cling to the sociological analyses of differentials in the United States: 'First, there has been a tendency in this literature to make use of very peculiar, nonrandom samples. Frequently, sample size is also very small. Most of these studies are retrospective in character, asking people to reconstruct their premarital circumstances at a time that often is quite removed from those circumstances' (Sweet, 1977). Data from the census—which are preferable as far as both number and representativity are concerned—relate to the characteristics of married persons at the time of enumeration rather than at a time preceding the first marriage.

Census data concerning those characteristics which only change very slightly between the time of marriage and the time of enumeration are usable, however, for differential analysis. With the aid of this sort of data perhaps some light could as yet be shed on the post-war decline of age at marriage in Western and Northern Europe. We shall attempt to demonstrate this by a differential analysis of the decline of age at marriage in the Netherlands.

The Dutch situation can however not serve as a perfect model for the situation in other Western and Northern European countries. None of the countries experienced such a sharp drop in age at marriage as the Netherlands between 1950 and 1970. Van Houte-Minet (1968), who compared the development of age at marriage in eleven Western countries since 1950, remarked that 'in the Netherlands, the changes which have taken place in the timing of first marriages, were the most outstanding we encountered'.
In a similar sense, Festy gave his opinion in a review of marriage in Western Europe after the Second World War. The 'modernization' of the Dutch demographic situation - expressed by, among others, a decline in the average age at marriage - is considered by him to be a spectacular example of adaptation to the European 'norm' of early (and frequent) marriage (Festy, 1971), the spectacular being the fact that in the Netherlands - as opposed to a number of other European countries - the decline in age at marriage in the Fifties and the Sixties was not a continuation or acceleration of a trend which had already existed for tens of years but a clear break with the past.

In this publication, the following aspects will be discussed in succession:
- the development of age at marriage in the Netherlands since the beginning of the 20th century;
- Dutch publications in which an explanation is given of the post-war decline in age at marriage in the Netherlands;
- the qualities and shortcomings of the data that are used in our analysis;
- decomposition and log-linear analysis of the decrease in age at marriage;
- reasons for the decline in age at marriage.

2. THE DEVELOPMENT OF AGE AT MARRIAGE IN THE NETHERLANDS SINCE 1900

An invariably high age at marriage was characteristic for Dutch men and women from the beginning of the 20th century up to the end of the Forties. In this period, the age at marriage of men lay between 28.0 and 28.6 years whereas the women were aged between 25.9 and 26.4 years when they married. As far as age at marriage is concerned - and consequently as far as closely connected phenomena such as age at which independence is gained, the moment in time when the departure from the parental home takes place, the age at which sexual relations are
commenced and the termination of women's labour force participation takes place, are concerned - we may suppose that Dutch society anno 1950 was not essentially different from that of 1900.

From 1950, however, the above-mentioned decline in age at marriage, which only came to end in the mid-seventies, set in. In a time-span of about 20 years, the mean age of men and women at marriage dropped by more than 3 years, to values of 24.8 and 22.8 years respectively. Subsequently, there was a slight rise in the age at marriage (Table 1).

Table 1. Mean age at first marriage by sex, Netherlands 1900-1904 - 1975-1979 (3).

<table>
<thead>
<tr>
<th>Period</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>1900-04</td>
<td>28.3</td>
<td>26.4</td>
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<tr>
<td>1905-09</td>
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<td>1910-14</td>
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<td>1915-19</td>
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<td>1935-39</td>
<td>28.0</td>
<td>25.8</td>
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<tr>
<td>1940-44</td>
<td>28.0</td>
<td>25.8</td>
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<tr>
<td>1945-49</td>
<td>28.6</td>
<td>25.9</td>
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<tr>
<td>1950-54</td>
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<td>1955-59</td>
<td>27.2</td>
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<td>1960-64</td>
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<td>1965-69</td>
<td>25.3</td>
<td>23.2</td>
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<td>1970-74</td>
<td>24.8</td>
<td>22.8</td>
</tr>
<tr>
<td>1975-79</td>
<td>25.1</td>
<td>22.9</td>
</tr>
</tbody>
</table>

(Source; Janssen, 1978; CBS, 1980).

(3) These data refer to first marriages of the man respectively the woman.
3. FORMER EXPLANATIONS OF THE DECREASE IN AGE AT MARRIAGE

The explanations that are given for the unprecedented rapid drop in age at marriage in the Netherlands are, to a large degree, based on changes observed in the level of those variables that are often cited in the international literature as a determinant of the age at marriage, e.g. changes in the level of educational attainment (MacDonald and Rindfuss, 1980; Voss, 1977; Hogan, 1978) changes in unemployment (Withers, 1979), changes in earning capacity of women (Ermisch, 1981) etc.

Partly, however, they are based on factors that are more specific for the Dutch situation (for instance the decreasing influence of the Roman Catholic or Orthodox Protestant churches) (4).

Pais (1967) attributed the increasing number of young marriages to the banishment of poverty (with the aid of social security legislation), the situation of full employment and the good income perspectives, which meant that there was very little point in waiting long before getting married. Pais' conclusions, however, were only based on the correlation between the trend in the age specific marriage rates and the trend in index figures of income per head.

Without using individual-level data, Frijling (1973) tested in an impressionistic way a number of hypotheses concerning the decreasing age at marriage. He supposed that the decrease in the age at which the dating period started and the lowering of the age at which the 'going steady' period commenced were affected by an expansion of the practical possibl-

(4) Pilarski and Snyder (1978), and MacDonald and Rindfuss (1980), however, also used the variable religious denomination in their analysis.
ities of contact between boys and girls; this in turn was related to increased urbanization (which reduced geographical distances, increased the possibilities of recreational contact, and furthered the integration of women in the labour process), increased co-education and the rise in women's participation in education, broader-selection criteria for persons with whom one was allowed to have contact (religion and social origin were less important as barriers) and a more tolerant attitude towards (sexual) contacts at a young age.

The reduction in the duration of the 'going steady' period before marriage was connected with changing perceptions of the economic risks which were linked with marriage. Increased social security played a part in this. The changed relationship between marriage, sex and children was also important, through the increase of enforced marriages resulting from premarital sex, and through the increase in the use of contraception (which means that marriages need not be postponed if one wishes to remain childless).

The relative increase of premarital pregnancies and the increasing prosperity (including social security) were also mentioned by Kooy (1973), together with earlier sexual maturity and a change in the collective notion of a desirable or ideal age at marriage. Kooy, however, preferred a broader theory of social change, in which the explanatory variables have not been taken out of their social context. He uses the concept of 'matrification' (5) borrowed from G. Rattray Taylor's 'Sex in History' (1954) to explain the changes that took place in the age at marriage in the Netherlands since the beginning of the Sixties. In accordance with this matrification,

(5) Matrism is characterized by a permissive attitude to sex, freedom and high status for women, spontaneity, hedonism, etc.
which in particular affected the dogmatically religious parts of the nation (Roman Catholics and Calvinists), the youth took their first steps towards heterosexual relationships sooner and marriages took place at an earlier age.

Corpeleijn (1974) stressed the importance of socio-economic factors for the declining age at marriage. Because economic independence could be gained at an earlier age—by broadening employment opportunities and raising incomes for young people—marriage is taking place at an earlier age. The increase in prosperity meant that the period of saving and house-hunting was strongly reduced. The increased participation by women in the labour process probably also played a part here. The growth of prosperity resulted in a rise in educational level and broader informational facilities via the mass-media. Through this, young people will probably grow away from their parental environment sooner and the need to set up their own home would set in at an earlier age.

Moors, Van der Vlist and Frijling (Moors et al., 1973; Van der Vlist et al., 1973; Frijling et al., 1973) concluded—on the basis of a survey among 3 marriage cohorts, married in the years 1958, 1963 and 1968—that the age at marriage had mainly decreased because contacts were now made at an earlier age than before (this factor explained 53.8% of the decreasing age at marriage). The reduced duration of the last 'going steady' period had a smaller effect (30.8%). According to the authors the lower age at the start of the dating period is probably due to the lower age at menarche. With respect to the shorter 'going steady' period, the different significance which religion and religious experience received in the period 1958-1968 are indicated; this could have lifted the barrier, at least partly, for the desire of independence.

From the review above it is clear that unanimous conclusions with regard to the causes of the de-
crease in age at marriage in the Netherlands have not yet been reached. This is caused partly by the fact that empirical data on trends in age at marriage in sub-categories of the population are almost completely lacking (thus making differential analysis impossible), and partly by the insufficient testing of hypotheses.

However, the Census of February 28th, 1971, the results of which have become available some 6 years ago, offers a possibility to examine the influence exerted on the decrease in the age at marriage by three important variables, viz. religious denomination, educational level and degree of urbanization of the municipality in which the couple is living(6).

These variables are frequently cited as important determinants of age at marriage (Frinking and Van Poppel, 1979). In the specific Dutch situation, they are especially relevant because several authors have postulated a relation between the decreasing age at marriage and the changing position of religion, the rise in educational level and the increasing urbanization in the Netherlands.

