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A longitudinal trend study
Ad Vossen & Jan Nelissen
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Keywords: motherhood, female employment, The Netherlands, parallel careers

Abstract

One of the main issues of modern social policy is whether or not to support women in removing existing incompatibilities between motherhood and employment. The useful effect of policy measures depends for a great deal on reliable and accurate knowledge of the dynamic and complex interrelationship between having children and a paid job.

The first part of this paper deals with an attempt to construct a rough framework that serves as a unifying structure, integrating principles and research findings from different disciplines in the field of study. The core of this conceptual model is based on the postulate that the causal relation between both variables is circular and cumulative in nature. Another principle that plays a central role is based on the recognition that one only can understand actual behaviour if underlying psychological variables like motives, aspirations and intentions are explicitly taken into account. Looking for an adequate research design a longitudinal panel study seems to be the most appropriate. Since however data that meet these conditions are not (yet) available for The Netherlands an alternative approach has been chosen to study the relation between the status of motherhood and having a paid job. In order to get a broader macro level view, the relationship between employment profiles and motherhood profiles has been studied from the historical perspective with (grouped) birth cohorts of women (1930 - 1964) as the unit of analysis. The longitudinal data, used for the analysis of the Dutch situation, were generated by a microsimulation model. For each cohort two age profiles have been established. One describing the cohort's motherhood career and the other one describing the employment career. First of all, a detailed description of changes that have taken place over time has been given for each profile separately. Next, the relationship between both profiles has been expressed in a simple regression formula. The hypothesis expecting a negative relation between 'years spent as mother of a young child' and 'years spent at the labour market' is indisputably confirmed.
1 Introduction

The competitive character of the relation between fertility and work has been phrased clearly and concisely by Regan and Roland (1985, p. 986) as follows "... the timing of critical career-building phases does not accommodate women's biological life cycle". Other authors speak of incompatibilities or even of an antagonistic relationship. The research tradition in this field is relatively long and extended. For detailed reviews and evaluations we can among others refer to Spitze (1988), Siegers et al. (1991) and Bernhardt (1993).

The most prominent theoretical point of interest has always been the kind of causal relationship existing between motherhood and employment. Research findings have been far from univocal in this respect (e.g. Klijzing at al., 1988). When looking for the greatest common divisor, results could be summarized as follows: there is a substantive negative influence of the presence of children on labour participation, and a less pronounced or even absent negative causal flow from labour participation towards fertility. Gradually however the idea is gaining ground that the only valid way of representing the causal structure between both variables should be based on the concept of circular cumulative causal relationship (Bernhardt, 1993).

Other authors emphasize the fact that explanatory models in this field of study should pre-eminently be multi-disciplinary. Willekens elaborates in this respect on the psychological postulate that "relations between variables pertaining to fertility and employment are mediated by personality traits, in particular the career orientations." (Willekens, 1991, p 12). So, for really understanding behaviour one needs to understand the underlying motives. This point of view is supported by a number of other researchers (e.g. Ni Brolchain, 1986; Bernhardt, 1993) who, although using different terms (like aspirations, intentions or plans), basically refer to Fishbein's model of reasoned action (e.g. Ajzen and Fishbein, 1980). In this model actual behaviour is considered as the final moment in the sequence beliefs -> attitudes -> intentions -> behaviour. In the following we will respectively use the terms motherhood aspirations and employment aspirations.

Another discipline that gradually came to the fore is micro-economics, and most dominantly represented by the 'new home economics', initiated by Becker in the early sixties and founded on rational-choice theory (e.g. Becker, 1976). From the new home economics' point of view,
the incompatibility between work and fertility is a time-allocation problem. Having children involves both material and immaterial costs and benefits, and will generally reduce the earning capacity of households. Articulating the postulate of rational-choice and underestimating the role of social-cultural determinants like the system of prevailing norms and values has lead to serious opposition (e.g. Lesthaeghe and Surkyn, 1988). Recently, Bernhardt (1993) pointed to the feminist perspective by stressing gender differences in social positions and roles as basic factors causing incompatibilities ("Work and motherhood are incompatible precisely because work and fatherhood are perfectly compatible", p 36). Other authors, like for example Kempeneers and Lelièvre (1991), are criticizing the restrictive way in which the concept of female activity is represented by having or not having a paid job. Finally we can refer to some interesting attempts to formalize the interrelations between labour market participation and fertility, carried out by Turchi (1991) and Bagozzi and Van Loo (1991).