Decomposition of the trend in the age at marriage allows us to see which influence these three developments have had. Besides, more specific hypotheses regarding decreasing age at marriage can perhaps be deduced by examining which religious denominations, educational levels, and groups of municipalities in particular have experienced a decrease in age at marriage.

Before beginning our analysis the material that is used will first be discussed.

(6) A possibly relevant characteristic of the married couples, the social group to which the husband belongs, cannot be used because this characteristic differs greatly at the time of enumeration from that at the time of marriage.
4. DATA

The data from the 14th General Population Census relate to marriages in which the partners were still living together at the time of the Census (so-called existing marriages) and for whom the marriage was the first one for both of them (7).

The data originate from a random sample of the total census. From all dwellings with 0, 1, 2 up to and including 9 residents, a 10% sample was taken; other dwellings were included integrally. The sample was taken in such a manner that every municipality, district and neighbourhood was represented proportionally. Altogether, nearly 15% of the Dutch population is represented in the sample. Data made available by the CBS concern results of the sample multiplied by the factor 10 (8).

As mentioned earlier, our material only concerns the ca. 200,000 existing first marriages. This carries a number of restrictions, the least of which is that a number of married men and women who were not living with their wife/husband on the date of enumeration (2% of the total number of married women) were not included in the data.

More important is that the characteristics of married persons on February 28th, 1971, need not necessarily be identical to their characteristics at the time of their marriage. Not only is there the possibility of the individuals concerned having changed relevant characteristics (religious denomination, educational level) between the date of marriage and the date of enumeration, but of the total number of people ever married, relatively more people with one characteristic or other could have

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(7) This definition differs from the one used in Table 1.
(8) For a complete description of the sample and the variables that are used see CBS, 1981a.
disappeared because of death, divorce or otherwise (9). A comparison with data on contracted marriages may partly clarify the situation.

From Table 2 it appears that a large percentage of marriages contracted after the War has remained intact up to the date of enumeration. More importantly, the mean age at marriage of the existing marriages differs only slightly (0.2 years at the most) from that of the contracted marriages. A more detailed comparison of the composition by age at marriage of the contracted and existing marriages yields the same conclusion. The drop in average age at marriage is just as sharp for both the contracted marriages and the existing marriages: 2.9 years for men and 2.5 (2.6) years for women.

However, it is questionable whether the concurrence of the age at marriage of existing and contracted marriages is as general in the different sub-categories (religious, educational etc.) of the population. The central question here is whether or not there is transition of marriages from one sub-category to another that is selective by age at marriage. Only partial answers to this question can be given.

- By comparing the results of the 1971 census to those of the 1960 census (CBS, 1969) it can be determined whether, within the marriage cohorts 1945-49, 1950-54 and 1955-59, the distribution of the existing first marriages by the woman's age at marriage underwent the same change between these two dates for the different religious denominations. Compared to 1960 (10) a slight increase in the percent-

(9) It may be expected that after a given marriage duration marriages contracted at a later age will be dissolved by death more often than marriages contracted at an earlier age; for divorce the opposite is true.

(10) The definition of age at marriage used in 1960 implies that the percentages found for the age group 25 years or younger are a little lower than they would have been according to the definition used in 1971.
<table>
<thead>
<tr>
<th>Period of marriage</th>
<th>(1) contracted marriages</th>
<th>(2) existing marriages</th>
<th>(2) : (1) x 100</th>
<th>Mean age at marriage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>men</td>
</tr>
<tr>
<td>1945-49</td>
<td>373,694</td>
<td>316,735</td>
<td>84.8</td>
<td>28.0</td>
</tr>
<tr>
<td>1950-54</td>
<td>376,340</td>
<td>329,040</td>
<td>87.4</td>
<td>27.5</td>
</tr>
<tr>
<td>1955-59</td>
<td>403,683</td>
<td>366,400</td>
<td>90.8</td>
<td>26.9</td>
</tr>
<tr>
<td>1960-64</td>
<td>426,695</td>
<td>397,185</td>
<td>93.1</td>
<td>26.2</td>
</tr>
<tr>
<td>1965-70</td>
<td>633,911</td>
<td>603,845</td>
<td>95.3</td>
<td>25.1</td>
</tr>
</tbody>
</table>

* (Sample 1 in 10 (x10))

Source: Centraal Bureau voor de Statistiek, 14e Algemene Volkstelling, annex woningtelling, 28 februari 1971.
tage of women married before age 25 can be found in 1971 for every religious denomination and for every marriage cohort (11). This increase differs only very slightly for each separate religious denomination. The only clear deviation can be found among 'other religious denominations' in marriage cohort 1945-49.

- As far as the educational level is concerned, it must be observed that this concerns a characteristic which is usually established before 20 years of age, that is, at an age below which in the period 1950-70 only 6-14% of Dutch women and a still lower percentage of Dutch men are married (12).

- The municipality where the married couple resided on February 28th, 1971 conforms probably the least with the situation at the time of marriage. Not only can migration lead to a couple living in a different municipality in 1971 than they lived in when they were married, but the degree of urbanization (13) of the same municipality may have changed between the time of marriage and the time of enumeration. This last factor has less significance if certain categories are taken together. Nevertheless problems remain with regard to the commuter munici-

(11) In marriage cohort 1945-49, the increase is 3.2 to 3.9%, in marriage cohort 1950-54 3.7 to 5.2% and in marriage cohort 1955-59 3.2 to 4.5% if the group 'other religious denominations' is excluded.
(12) For US women Davis and Bumpass (1976) found a (negative) relationship between age at marriage and educational increments after marriage; however, in the period under study age at marriage was 3 to 5 years higher for Dutch women than for women in the US.
(13) In the typology of municipalities according to degree of urbanization, emphasis is placed on those characteristics of urbanization which are related to economic (agricultural) structure. Morphological and functional aspects of urbanization are used as secondary criteria.
palities and urbanized rural municipalities; the municipalities which were considered as 'urbanized rural' in both 1947 and 1971, only have 53.1% of the total number of inhabitants of the urbanized rural municipalities in 1971. For the commuter municipalities this was even only 41.8%. The rural municipalities of 1971 were, however, all classified as such in 1947, whereas the municipalities which were considered as medium and large towns in both 1947 and 1971 contain 89.9% of the population that belonged to this category in 1971 (14).

Our conclusion is that as far as religious denomination and level of education are concerned, the characteristics of the spouses as reported in the Census correspond reasonably well with those at the time of marriage; for the degree of urbanization however the correspondence is less good.

In our analysis of the influence of religious denomination, educational level and degree of urbanization on the decrease in age at marriage, use is made of the existing Central Bureau of Statistics classifications. A number of levels of the variables mentioned were taken together, however, where this was possible without yielding meaningless categories. Table 3 gives a summary of the resulting classification.

The decline in age at marriage is analysed here by comparing the mean age at first marriage (MAFM) of first marriages, existing in 1971 and contracted in the periods 1945-49, 1950-54 and 1965-70. Data for

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Table 3.: Categories of variables used in the analysis

Educational level at the time of enumeration (variable A)
1 = first level
2 = not completed second level first stage
3 = completed general education at the second level
4 = completed vocational education at the second level first stage
5 = completed vocational education at the second level second stage
6 = third level
7 = unknown or enrolled in full-time education

Religious denomination at the time of enumeration (variable B)
1 = Roman Catholic
2 = Dutch Reformed
3 = Calvinist
4 = other religious denominations
5 = no religious denomination

Period of marriage (variable C)
1 = 1965-70
2 = 1950-54
3 = 1945-49

Degree of urbanization of the municipality at the time of enumeration (variable D)
1 = rural municipalities
2 = commuter municipalities
3 = urbanized rural municipalities
4 = medium and large towns

the periods 1955-59 and 1960-64 are also available. The analysis is done separately for men and women.

5. DECOMPOSITION OF THE CHANGE IN AGE AT MARRIAGE

The radical changes which the Dutch society underwent after the Second World War are, to a fair ex-
tent, connected with a sharp increase in urbanization, changes in the composition by religious denomination and a sharp increase in educational level of the Dutch population. It is self-evident that, as a result of these processes, shifts also took place in the composition of the marriages contracted in the different periods, and, as a consequence, in the composition of the existing marriages. In the most recent marriage cohort (1965-70) Roman Catholics e.g. had a 5% higher share in the total number of existing first marriages than in marriage cohort 1945-49 whereas the percentage of Dutch Reformed marriages decreased 7 percentage points. The changes in the composition by educational level amount to a sharp decrease in the percentage of existing marriages of men (-22%) and women (-33%) with only primary education and a sharp increase in the percentage of marriages of men and women with vocational education at the second level, first stage(15).

To what extent may these changes in the composition of the existing marriages - changes which in our opinion form a good reflection of the changing characteristics of the contracted marriages - be held responsible for the drop in age at marriage in the Netherlands? The three-component method proposed by Kitagawa (1955) for the analysis of the difference between two rates can give an answer to this question.

The total difference in MAFM of the existing marriages, contracted in 1945-49, and the existing marriages, contracted in 1965-70, is decomposed into three components:

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(15) It remains to be mentioned that for 17% of all persons not receiving education anymore, it is not known what education they had previously had. There are strong indications that this particularly concerns people with little education. This is probably due to the fairly complicated structure of the census form (Vliegen and de Jong, 1981).
- the first component measures which part of the change in MAFM during the periods 1945-49 and 1965-70 was brought about by changes in the composition of the existing marriages by religious denomination, degree of urbanization and educational level, assuming there was no change in the MAFM of the different sub-groups;

- the second component measures which part of the change can be attributed to changes in the MAFM of the different sub-groups, assuming there were no changes in the composition by educational level, degree of urbanization and religious denomination;

- the third (interaction) component measures changes in both the composition and the MAFM of the different subgroups.

The three-component analysis was also carried out on a more restricted model where degree of urbanization was not taken into account.

From Table 4 it appears that the decline in the MAFM in the Netherlands can almost exclusively be attributed to the decline in the age at marriage in the various sub-groups.

The changing composition of the population - in terms of religious denomination, degree of urbanization and educational level - did not have any real influence on the national trend of the MAFM. This implies that an explanation of the decrease in age at marriage that is based on a mechanistic interpretation of the urbanization process (according to which an increase of the proportion of the population living in urban areas automatically leads to a decrease in age at marriage for the population as a whole) has to be rejected; the same is true for explanations in terms of the increasing educational level of the Dutch society (viewed as a decrease in the proportion of the population that received only primary education), or the increasing level of secularization (conceived as the increasing numerical importance of the group without religious denomination).
### Table 4. Components of the difference between the national MAFM in the periods 1945-49 and 1965-70 (period 1945-49 as standard).

<table>
<thead>
<tr>
<th>Name of component</th>
<th>Men</th>
<th>Women</th>
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<tbody>
<tr>
<td></td>
<td>Actual</td>
<td>Per cent</td>
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<tr>
<td></td>
<td>component</td>
<td>component</td>
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<td>1</td>
<td></td>
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<tr>
<td>Difference in MAFM specific for each educational level and religious denomination (and degree of urbanization)</td>
<td>-2.57</td>
<td>-2.59</td>
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<td></td>
<td>-2.40</td>
<td>-2.40</td>
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<tr>
<td>Difference in the composition by religious denomination and educational level (and degree of urbanization)</td>
<td>-0.27</td>
<td>-0.16</td>
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<td></td>
<td>0.08</td>
<td>0.11</td>
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<tr>
<td>Interaction component</td>
<td>-0.08</td>
<td>-0.11</td>
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<td></td>
<td>-0.18</td>
<td>-0.23</td>
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<tr>
<td>Total difference</td>
<td>-2.92</td>
<td>-2.86</td>
</tr>
</tbody>
</table>

(1) Excluding degree of urbanization
(2) Including degree of urbanization

Source: Centraal Bureau voor de Statistiek, 14e Algemene Volkstelling, annex woningstelling, 28 februari 1971 (Sample 1 in 10 (x10)).
Instead of this, explanations must start from the analysis of the decline in the MAFM in the various sub-groups of the population.

In Table 5, data are presented on the post-war decrease in MAFM for 5 religious denominations, 7 levels of education and 4 groups of municipalities. Clear differences can be seen in the degree in which MAFM declined in the different sub-groups. As far as religious denomination is concerned, Roman Catholic men and women had the largest decrease, whereas 'Other religious denominations' showed a smaller than average decrease. Men which received higher education (third level) experienced the smallest, higher educated women on the other hand experienced the largest decrease in MAFM; conversely, women with only primary education (not completed first stage of second level) showed the largest decline. MAFM decreased most among men and women residing in rural municipalities; the decrease was smallest among couples living in commuter municipalities. In comparison to the decrease in MAFM for the total group of marriages, the differences in the degree in which MAFM in the different sub-groups has declined are very small; deviations from the mean decrease range from +0.2 to -0.7 years (religious denomination), from +0.6 to -0.9 (educational level) and from +0.5 to -0.6 years (degree of urbanization) for males and from respectively +0.2 to -0.4, + 0.4 to -0.2 and +0.3 to -0.4 years for females. The impact of the different variables differs considerably between men and women. Accordingly, our tentative conclusion is that the decline in MAFM is predominantly the effect of time; religious denomination, level of education and level of urbanization do not differentiate the decline much. However, a correct evaluation and quantification of the importance of the different factors can only be given by means of multivariate analysis. This will be done in the following sections. The autonomous effect of the time-period will be quantified, as well as the effect of the other variables separately and combined. Further, the effects of the changing relationships over time
Table 5. Mean age at first marriage by sex and religious denomination, educational level, and degree of urbanization, 1945-49, 1950-54 and 1965-70.

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
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<td>Religious denomination</td>
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<td>- Roman Catholic</td>
<td>28.7</td>
<td>28.1</td>
<td>25.6</td>
<td>3.1</td>
<td>26.1</td>
<td>25.5</td>
<td>23.4</td>
<td>2.7</td>
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<td>- Dutch Reformed</td>
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<td>27.6</td>
<td>25.2</td>
<td>2.9</td>
<td>25.4</td>
<td>24.9</td>
<td>22.8</td>
<td>2.6</td>
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<tr>
<td>- Calvinist</td>
<td>27.9</td>
<td>27.3</td>
<td>25.1</td>
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<td>25.6</td>
<td>25.2</td>
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<tr>
<td>- Other religious denominations</td>
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<td>28.0</td>
<td>25.8</td>
<td>2.2</td>
<td>25.1</td>
<td>25.3</td>
<td>22.9</td>
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<td>- No religious denomination</td>
<td>27.2</td>
<td>26.8</td>
<td>24.7</td>
<td>2.5</td>
<td>24.3</td>
<td>24.0</td>
<td>22.2</td>
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<td>- First level</td>
<td>28.5</td>
<td>27.8</td>
<td>26.1</td>
<td>2.4</td>
<td>25.5</td>
<td>24.9</td>
<td>23.2</td>
<td>2.3</td>
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<tr>
<td>- Not completed second level, first stage</td>
<td>27.5</td>
<td>26.9</td>
<td>24.0</td>
<td>3.5</td>
<td>24.7</td>
<td>24.0</td>
<td>22.1</td>
<td>2.6</td>
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<tr>
<td>- Completed general education at second level</td>
<td>28.0</td>
<td>27.6</td>
<td>25.2</td>
<td>2.8</td>
<td>25.4</td>
<td>25.3</td>
<td>22.9</td>
<td>2.5</td>
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<tr>
<td>- Completed vocational education at the second level first stage</td>
<td>27.3</td>
<td>27.0</td>
<td>24.7</td>
<td>2.6</td>
<td>25.1</td>
<td>24.7</td>
<td>22.6</td>
<td>2.5</td>
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<tr>
<td>- Completed vocational education at the second level second stage</td>
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<td>27.4</td>
<td>25.3</td>
<td>2.1</td>
<td>26.5</td>
<td>26.1</td>
<td>23.9</td>
<td>2.6</td>
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<tr>
<td>- Third level</td>
<td>28.8</td>
<td>28.5</td>
<td>26.8</td>
<td>2.0</td>
<td>28.2</td>
<td>27.3</td>
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<tr>
<td>- Unknown or enrolled in full-time education</td>
<td>28.2</td>
<td>27.9</td>
<td>25.5</td>
<td>2.7</td>
<td>25.4</td>
<td>25.0</td>
<td>23.0</td>
<td>2.4</td>
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<tr>
<td>- Rural municipalities</td>
<td>28.9</td>
<td>28.3</td>
<td>25.5</td>
<td>3.4</td>
<td>25.9</td>
<td>25.3</td>
<td>23.1</td>
<td>2.8</td>
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<tr>
<td>- Commuter municipalities</td>
<td>28.0</td>
<td>27.6</td>
<td>25.7</td>
<td>2.3</td>
<td>25.4</td>
<td>25.0</td>
<td>23.3</td>
<td>2.1</td>
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<tr>
<td>- Urbanized rural municipalities</td>
<td>28.4</td>
<td>27.7</td>
<td>25.3</td>
<td>3.1</td>
<td>25.6</td>
<td>25.0</td>
<td>23.0</td>
<td>2.6</td>
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<tr>
<td>- Medium and large towns</td>
<td>27.7</td>
<td>27.4</td>
<td>25.0</td>
<td>2.7</td>
<td>25.1</td>
<td>24.7</td>
<td>22.6</td>
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<tr>
<td>All existing first marriages</td>
<td>28.1</td>
<td>27.6</td>
<td>25.2</td>
<td>2.9</td>
<td>25.4</td>
<td>24.9</td>
<td>22.9</td>
<td>2.5</td>
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</table>

Source: Centraal Bureau voor de Statistiek, 14e Algemene Volkstelling, annex woningtelling, 28 februari 1971; (Sample 1 in 10 (x 10)).
of religious denomination, level of education or level of urbanization on the MAFM are studied. To disentangle the various effects, log-linear analysis is used. Log-linear models were developed to describe cross-classified categorial data (see e.g. Bishop, Fienberg and Holland, 1975). They suit therefore the data we are dealing with very well. The advantage of log-linear models is that questions that the data are designed to answer may be stated precisely in terms of the parameters of the models. The parameters quantify the relative importance of each of the determinants separately or combined, and help to identify the explanatory variables that are essential to understand the changes that were observed in the MAFM.