This overview is of course far from complete and highlights only some generalities selected from a long and vivid discussion. In spite of the fragmentary and superficial character it is worth trying to integrate different points of view in a kind of unifying structure. The resulting scheme is depicted in figure 1 and will shortly be commented.

The scheme should be read from the bottom (young adulthood) to the top (pension age). In the left part the employment career is specified, in the right part the motherhood career. At both sides complexes of various meso- and macro-level determinants (contextual variables) represent the continuous influence from the environment. The scheme is structured in the form of a sequence of interrelated employment and motherhood blocks.
Figure 1  Interdependence motherhood and employment
This sequence of blocks is preceded by a complex of early, often unmatured aspirations about a professional career, a motherhood career and aspirations about the way both careers should preferably become combined. These aspirations can be considered as a joint product of individual psychological predispositions and influences from the social environment (e.g. norms, values and beliefs transmitted by the family, by peer groups and institutions). Every block contains five elements. At the bottom line of each block we find the employment and motherhood-aspirations (e&m-aspirations): a woman's general idea about whether or not and, if so, how to combine an employment and a motherhood career. Next we find more concrete plans (or intentions) regarding a certain step in the employment respectively motherhood career. Whether a plan is going to be realised, depends on the outcome of a confrontation of, on the one hand, a heterogenous complex of micro, meso and macro factors that either facilitate or hinder (so-called f&h-factors) the realisation of the plan in question, and on the other a cost benefit-analysis. The result of this analysis will, or will not lead to behavioural action and thus to either the attainment of a new, or the mantaining of the current status position in the interdependency system (employment: yes/no, or motherhood: yes/no). In terms of causal relations determining the status position, a distinction has to be made between an internal causal flow (either from the bottom to the top of a block or between blocks) and an external causal flow (coming from the environment of the system), continuously affecting every element within the block. An example of an effect from outside is the involvement in a durable partnership relation, which can play an important role in the transformation of aspirations and plans.

It goes without saying that the scheme can be described in more detail. Useful distinctions can be made between full-time and part-time employment, between paid-work and non-paid (domestic) work. Further elaboration could take place in structuring the environment in terms of cultural, economic and policy clusters. But, since the function of the scheme is limited here, we will refrain from a further clarification. We will only add a few remarks in the sideline. All theoretical as well as empirical research in this field of study could - more or less explicitly - be codified within the frame of reference described above. As one can see, a 'grand' theory of the interdependency between employment and motherhood, demands comprehensive knowledge of the causal structure within blocks, the causal relations between blocks and, in addition, the complex causal relationship existing between the employment/motherhood system and its heterogenous environment. Existing scientific knowledge only covers parts and fragments of the total system. The new home economics-theory for instance mainly covers the contents of block 5.
(2) and its external relations. A lot of empirical studies are restricted to the more directly observable behavioural aspects in the scheme. Using hazard rate-methodology, transitions between the different status positions in terms of intensities and duration of intervals are calculated, analyzed and sometimes explained (see for instance Hoem and Hoem, 1989; Heckman and Walker, 1990).

The scheme can among other be of help when structuring a review study, locating specific research projects, comparing projects and proposing a research agenda.

It is indisputably clear that studying the interdependency between employment and motherhood careers demands longitudinal analyses. This goes, among others, back to the underlying principle of circular cumulative causality. A lot of empirical research has however been carried out on transversal, cross-sectional data. In these studies, as a matter of fact, the causal relationship within and between blocks is modelled in a invalid way by wrongly assuming a logical connection between, for instance, women having their first child in a certain calendar year and employment aspirations/behaviour of a younger age group (so, from a different cohort!) in the same calendar year. Empirical studies affirmed the validity bias that thus can occur (Blossfeld and Huinink, 1991; Véron, 1988).