In section 6, we present the general results of the log-linear analysis and show the predominance of the effect of time-period on the MAFM.

The predominance of the autonomous time-period effect indicates a relatively high degree of time-period homogeneity of the other variables (i.e., the relationship between an explanatory variable and MAFM does not change over time). However, allowing for time-period heterogeneity of some of the variables enables to allocate to other variables a substantial proportion of the variation in the mean age that cannot be attributed to the autonomous time factor. In section 7, the time-period heterogeneity of the explanatory variables is studied.

6. DETERMINANTS OF THE MAFM

The data base for the log-linear analysis of changes in the MAFM is a multi-way contingency table of mean ages at first marriage. The dimension of the table is equal to the number of cross-classified variables. Religious denomination, educational level and time-period are the explanatory variables selected for further analysis and the data base therefore consists of a three-dimensional table. Five religi-
ious denominations are considered, together with seven levels of education, and three time periods.

The analysis was also carried out by including a fourth variable, namely, the level of urbanization. The inclusion of this variable does, however, not increase the performance of the model. The main discussion is therefore limited to the three explanatory variables mentioned earlier. The results of the analysis of the four-dimensional table are summarized in the last paragraph of this section.

This section consists of four parts. First, the log-linear model of the data is presented. We focus on a model that fully describes the data. Second, the parameters of the model are studied to identify the importance of each of the explanatory variables separately and combined. Third, a log-linear model is selected that is as simple as possible but that adequately describes the data. Finally, the contribution of urbanization as an explanatory variable is discussed.

a. The log-linear model of data

To quantify the effects of the variables and of combinations of variables (joint variables) on the MAFM, the data are described by a log-linear model. The basic idea of log-linear modeling is to express each observed MAFM as a product of several terms (parameters) each representing a particular type of effect on the MAFM of the cross-classified variables. To fully describe the data, the model must consist of as many terms as there are types of effects exhibited by the data. Such a model is referred to as a saturated model. Instead of the product-form, the additive form may be used by taking the natural logarithms of the observed MAFM and of each of the terms (hence the label 'log-linear model'). In analogy to the analysis of variance, the effects are classified in i) overall effect, ii) main effects, iii) first-order interaction effects,
and iv) second-order interaction effects. The overall effect is the natural logarithm of the geometric mean of all the MAFM's. It may be considered an overall size effect. To calculate the mean, no weighting is introduced, since our interest is in the comparison of mean ages (and changes therein) of the various categories. The question of how changes in the composition of categories affect the MAFM is not the subject of study. It was addressed in section 5. The main effects are the effects of the variables separately. They are measured by comparing the natural logarithm of the geometric mean of the MAFM's of a particular variable (summed over other variables) with the logarithm of the overall geometric mean (overall effect). If both means are equal, the particular effect is absent. The first-order interaction effects are the effects of pairs of variables, and the second-order interaction effects are the effects of three variables combined.

The saturated model of a three-way table is (additive form):

\[
\ln \text{MAFM}_{ijk} = \lambda + \lambda_A^i + \lambda_B^j + \lambda_C^k + \lambda_{AC}^{ik} + \lambda_{BC}^{jk} + \lambda_{AB}^{ij} + \lambda_{ABC}^{ijk}
\]

where

- \( \text{MAFM}_{ijk} \) is the MAFM in time-period \( k \) for the group of people with religious denomination \( i \) and educational level \( j \),
- \( \lambda \) is the overall effect,
- \( \lambda_A^i \) is the main effect of variable A (level of education)
- \( \lambda_B^j \) is the main effect of variable B (religious denomination)
\( \lambda^C_k \) is the main effect of variable C (time-period),

\( \lambda^{AC}_{ik} \) is the effect of the combined variable AC (first-order interaction effect exhibited by the A-C matrix),

\( \lambda^{BC}_{jk} \) and \( \lambda^{AB}_{ij} \) are also first-order interaction effects,

and \( \lambda^{ABC}_{ijk} \) is the second effect of the combined variables ABC (second order interaction effects).

b. Interpretation of the parameters (16)

The overall effect is 3.291 for men and 3.206 for women, indicating an overall, unweighted, mean age (geometric) of 26.9 years for men and 24.7 years for women. To identify the determinants of deviation from this grand mean age, we must consider the effects of each of the variables and combined variables. A variable has no effect if the associated log-linear model parameter \( \lambda \) is zero. To test the zero hypothesis \( H_0 \) that a particular \( \lambda \) is nil, Goodman (1978, p. 70 and 149) suggests a standardization of \( \lambda \) by dividing the estimated \( \lambda \) parameter by its variance. Since the cells of the contingency table do not contain counts in large a sample but mean ages, the standardized \( \lambda \)-values do not have the very useful statistical properties that Goodman derived. The standardized \( \lambda \)-values of the saturated

(16) The computer program used was ECTA. The complete set of parameters of the saturated model is contained in NIDI Working Paper No. 31, on which this paper is based.
model are however indicative for the importance of the effect and are useful in the selection of an adequate unsaturated model.

If we look at the parameters of the multiplicative model, we see that in the period 1965-70, the geometric mean of the MAFM for males was \( \tau \times \tau_1^0 = 26.882 \times 0.943 = 25.25 \) years. In other words, in the later period, the MAFM was 5.7% below the overall mean (1.53 years). In the earlier period (1945-49) the MAFM was 2.6% higher than the overall mean (i.e. 0.97 years) and 9.9% of the overall mean above the MAFM of the later period (equivalent to 10.9% of the MAFM of the earlier period). No other variable affects the MAFM as time does. For men, the \( \lambda \)'s of the other variables are not significant. For women, the \( \lambda \) associated with higher education (\( \lambda^A_6 \)) is significant. Higher education increases the MAFM of women with 8.6 per cent (\( \tau^A_6 = 1.086 \)), which is about 2.1 years.

A remarkable observation is the negligible effect of the joint variables AB, AC, BC. Because the log-linear model is hierarchical, the absence of first-order interaction effects (effects of combined two variables) implies the absence of higher-order interaction effects. As a consequence, the ABC-effects will also be negligible, as can be concluded from the magnitudes of the standardized \( \lambda^{ABC} \)-parameters. The effect of combining two variables amounts to a maximum of 2.3% for men (\( \tau^{AB}_1 = 1.023 \)), which is somewhat more than half a year, and to 2.4% for women (\( \tau^{AB}_1 = 1.024 \)). This indicates that Calvinists, who generally have an MAFM equal to the mean (\( \tau^B_3 = 0.993 \)), have a higher MAFM when they have had the lowest level of education (2.3 and 2.4% respectively above the MAFM of persons with the lowest level of education).

The absence of the effects of the joint variables AC and BC (below 2 %) indicates the time homogeneity of the effect on the MAFM of religious denomination and
level of education. In other words, during the post-war period, only minor changes can be observed in the way in which religious denomination and/or level of education affected the MAFM.

c. Selection of an appropriate log-linear model

The absence of significant interaction effects between the explanatory variables implies that several of the parameters of the saturated log-linear model are close to zero and may be omitted from the model without much effect on the descriptive potential of the model. Table 6 shows the results of applying different models to the set of MAFM data. The simplest model assumes that the MAFM is the same for the subgroups of the population (26.919 years for males and 24.734 years for females) (17). The likelihood ratio is 7.67 for males and 10.95 for females, indicating a greater homogeneity of the MAFM among males. The likelihood ratio should be interpreted with care. The small values of $L^2$ in Table 6 do not necessarily mean an extremely good fit. Changes in mean ages at first marriage occur within a small range only. The error of estimation will therefore be small compared to the mean age. The significance of the $L^2$ lies not in its absolute value; it is however useful to compare different models.

The importance of the time factor for the MAFM is also demonstrated in Table 6. Adding a time-period effect to the overall effect reduces the $L^2$ from 7.67 to 2.81 for males and from 10.95 to 5.61 for females (Model $H_3$ versus $H_0$). In other words, the time factor explains 64% of the variation in MAFM for males and 49% for females ($100 \times \frac{L^2(H_0) - L^2(H_3)}{L^2(H_0)}$).

The autonomous time-period effect is therefore less significant for females than for males. Further-

(17) These values are the unweighted overall mean ages.
Table 6. Hierarchical log-linear models applied to the contingency table of MAFM by level of education (A), religious denomination (B) and time-period (C)

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Model</th>
<th>Degrees of freedom</th>
<th>Likelihood ratio $\chi^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$H_0$</td>
<td>equal cell value</td>
<td>104</td>
<td>7.67</td>
</tr>
<tr>
<td>$H_1$</td>
<td>{A}</td>
<td>98</td>
<td>6.11</td>
</tr>
<tr>
<td>$H_2$</td>
<td>{B}</td>
<td>100</td>
<td>6.96</td>
</tr>
<tr>
<td>$H_3$</td>
<td>{C}</td>
<td>102</td>
<td>2.81</td>
</tr>
<tr>
<td>$H_4$</td>
<td>{A,B,C}</td>
<td>92</td>
<td>0.66</td>
</tr>
<tr>
<td>$H_5$</td>
<td>{AB,C}</td>
<td>68</td>
<td>0.33</td>
</tr>
<tr>
<td>$H_6$</td>
<td>{AC,B}</td>
<td>80</td>
<td>0.46</td>
</tr>
<tr>
<td>$H_7$</td>
<td>{A,BC}</td>
<td>84</td>
<td>0.61</td>
</tr>
<tr>
<td>$H_8$</td>
<td>{AB,AC}</td>
<td>56</td>
<td>0.14</td>
</tr>
<tr>
<td>$H_9$</td>
<td>{AB,BC}</td>
<td>60</td>
<td>0.29</td>
</tr>
<tr>
<td>$H_{10}$</td>
<td>{AC,BC}</td>
<td>72</td>
<td>0.41</td>
</tr>
<tr>
<td>$H_{11}$</td>
<td>{AB,AC,BC}</td>
<td>48</td>
<td>0.09</td>
</tr>
<tr>
<td>$H_{12}$</td>
<td>{AB}</td>
<td>70</td>
<td>5.18</td>
</tr>
<tr>
<td>$H_{13}$</td>
<td>{AC}</td>
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<td>$H_{14}$</td>
<td>{BC}</td>
<td>90</td>
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<tr>
<td>$H_{15}$</td>
<td>{ABC}</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

more, for females, the time factor cannot be considered the only major determinant of the MAFM. The level of education has also a significant effect on the MAFM (see $H_1$); alone, it explains 39% of the variation in MAFM of females. The large effect of the level of education on the MAFM of women is not unexpected; recall that the $\chi^A$-value associated with higher education was statistically significant.

Remarkable is the very small effect of the religious denomination on the MAFM. It alone explains only 13% of the variation in the MAFM for males and 8% for females.
The low interaction effect between the explanatory variables is also apparent in Table 6. All interaction effects combined account for only 9% of the total variation in the MAFM for males (0.66/7.67) and 5% for females (0.52/10.95) (the $L^2$ that is not explained by the model of mutual independence (A, B, C) is explained by the interaction between the explanatory variables).

The independence model

$$\ln \text{MAFM}_{ijk} = \lambda + \lambda_i^A + \lambda_j^B + \lambda_k^C$$

therefore gives an adequate description of the data. Although the interaction effects contribute only marginally to the explanation of the variation in the MAFM, it is worthwhile to study these effects, in particular the time-dependence of the explanatory variables. The question whether the effects on the MAFM of each of the explanatory variables change with time, will be answered in the next section.

d. Relevance of level of urbanization as an explanatory variable

The level of urbanization has only a very limited effect on the MAFM. This conclusion can be derived from the study of the parameters of the log-linear model and from the evaluation of the total variance in the MAFM that is explained by the urbanization variable. The standardized values of the main effects of the level of urbanization in the saturated model range from -0.387 to 0.729 for males and from -0.252 to 0.489 for females. The values are remarkably low. The parameters also show that in rural municipalities, the MAFM of males is 1.2% above the geometric mean (26.97 years) and in medium and large towns 0.6% below the mean. For females, the differences of the mean (24.72 years) are respectively 0.8 and 0.3%. Again, this illustrates the absence of an urbanization effect.
The level of urbanization explains only 3.6% of the total variance of the male MAFM; for females, the explained variation is even less (2.1%). If urbanization is included in the model, the autonomous effect of time on the MAFM drops from 64 to 47% for males and from 49 to 41% for females. The difference may in part be attributed to the time-heterogeneity of the level of urbanization and to the higher-order interaction effects (18).

7. TIME-PERIOD HETEROGENEITY OF THE EFFECTS ON THE MAFM OF THE EXPLANATORY VARIABLES

In the previous section, the importance of the autonomous time factor was demonstrated. Most of the variation in the MAFM since the Second World War can be associated with the time factor and must therefore be explained by factors not accounted for by changes in the level of education, religious denomination or degree of urbanization.

Another observation, made in the previous section, was the relative time-period homogeneity of the effects of the explanatory variables. What this means is that the effect on the MAFM of each of the explanatory variables does not change with the time-period. In Table 6, it was shown that level of education, religious denomination and time-period, taken separately, sufficiently explain the variation in the MAFM (hypothesis $H_4^* : L^2$ is 0.66 for males and 0.52 for females). We could therefore conclude that the mutual independence model, which contains the main effects only, provides an adequate description of the MAFM data. An extension of this simple unsaturated model to account for the time-period heterogeneity of the effects, does not improve the performance of the model much. It may however be

(18) The results of the inclusion of the urbanization variable are not shown here, but can be found in NIDI Working Paper No. 31.
useful to investigate the time-period heterogeneity of the effects of level of education and religious denomination because it helps to explain the variation in the MAFM that cannot be explained by the time-period only. There are also remarkable differences in the time-period heterogeneity of the effects between males and females.

a. Time-period heterogeneity of the effect of the level of education (variable A)

Recall that the time-factor explains 64% of the total variation in the MAFM for males and 49% for females (hypothesis H3 in Table 6). The three explanatory variables taken separately explain respectively 91 and 95% of the total variation in the MAFM (hypothesis H4).

Of the unexplained variation in the MAFM for males, 30% can be explained by the time-period heterogeneity of the effect of the level of education \(100 \times \frac{L^2(H_6) - L^2(H_4)}{L^2(H_4)}\).

For females, the time-period heterogeneity of the effect of this variable explains only 10%.

The way the level of education affects the MAFM, changes therefore more rapidly over time for males than for females. The impact of the time-period heterogeneity of the level of education-effect on the MAFM can be measured from the \(\tau^{AB}\)-parameters, which are the parameters of the multiplicative model and are computed by simply taking the exponents of the \(\lambda^{AB}\)-parameters.

For instance, \(\tau^{AC}_{23} = 1.015\) and \(\tau^{AC}_{21} = 0.980\); in the absence of the time-period heterogeneity of the level of education, the MAFM would be 27.31 / 1.015 = 26.91 years in the period 1945-49 and 23.98 / 0.98
= 24.47 years in the period 1965-70 (19). The decline would have been 2.44 years or 0.89 years less than in the presence of the time-period heterogeneity of the level of education-effect. We may therefore conclude that this time-period heterogeneity accounts for 27% (0.89 years) of the change in the MAFM of the group of people with not completed second level (first stage) education. This is the highest effect of the time-period heterogeneity of the level of education that can be found in the data.

The highest time-heterogeneity effect for males is found in educational level 4 (completed vocational education at the second level, first stage). It accounts for 0.28 years or 10% in the change of the MAFM.

b. Time-period heterogeneity of the effects of religious denomination (variable B)

The impact on the MAFM of religious denomination is remarkably stable over time. The time-period heterogeneity of the effect of this variable can explain only a small share of the variation in the MAFM that cannot be explained by the mutual independence model (Hypothesis H₄). The share is 10% for females and 8 for males \( \{100 \times \left[ L^2(H_7) - L^2(H_4) \right] / L^2(H_4) \} \). The effect for females is highest for group four, 'other religious denominations'.

The size of the time-period effect and the inconsistency (positive effect in the second period, negative effects in the first and third periods) do not allow to draw a conclusion.

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(19) To purge the data of the effect of interaction between time-period and level of education, the observed MAFM is divided by the appropriate \( \tau \)-parameter (compare Clogg, 1978).
The combination of the time-period heterogeneities of the level of education and the religious denomination effect explains 38% (males) and 19% (females) of the variation in the MAFM that cannot be explained by the mutual independence model \(100 \times \frac{L^2(H_{10}) - L^2(H_4)}{L^2(H_4)}\). Note that hypothesis \(H_{10}\) is the hypothesis of conditional independence (A independent of B, given C) and assumes that in each of the three periods, the effect on the MAFM of the level of education is independent of the effect of the religious denomination. It can be seen from Table 6 that this assumption does not hold. Of the variation in the MAFM that cannot be explained by the mutual independence model, 50% (males) and 44% (females) can be explained by the interaction between level of education and religious denomination \(100 \times \frac{L^2(H_5) - L^2(H_4)}{L^2(H_4)}\). In the next section, the time-period heterogeneity of the joint variable AB will be studied.

c. Time-period heterogeneity of the joint variable
level of education and religious denomination.