The research designs most satisfying the methodological and theoretical demands spoken of in the foregoing, are without doubt the retrospective survey and the panel study, both describing processes from a longitudinal point of view. Nevertheless, both have their specific pitfalls and drawbacks. The weaker point of a retrospective survey in this respect is for instance the difficulty to measure in a valid and reliable way early motherhood and employment aspirations. Good examples of well conducted retrospective surveys are, among others, an international comparative study carried out on motherhood and employment data of 12 countries of the European Community by Kempeneers and Lelièvre (1993), and a survey among low-educated Dutch women by Turkenburg (1994). The most important disadvantage of a panel study is - especially in this case - the long duration of the project. When starting now, it would take a period of about 40 to 50 years to fully describe employment and motherhood careers from their beginning to their end.

However, the conceptual framework we introduced above still deals with an omission. Although it is well equipped for explanatory purposes and theory building, a historical dimension is
actually lacking. Useful additional knowledge of the interrelation between motherhood and employment can be collected from macro level data describing and comparing employment and motherhood profiles over a longer time span, thus seeking for regularities and patterns. In the second part of this paper we will carry out a longitudinal trend study of labour market participation and motherhood for Dutch women belonging to the birth cohorts 1930-1964. In terms of the frame of reference the unit of analysis is hereby changed from the individual woman (micro level) into a birth cohort of women (macro level), whose careers will be separately described at an aggregate level in the form of an age specific profile. More specifically two (descriptive) hypotheses will be tested.

In the following section information will be given about the data-set to be used. In the next two paragraphs motherhood and employment profiles will respectively be introduced and commented upon. Subsequently, the relationship between both profiles will be established, in a simple way, in the form of a regression equation. A short discussion will end the paper.

2 The Data

The reason to make use of microsimulation data is mainly twofold. In the first place, existing demographic and (socio)economic data do not enable to describe in a proper way neither motherhood nor employment careers from a longitudinal perspective. Secondly, definitions of labour participation have changed frequently in the period under study so that it is hard to standardize existing statistics satisfactorily. To begin with, figure 2.1 depicts the time scheme of the analyses. Since simulation starts in 1947, birth cohort 1930 is the first one whose motherhood and employment career can be followed completely. Observations have been used up to 1990, whereas from that year on, (official) forecasts were used. So, the profiles of the oldest cohorts are almost completely based on observations, while those of the youngest cohorts are based for a great deal on projections.

The data used for the present analyses are derived from the dynamic, cross-sectional microsi-
mulation model NEDYMAS\textsuperscript{1}. In short, microsimulation creates a synthetic database which reflects developments in the demographic and economic structure of the population. The dynamic approach implies that processes are explicitly simulated, which means that the size of the microdata base changes during the simulation period. The sample passes hereby through time, year by year. For each individual in the microdata base it is determined which personal characteristics change, and to what extent, each year. An overview of the ins and outs of microsimulation approach, especially with respect to social policy, can be found in Citro and Hanushek (1991).

NEDYMAS is based on three interrelated modules: a demographic module, a labour market and income formation module, and a social security module. The principle of microsimulation is shown in figure 2.2. To illustrate the general principle we will take the modelling of mortality. The decision whether an individual will or will not undergo a potential transition is simulated with the aid of the Monte Carlo method. In view of this, the conditional probability of an individual undergoing that event has to be given. For example, for a 77-year-old divorced woman the probability of dying was 6.75 per cent in 1968. Subsequently a number is randomly drawn from the uniform \([0,1]\) distribution. If this number is smaller than or equal to the probability of dying of 0.0675, the woman is expected to die. If the number is larger, she will remain alive that year. If she dies, it is established whether she had children, and if so, they become orphans. So, decisions or events at the level of an individual can have implications for other individuals.