The joint variable represents the socio-cultural characteristics of the population. Socio-cultural change is identified and quantified by the time-period heterogeneity of this joint variable. It should be stressed that the time-period heterogeneity is very small since model \(H_5\), which represents time-period homogeneity of the joint variable AB, fits the data exceptionally well \((L^2(H_5) = 0.33\) for males and 0.23 for females). It is however of interest to look at the time-period heterogeneity. The variation in the MAFM that the assumption of the time-period homogeneity of the joint variable AB cannot explain is 0.33 for males and 0.23 for females. The unexplained variation must be attributed to the time-period heterogeneity.

In this section, we try to disentangle the time-period heterogeneity of the joint variable AB. The central question is which variables cause the time-
period heterogeneity of AB. From our previous analysis, we may expect that (at least for males) the time-period heterogeneity in the level of education contributes considerably to the time-period heterogeneity of AB. The total time-period heterogeneity can be considered in three distinct parts. Table 7 examines the parts of the total effect of the time-period heterogeneity, which result from a) time-period heterogeneity in level of education alone, b) time-period heterogeneity in religious denomination alone, and c) time-period heterogeneity in residual factors unexplained by a) and/or b); the latter represents the time-heterogeneity in the relationship of level of education to religious denomination. It presents two procedures to study time-period heterogeneity. In part A, we first allow time heterogeneity in religious denomination to explain the data and then, after controlling for the time heterogeneity in religious denomination, we examine the time heterogeneity in level of education. In part B, the procedure is reversed. This approach is adapted from Clogg (1979, Chapter 4).

Table 7, part A, shows that time heterogeneities in level of education of males and females account for 60 to 22% respectively of the total effect of time-period heterogeneity in the table of MAFM. In other words, two-thirds of the time-period heterogeneity in the MAFM of males may be attributed to the changes in the level of education of males. For females, changes in level of education are of less influence on the MAFM. Of more importance is the changing relationship of level of education to religious denomination. About 56% of the total time heterogeneity in the MAFM for females is explained by the relation between the two variables. Only 22% can be explained by changes in the level of education as such (aggregated over all religious denominations) and another 22% is due to changes in religious denominations. What this means is that for females the way in which changes in level of education between 1945-49 and 1965-70 affected the MAFM differed considerably between religious denomina-

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tions. Such a difference cannot be observed for males.

Part B of Table 7 gives a picture that is similar to Part A. If we do not allow the effect of changing religious denomination to be taken out first, then the share of the changing level of education in the total time-period heterogeneity is somewhat less for males (58%). In other words, the time-period heterogeneity of religious denomination is somewhat higher if we first allow the effect of changing level of education to be taken out. For females, no difference occurs. Table 8 compares the estimates of the three component parts of the total time-period heterogeneity. It shows that the changing level of education accounts for between 58 and 61% of the total time-period heterogeneity in the MAFM of males. For females, the changing relationship of level of education to religious denomination is the important component of the total time-period heterogeneity in the MAFM. We should stress once again, however, that the time-period heterogeneity of both the explanatory variables is small. It accounts only for 4.3% of the total variation in the MAFM for males (0.33/7.67) and 4.7 for females (0.52/10.95).

From the results of the decomposition of the decrease in MAFM it appeared that the changing composition of the Dutch population - as far as religious denomination, level of education and degree of urbanization are concerned - could not explain the observed trend in age at marriage. Next, log-linear analysis proved that the decline in age at marriage could not be explained by a changing impact of religious denomination, educational level and degree of urbanization on age at marriage. Therefore, explanations for the decrease in MAFM cannot be found in changes that only took place among members of specific religious denominations, in a restricted group of municipalities or among people with a specific level of education. If our analysis has proved anything, then it is that explanations for the decline in age at marriage have to be found in those
Table 7. Partitioning the effect of time-period heterogeneity in the explanatory variables on the variation in the mean age at first marriage between the periods 1945-49 and 1965-70.

Part A. Time-period heterogeneity in level of education, given time-period heterogeneity in religious denomination

<table>
<thead>
<tr>
<th>Source of variation</th>
<th>Degrees of freedom</th>
<th>Likelihood ratio ($L^2$)</th>
<th>Share [ $L^2/L^2(H_5)$ ]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>males</td>
<td>females</td>
</tr>
<tr>
<td>1. Total effect of time-period heterogeneity [$L^2(H_5)$]</td>
<td>68</td>
<td>0.33</td>
<td>0.23</td>
</tr>
<tr>
<td>1.a Unexplained by {AB, BC} [$L^2(H_9)$]</td>
<td>60</td>
<td>0.29</td>
<td>0.18</td>
</tr>
<tr>
<td>1.a.a Unexplained by {AB, BC, AC} [$L^2(H_{11})$]  - explained by {A, B, C}</td>
<td>48</td>
<td>0.09</td>
<td>0.13</td>
</tr>
<tr>
<td>1.ab Explained by {AB/BC, AC} (L^2(H_9) - L^2(H_{11}))</td>
<td>12</td>
<td>0.20</td>
<td>0.05</td>
</tr>
<tr>
<td>1.b Explained by {BC/AB, C} (L^2(H_5) - L^2(H_9))</td>
<td>8</td>
<td>0.04</td>
<td>0.05</td>
</tr>
<tr>
<td>Source of variation</td>
<td>Degrees of freedom</td>
<td>Likelihood ratio $L^2$</td>
<td>Share $[L^2/L^2(H_5)]$</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------------</td>
<td>--------------------</td>
<td>------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>males</td>
<td>females</td>
</tr>
<tr>
<td>2. Total effect of time-period heterogeneity $[L^2(H_5)]$</td>
<td>68</td>
<td>0.33</td>
<td>0.23</td>
</tr>
<tr>
<td>2.a Unexplained by ${AB, AC} [L^2(H_8)]$</td>
<td>56</td>
<td>0.14</td>
<td>0.18</td>
</tr>
<tr>
<td>2.aa Unexplained by ${AB, AC, BC} [L^2(H_{11})]$</td>
<td>48</td>
<td>0.09</td>
<td>0.13</td>
</tr>
<tr>
<td>2.ab Explained by ${BC/AB, AC}$ $L^2(H_8) - L^2(H_{11})$</td>
<td>8</td>
<td>0.05</td>
<td>0.05</td>
</tr>
<tr>
<td>2.b Explained by ${AC/AB, C}$ $L^2(H_5) - L^2(H_8)$</td>
<td>12</td>
<td>0.19</td>
<td>0.05</td>
</tr>
</tbody>
</table>
Table 8. Components of time-period heterogeneity, obtained by two different partitioning methods

<table>
<thead>
<tr>
<th>Component</th>
<th>Partitioning method</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$(H_5 \rightarrow H_9 \rightarrow H_{11})$</td>
</tr>
<tr>
<td></td>
<td>males</td>
</tr>
<tr>
<td>Time heterogeneity in level of education</td>
<td>0.61</td>
</tr>
<tr>
<td>Time heterogeneity in religious denomination</td>
<td>0.12</td>
</tr>
<tr>
<td>Time heterogeneity in relationship of level of education to religious denomination</td>
<td>0.27</td>
</tr>
<tr>
<td>Total time heterogeneity of the explanatory variables</td>
<td>1.00</td>
</tr>
</tbody>
</table>
factors that changed post-war Dutch society as a whole. Taking this into account, we will, by way of conclusion, try to discuss some factors that played a part in the decline of age at marriage after the Second World War.

8. A TENTATIVE EXPLANATION

The central argument in our explanation is that during the period 1945-70 people have become relatively more free in the timing of marriage as structural conditions impose fewer obstacles to marriage than was once the case. On the one hand, it is easier to meet the material and financial demands which marriage imposes and which provided grounds for delay; on the other, a number of structural constraints upon marriage have been relaxed. That people have become more free in their timing decision has lead, in our view, to a younger age at marriage as marriage seemed an inevitable and attractive state to most people in the Netherlands during the post-war period (20).

In a general sense it can be stated that in the period 1945-70 it has become easier to meet the financial and material implications of the demand for economic, domestic or residential independence that is associated with the married state.

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(20)This becomes evident from several surveys (Friming and Van Poppel, 1979). Marriage is viewed as attractive because 'marriage has come to be connected, in terms of both ideas and practice, to the attainment of various rights and status advantages which are themselves highly valued in society; it is taken for granted that only married people have a proper right to have children; marriage is both ideologically and practically associated with the social right to be treated as a full adult and an independent member of society; marriage slots people into their rightful places as adults in society' (Busfield and Paddon, 1977).

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a. Economic independence

A crucial part here is played by the considerable economic growth (21) coupled with the transformation of Dutch society that took place in the Fifties and Sixties; rising levels of income, low rates of unemployment, decreasing importance of the primary sector of the economy, the growing labour force participation of women, the increase of social security, state provisions for education, medical care etc. and the growth of credit financing are among the aspects that are of special relevance here.