The heart of microsimulation modelling is formed by its state representation of the components of the system of interest. This is executed by drawing up a list of attributes for each individual in the sample. The next step, after the adaptation of a micro-representation, is the specification of an initial population. Preferably a real sample of individuals and households along with their attributes are to be used. However, such a sample was not available. A first usable sample can be derived from the Dutch 1947 Census data; see Nelissen (1994). So, the model simulates all events from 1947. Each year the characteristics of the individuals (and thus the households) are updated, if necessary.

\textsuperscript{1} NEDYMAS stands for NEtherlands DYnamic Micro-Analytic Simulation model; see Nelissen (1994)
The demographic module of NEDYMAS from which the motherhood profiles were generated, contains 16 submodules. Each year starts with the determination of the number of immigrants. Next, all individuals successively go through the processes of family reunification (migrants), emigration and return immigration. Thereafter the outflow out of institutional households has been simulated. Then the population in our database are subjected to the possibility of moving into an institutional household, of death, of being a candidate for marriage, of divorce, of dehabitation and of being a candidate for cohabitation. When all persons are dealt with, the matching of persons takes place to complete the simulation of marriage and cohabitation. The last steps in each year are the simulation of splitting-off of children and fertility. The various transition rates are based on observations, if available. However, especially for the period 1947-1965 additional assumptions had to be made. The future demographic transition rates are based on the forecasts of the Netherlands Bureau of Statistics.
Figure 2 Data and microsimulation results

**fig 2.1** Time scheme of analysis

![Time scheme of analysis](image)

**fig 2.2** The principle of microsimulation

![Microsimulation principle](image)

**fig 2.3** Mother of a younger child

4 micro runs ('50-'54)

![Mother of a younger child](image)

**fig 2.4** Participation rates

4 micro runs ('50-'54)

![Participation rates](image)
The data used to construct the employment profiles are generated by the *labour market and income module* of NEDYMAS. Labour supply is determined with a labour supply equation, modelled by Van Soest, Woittiez and Kapteyn (1990), which explicitly takes account of demand side restrictions. The labour supply of individual household members is considered in a neo-classical framework, in which after-tax wages, the social security and tax system, as well as the household composition, are taken into account. The Labour Force Surveys (Arbeidskrachtentellingen) are the starting-point for the determination of the transition probabilities between the different states of economic activity. The states used in the Labour Force Survey are transformed to six states: disabled, employed, unemployed, soldier, student, and retired or working in own household. Using these data, it is determined for each year for each individual whether his or her economic activity changes. In this process additional data (p.e. unemployment data) are used. Future developments concerning labour participation and unemployment are based on forecasts of the Dutch Department of Social Affairs. We assume that national income will grow annually by 2%.

Both graphs in the lower part of figure 2 give an indication of what is called the Monte Carlo variability (see Nelissen 1994). They show simulation results of four runs, each with a different value for the random generator. Figure 2.3 presents the outcome regarding the presence (or absence) of children, while figure 2.4 contains simulation results concerning elements of the employment profile. As one can see, the variance resulting from the simulation approach appears to be rather limited.

A more detailed and critical comparison of simulated data with observed data can be found in Nelissen (1991) and (1993).

3 Motherhood profiles

Earlier research has repeatedly pointed to the fact that the presence of young children in the household has proved to be one of the most important determinants of female labour-force participation. According to Jones (1982) presence of children should be decomposed into two factors. The first is the - in the beginning strongly negative - direct impact of a birth, and the second is the declining probability of working outside the home as the number of children is
growing. The present analysis combines these two components into the variable motherhood career. This variable has been operationalized in so-called motherhood profiles, consisting of a series of age specific quantities that stand for the proportion of women, in a given age group, that has a youngest child in her household in the age group 0-17. Within this crude age grouping a specification has made in subgroups (0-5, 6-11, and 12-17 years). Working with profiles has the advantage that a clear distinction can be made between quantities representing the intensity of the phenomenon and quantities measuring timing or localization aspects. Since birth cohorts have been chosen as unit of analysis, the quantity measuring the intensity-aspect of the motherhood profile can be described as the average number of years lived in a birth cohort in the status position 'mother of a younger child' (Y.MYC). From an analytical point of view this aggregate quantity is rather hybrid in character. As such it reflects not only the average number of children brought forth by a cohort (or, more specifically, a series of parity progression rates), but also the length of birth-intervals. The timing-aspect (the mean age of being the mother of a younger child: A.MYC) contains, in above, effects of the mother's age at the birth of her first child. The intensity-variable Y.YMC is, as a construct, comparable to the demographic quantity 'life expectancy', albeit the former is a crude measure that doesn't correct for mortality and migration. Since, however, the impact of both variables is only marginal and occurring in all cohorts, the validity of this quantity is hereby not seriously jeopardized. As described earlier, the constituting elements of a cohort's Y.MYC and Y.MYC are produced by microsimulation.

Figure 3 depicts some of the results. First of all, for most of the birth cohorts a picture is showing the overall profile as well as subprofiles for specific age groups of young children. When, at face value, comparing the overall profiles over time we can see an almost steadily decline in its volume, as well as a certain shift in its form. This therefore means that the average number of years spent in the status 'mother of a younger child' is (or will be) decreasing from cohort to cohort. Picture 3.6 summarizes the evolution in Y.MYC. From the upper line in the graph it can be learned that in the earliest birth cohort (1930-1934) women, on an average, spent a bit more than 16 years of their life-time as mother of a child under 18. For the most recent birth cohort (1960-1964) Y.MYC will reach the level of 11 years. Or, a decrease of almost 50%. If we consider having a younger child as one of the factors that hinders the realization of aspirations about the combination of a motherhood and employment career, we could (ceteris paribus) as a consequence expect employment figures to rise.
When looking at the subprofiles we can see, once again, a more or less regular decline in the subprofile's volumes over time. This is of course not quite a surprise, since there exists a purely additional relationship between the subprofiles and the overall profile. So as a consequence, the decrease at the overall level must be reflected in the subprofiles. In spite of the fact that age intervals covered by the subprofiles are equal, their volumes are different. The greatest difference is found between the volume of Y.MYC_{6-11} on the one side and the volume of both Y.MYC_{6-11} and Y.MYC_{12-17} on the other side. As Y.MYC is a hybrid quantity, the differences between the subprofiles are the mixed result of the parity progression-pattern of a cohort and differences in the duration of birth-intervals. The pictures are clearly showing that, in the course of time, not only all partial Y.MYC's are decreasing but that there is also a diminishing difference between Y.MYC_{6-11} and both other age specific Y.MYC's. The latter is, among others, due to the fact that higher parities are becoming scarce and the variance in the ultimate number of children within a cohort decreases. When we return once again to figure 3.6 we see that cumulated values of Y.MYC show a similar pattern over time. Two post-war cohorts, to wit 1950-1954 and 1955-1959 are interrupting the monotonous decrease in Y.MYC-values. Since a sudden increase in the average number of children as a possible explanation for this phenomenon, empirically does not hold true, it is more plausible to assume that structural changes in the timing pattern are the true cause. This view is supported by figure 3.7 that is showing the longitudinal trajectory of the timing-variable A.MYC. For every age group we see a decline (in mean age at which women have their youngest child) until cohort 1945-1949, followed by an almost constant upswing. This movement can be considered as an exponent of the more obvious trend that women incline to postpone motherhood to higher ages. This interpretation is in accordance with conclusions from earlier analyses based on vital statistics (Janssen en Vossen, 1986).