The average income per income-earner (purchasing power 1975) increased from 10,736 guilders (1948-49) via 11,778 (1950-54) to 18,448 (1965-70). The gap between own income and the amount of money that is subjectively considered necessary to make ends meet has more than doubled between 1960 and 1970 (NIP0, 1970). Accordingly, in a shorter period of time than before, the savings could be realized that are necessary for purchasing those material goods and services that people feel are necessary or desirable for married life. Moreover, through the growth of credit financing the individual does not always have to wait to purchase goods and services; instead, he can use his prospective income to gain immediate

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(21) According to Ermisch (1981), the net effect of economic growth on the incentive to marry is ambiguous. To be sure, higher real incomes create a greater demand for the characteristics associated with marriage and reduce the financial constraints on the ability to set up a separate household, but a general rise in real wages also raises the cost of searching for a partner and the cost of producing the characteristics associated with marriage by raising the value of one's own time. In addition, it increases the expected degree of labour force participation by married women which in turn reduces the gains from marriage associated with the household division of labour.
credit (Busfield and Paddon, 1977). Loans granted for time-purchase finance increased since 1957-58 from 95 million guilders a year to more than 200 million in 1970. The number of loans granted for consumer credit decreased after the war but the average amount per loan increased tenfold (CBS, 1979).

In other respects too, it has become easier to obtain the goods and services that people feel are desirable for family life. Because the state and related institutions now provide a number of services for family members (e.g. education and medical care) that previously had to be paid for directly by individuals, the forethought, planning and saving that was necessary for making these provisions are no longer necessary. Important is also that 'the state now intervenes to compel almost all workers to make provision for those contingencies (illness, unemployment, unfitness for work) that previously only the prospect of marriage may have elicited; in that respect marriage is made less of a hurdle' (Busfield and Paddon, 1977).

In yet another respect, the introduction of the Social Security System may have had a decreasing effect on the age at marriage. The introduction of the General Old Age Pensions Act (1957), the General Widow's and Orphans' Act (1959), the General Assistance Act and the abolishment of the legal maintenance obligation of children towards their parents freed young people from the burden of caring for parents which were left alone after the marriage. Economically as well as morally, marriages at younger ages were made easier by this (Modell et al., 1978).

Unemployment in the Netherlands was very low during the post-war period and the registered labour reserve (in % of the total labour force) remained nearly all the time below the pre-war figures; the rate of unemployment decreased from 2.13% (1947-49) and 2.60% (1950-54) to 1.58% (1955-59) and 0.86%,
and only after 1966 an increase took place (1.28% in 1965-70) (CBS, 1979). As a consequence of this relative economic security and of the minimum of existence that was guaranteed by the social security system, people were inclined to show less concern about their job prospects (22). Their future material circumstances and the future financial burden of married life worried them less (23) and for that reason did not lead any longer to postponement of marriage (Busfield and Paddon, 1977). Moreover, the number of jobs which provide stable, predictable careers (because they were not subjected to market fluctuations), e.g. in the public sector, in the educational system and with the government, increased considerably.

After the Second World War important changes, which had consequences for the age at marriage, also took place in the structure of the labour force. The proportion of the labour force working in agriculture and fishery declined from nearly 20% in 1947 to 10% in 1960 and to 6.7% in 1971 (Ellemers, 1980). Therefore two occupational groups which traditional-

(22) The higher level of prosperity and the extension of the social security system not only provided the lower class with a guarantee for a minimum existence but also offered more room for 'self-expression' to the middle classes; rules of conduct which emphasized 'control' and 'curbing of passions' made room for these new values because the fear of sinking socially became less oppressing (Brinkgreve and Korzec, 1978). The effect on the age at marriage may in both cases have been the same.
(23) Soberness and thrift, bitter necessity and important virtues in the Fifties, devaluated, due to the rapid increase of spending possibilities. Indicative for this is that in the advice column of Margriet (the most popular women's weekly magazine in the Netherlands) the awareness that poverty, illness and misfortune are forever threatening, is disappearing in the Sixties and Seventies (Brinkgreve and Korzec, 1978).
ly have been characterized by late marriage - agricultural labourers and farmers (the latter otherwise marrying late for different reasons) (24) - nearly disappeared.

The possibilities of employment for married women increased very strongly in the post-war period; the percentage of married women in the labour force increased from 4.1 (1947) via 10.1 (1960) to 21.2% (1971) for women aged 15-19, from 3.7 via 9.2 to 26.3% for women aged 20-24, and from 2.4 via 5.2 to 16.0% for women aged 25-29 (Berends and Boelmans-Kleinjan, 1979). Economic independence of the future couple can in this way be realized more easily and at an earlier age than in a situation in which only a married man can earn an income. However, the changing conception of the woman's role - marriage does not any longer mean the giving up of the role of working woman (25) - plays a part here too because for a number of women the forced termination of labour force

(24) For agricultural labourers, the low income and the unfavourable housing situation (old dwellings, tied to a farm) play a part; for farmers the waiting period in which the financial and spatial problem, connected with the acquisition of a farm, has to be solved.

(25) The passive role for the female partner to the marriage in this part of the explanation (a woman's job induces a man to feel that he could 'afford' to marry whereas it can as well encourage a woman to feel that she could 'afford' not to marry) (Preston and Richards, 1975) is in line with the dominant ideology of the period.
participation may have been a reason for postponement of marriage (26).

b. Residential independence

In the post-war period, important changes took place in the age at which married couples were able to meet an essential demand of married life (27), to with a place of their own.

(26) Our interpretation of the consequences of the increased labour force participation differs from that of Ermisch who, following Becker, states that, as economic opportunities for women develop so that their earning capacity rises relative to men's, the cost of accepting the traditional marital division of labour increase and the advantages of marriage for women diminish so that women will marry later and less frequently (Ermisch, 1981). Rises in women's wages relative to men's and a higher degree of lifetime labour force participation, therefore, tend in his opinion to produce postponement of marriage. Dutch data with regard to the trend in women's wages relative to men's do not lend themselves to this conclusion. For, only between 1952 and 1957, the gross weekly earnings of adult female industrial workers increased less than those of male workers of the same age; since 1963, however, women's wages have risen more than men's (+161% with regard to 1961 against +121% among men) whereas the age at marriage continued to decline. Among minor industrial workers (younger than 21) however, the rise in women's wages (with regard to 1947) is less than among men.

(27) In the survey conducted by Moors et al. (1973), for nearly 60% of the married women, having a home of their own was an important enough reason to postpone marriage.
Compared to the years directly after the war, the possibility of acquiring a house for those who wish to marry has clearly increased. Directly after the war, there was a very great housing shortage due to, among others, war damage. After the Second World War the government started playing an active part in the area of housing production and its financing. Compared to 1948-49, the average annual number of newly built houses ready for occupation had increased by 53% in 1950-54 and by 208% in 1965-70. In 1948-49, only 47 newly built houses became ready for occupation for every 100 marriages; in 1950-54 the number had risen to 70 and in 1965-70 to 105 (CBS, 1979).

When judging the effect of the improved housing situation on the decline in age at marriage, the changes in the markets for purchase and rented houses must be considered separately (Busfield and Paddon, 1977). Having a house of one's own was, until 1956, only possible for workers on own account and the professions (Van der Windt, 1978); the majority of employees and labourers did not have a sufficiently secure job and/or a sufficient income to obtain a mortgage and lived in rented houses. Postponing marriage in order to wait for better housing was not really worth it because the accumulation of a deposit was impossible and no sharp rise in income after 23 years of age was to be expected. In addition, being dependent on rented council and housing association houses had a stimulating effect on marrying young and having children; by marrying and having children one did not only create the family unit for which most of the houses were designed, but also produced overcrowding so that the chances for acquiring a house (by gaining a greater
urgency) increased (28). However, for those who wished to delay their marriage until they acquired a house, the increased housing production meant that there was the possibility of getting a house earlier and getting married earlier. Government measures meant to stimulate the purchase of houses which meant that after 1956 acquiring a house of one's own came within reach of larger groups of employees, and, to a lesser extent, labourers. This did not necessarily lead to delaying marriage; both government stimulation and the relatively low rate of interest, the continual strong expectation of rising prices, the easy obtainment of mortgages, the increasing number of jobs offering 'security' and the favourable income perspectives made marrying and purchasing a house possible at a young age. The number of new registrations of mortgages on real property increased sharply in the post-war period from an average of 44,600 per year (1945-49) to 82,600 (1950-54) and 156,000 (1965-70) (CBS, 1979).

The improvement of the total housing situation can be seen clearly in the results of various housing shortage surveys and public opinion polls. While more than 30% of Dutch people said they experienced personal difficulties because of the lack of housing in 1945-49, this figure dropped to 19-25% in the years 1950-54 and to 11-15% in the years 1965-70 (NIP0, 1970). Furthermore, it appears that the percentage of all households living in with others because of the housing shortage dropped from 7% in 1956 to 1% in 1970. Living in occurred mainly in the younger and lower income groups (Den Draak, 1974).

(28) Besides, the parental generation, with fewer children of their own, was in a better position to provide lodging for their married children; the average number of persons per room decreased from 0.95 in 1930 to 0.90 in 1947, 0.80 in 1956, 0.76 in 1960, 0.72 in 1964, 0.67 in 1967 and 0.65 in 1971 (CBS, 1979).
c. Other structural constraints

Different from the financial and material constraints that we have just discussed, are the obstacles imposed to marriage by marriage market inefficiencies. According to Becker (1973), a relative scarcity of unmarried members of the opposite sex with the 'preferred' age-characteristics enhances the (time)cost of search and will lead to postponement of marriage.

Large changes in the relative scarcity of one of the sexes did not take place in the Netherlands in the post-war period, however (the number of unmarried women aged 15-29 per 100 unmarried men aged 20-34 varied between 129 and 136 in the period 1947-60, increased to 150 in 1965 and decreased again to 137 in 1970).

The sex ratio apparently was no barrier for a decrease in the age at marriage of both sexes. Much more important is, however, that the selection criteria for the choice of possible marriage partners have been widened in the Fifties but especially in the Sixties. Religiously mixed marriages are more accepted now by public opinion (in 1959, 60% of the Dutch population disapproved of these marriages whereas in 1970 this was only 21%; NIPO, 1970) and occur more frequently too. Among marriages contracted in 1950-54 and still existing in 1971 only 3.4% of Roman Catholic, 9.6% of Dutch Reformed and 5.1% of the Calvinist men had a religiously mixed marriage; in 1965-70, these percentages were 8.8, 20.0 and 12.2 respectively (CBS, 1981a). Socially mixed marriages increased too in the period 1954-72 (Van Tulder, 1972). Both factors may have contributed to the decline in the age of marriage of men and women.

Contraceptive technology, which has become available, has clearly weakened a 'structural constraint' in the marriage decision; the connection between getting married and promptly having children has
become looser which means that it now is less important to postpone marriage. The effect of this was not very significant, however. It is true, the percentage of marriages in which a child was born in the same year as the marriage or the subsequent year dropped between 1950-54 and 1965-70 (from 66.8 to 64.8% (among the group married before 20 years of age), from 56.7 to 42.8% (age at marriage 20-24 years) and from 47.8 to 40.0% (age at marriage 25-29 years) (CBS, 1974)), but this decline took place especially after 1965.

Another (emotional) risk that once was associated with marriage, viz. the practically everlasting character of it, decreased considerably in the post-war period. Between 1947 and 1970, the percentage of the population that wanted to facilitate divorce rose from 13 to 50% (NIPO, 1970); the divorce rate, however, increased only at the end of the Sixties (CBS, 1976).

d. Changing position of young men and women

The considerable economic growth and the extension of the social security system connected with it, new foreign-political developments and demographic trends brought about important changes in the position of the youth that had a direct influence on the age at marriage.

Of paramount importance is that economic independence from the parents came within reach of a growing proportion of boys and girls. The rise in income, of which the whole labour force has profited but which was especially strong among minor males(29) (as far as gross weekly earnings of industrial workers are concerned), in particular after 1963; a system of grants for a growing number of students (2,507 grants in 1950-51, 11,616 in 1960-61 and

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(29) Wages of minor female workers lag behind those of their adult colleagues.
29,588 in 1969-70) with higher average amounts (from 946 to 3,536 guilders) also for married students; social security benefits on which the youth too could fall back, all this layed the foundation for the decline of the age at which the youth reached economic independence, the important condition for marriage. Sanctions against cutting loose from parents (30) and against early marriages, which for an important part depend on the degree in which children depend on their parents for their subsistence, are losing their effect in this situation (Brinkgreve and Korzec, 1978).

Parental vetoes to the marriage of their children or the parents' actual command over the income of their young adults were gradually considered socially unacceptable. An analysis of the advice column in the Netherlands' most popular women's weekly magazine, demonstrated that between 1960 and 1970 young people were taken more seriously as far as their desires and amorous feelings were concerned than in the years 1940-60 (Brinkgreve and Korzec, 1978). The general greater independence of children reduced a possible barrier against early marriage (31).

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(30) Strong changes in norms and values with regard to sexuality, politics, religion etc., which took place in this period, will at the same time have lead to a growing away from the parental home at an earlier age and to a more frequent occurrence of conflicts between parents and children; this may have caused the wish to be free of the parents to come at an earlier age and with higher intensity. Marriage as a way to independence and as a solution for parent-child problems then comes into view at an earlier age.

(31) In 1958 an alteration of the law was accepted by which persons under the age of 30 did not any longer need to have parental permission for marriage; however, this bill acquired the force of law only in 1970 (Kooy, 1980).
The status of a marriageable economically independent person depended partly on whether or not the man had completed his compulsory Military Service. The temporary relapse of income and the absence from home made it undesirable for the majority of young people to marry before the man had done his Military Service.

Demographic changes (the growing number of 18-19 year old boys) and the political-military détente lowered the importance of this factor. Especially in the Sixties, the percentage of conscripted young people from the age-group concerned declined (32) while for those persons entering Military Service, it became less of an obstacle due to a gradual shortening of the period of Service particularly after 1963 (for most conscripts from 20 to 16 months) (33). In addition, in a number of cases financial provisions made it less necessary to postpone marriage until Military Service had been completed.

The earlier age at which boys and girls develop their secondary sexual characteristics (34) probably

(32) An indication of this is that the number of conscripts which formed 22-25% of the total number of 18-19 year old men in 1945-49 and 29-30% of them in the years 1954-61, formed a smaller part of the cohort of 18-19 year olds in subsequent years; 20% in 1964, 17% in 1970. (Information of the Department of Defence, Conscription Section).

(33) Information from the Information Service of the Department of Defence.

(34) The median age at menarche dropped from 13.7 (1954-56) via 13.4 (1965) to 13.3 years. The development of the breasts took place 5 to 6 months earlier between 1954-56 and 1965 while after 1965 the age at which the breasts of 50% of the girls had reached the adult stage was 0.9 years younger. Secondary sexual characteristics (pubic hair growth) of boys also developed earlier, about 6 months with respect to 1954-56, about one year with respect to 1965 (Van Wieringen, 1968; Groeien is gezond, 1981).
has led to earlier heterosexual relationships (the beginning of the dating and 'going steady'-period). For, the age at which secondary sexual characteristics of a girl develop, determines the timing of the social perceptions of the pubescent girl as an appropriate participant in heterosexual relationships (35). She will define herself so and her parents and potential male partners will identify her so. These perceptions tend to set in motion the social processes which lead to intercourse and marriage (Udry and Cliquet, 1982) (36).

Obviously other factors too have played a role in the earlier forming of unions, like increasing co-education (the percentage of junior secondary and secondary grammar schools in which there was no co-education of boys and girls decreased from 33.3% in 1947 to 2.7% in 1971 (37)), a decline in the control exerted by church, religious community and school, increased mobility, disappearance of the village community, etc.

The earlier forming of heterosexual unions has lead to an increase in the number of premarital pregnancies, but this increase has played only a small role

(35) For boys the same holds but in a lesser degree. (36) The early biological and sexual maturity is itself related to the increasing level of prosperity; to the consumption of food that is richer in proteins, better housing, smaller families and less frequent and shorter illnesses. (37) The figure for 1971 is compiled from the 'Lijst van scholen van het voortgezet onderwijs en statistische uitkomsten 1 september 1971' (List of schools for secondary education and statistical results). Published by 'Ministerie van Onderwijs en Wetenschappen' and the CBS, 's-Gravenhage 1972. The reorganisation of the secondary school system and the declining number of pupils, as well as more free morals played a part in this. 

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in the decline of the age at marriage. Marriages in which a child was born within 6 months of the marriage comprised a smaller share of the total number of marriages in 1965-69 than in 1950-54; of those married before 20 years of age, the percentage dropped from 59.5 to 37.0; of those aged 20-24 from 22.4 to 14.7 and of those aged 25-29 from 8.1 to 7.9% (CBS, 1975). On the other hand, premarital pregnancies occurred relatively more frequently in 1965-69 than in 1950-54. For women under 20 years of age the premarital pregnancy rate was 0.8% in 1950-54 and 1.0% in 1965-69; for women of 20-24 years of age the rates were 2.9 and 3.8% respectively and for women aged 25-29 years 1.8 and 2.1%.

9. CONCLUSION

Our study has demonstrated that the changing composition of the Dutch population (as far as it is reflected in the composition of existing marriages at the time of the 1971 census) did not have any effect on the decline of age at marriage in the Netherlands. The effect was investigated with the aid of Kitagawa's standardization technique. In order to enable the isolation and quantification of the contribution of the explanatory variables to the decline in age at marriage, the standardization approach was complemented with a log-linear analysis. The results of this showed that the time factor presents the most important explanation for the decline in age at marriage within each sub-group of the population; not one religious denomination, educational level or group of municipalities equals the significance of the time factor. This negative result is important considering the explanations given up to now for the decline in age at marriage. The educational level accounts for the minimal degree of heterogeneity in the temporal development of the age at marriage in the various sub-groups as far as men are concerned; where women are concerned, it is accounted for by the changing relationship between education and religious denomination.
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