In the first part of this paper we have articulated that processes of motherhood as well as employment should be studied from a longitudinal point of view, so actually within cohorts. It was argued that cross-sectional analysis, based on 'synthetic' cohorts as unit of analysis, may be seriously biased, given the fact that changeing timing processes within
Figure 3  Motherhood profiles cohorts 1930-1964

fig 3.1 motherhood profile
cohort 1930-1934

fig 3.2 motherhood profile
cohort 1940-1944

fig 3.3 motherhood profile
cohort 1945-1949

fig 3.4 motherhood profile
cohort 1950-1954

fig 3.5 motherhood profile
cohort 1960-1964

fig 3.6 Y.MYC all cohorts

fig. 3.7 A.MYC all cohorts

fig 3.8 motherhood profile
period 1983-1985
cohorts, are falsely being interpreted as changeing intensity processes. When cohorts, for instance, are massively postponing births (timing) it looks - viewed from a cross-sectional or transversal angle - like an intensity decline, whereas in terms of the ultimate number of children (intensity) nothing really has to change. This phenomenon can thus be considered as a form of deflation. Later on, during a period when women are making up for the postponed births, a reverse, inflation-like, situation occurs. In short, cross-sectional analysis in this respect will often be, more or less, contaminated by inflation or deflation processes. That this really is the case in the situation we are studying now, is demonstrated in figure 3.8 where profiles are presented, based on microsimulation output for the period 1983-1985. Apart from less regular shapes, we observe a quite 'illogical' phenomenon, to wit a situation in which the volume of subprofile Y.MYC\textsubscript{12-17} exceeds the volume of the other subprofiles. It would mean that women are spending more years in their status 'mother of a youngest child aged 12-17 years' than in their status 'mother of a youngest child aged 0-5 years'.

When shortly summarizing we have found a substantial decrease in 'years spent as mother of a young child' varying from almost 50% for Y.MYC\textsubscript{0-17} to almost 40% for Y.MYC\textsubscript{0-5}. The trend was interrupted by cohorts 1950-1954 and 1955-1959, due to a structural change in the timing pattern of reproduction. The latter might be a correlate of more comprehensive 'generational' changes that have been traced by Becker (1992). Taken as a whole we could say that the evolution in the motherhood profile, at least potentially, has favoured an increase in labourmarket participation of women.

4 Employment profiles

As already remarked before, the microsimulation data produced by NEDYMAS, offer a unique opportunity for a continuous, longitudinal analysis of female employment careers over a substantial span of time, not being troubled by changing definitions and other practical problems like transforming non-continuous, cross-sectional data into continuous longitudinal data. Besides, since the data are differentiated with respect to part-time/full-time factors, they enable to

\[\text{2} \text{ These findings could be verified by comparison with empirical data from a partial numeration held on January 1st, 1987 (NCBS, 1988).}\]
determine employment in terms of persons as well as in person-years. Next to full-time employment (>32 hours per week) two categories of part-time employment have been distinguished (0-19 hours and 20-31 hours per week). Employment profiles consist of a series of age specific participation rates, calculated for a specific cohort. Analogous to the analysis of motherhood profiles, employment profiles can be characterized by a volume (or intensity) quantity, and by a timing (or localization) quantity. The former has been expressed in a variable named Y.PP, which stands for the average number of years in a cohort’s life span that women are employed in a paid job (either full-time or part-time). Like the variable Y.MYC, introduced in the foregoing section, Y.PP is a gross quantity in the sense that it has not been corrected for the demographic factors mortality and migration. When analyzing employment profiles in terms of person-years, the variable Y.PPY will be used, which indicates the average number of person-years participation generated by a cohort. The description of timing characteristics of the profile has been omitted, because - contrary to the motherhood profile - employment patterns don’t show the kind of regularity that makes them appropriate to be parametrized.

Figure 4 contains a series of graphs, describing the employment profiles in persons for the cohorts 1930-34 till 1960-64. In each of these graphs 4 subprofiles are presented. The upper line depicts the subprofile of total, or overall, participation rates (sum of part-time and full-time employment). Generally spoken, the shape of the employment profile is quite different from the shape of the motherhood profile, which comes very near to a normal distribution.

Figure 4.1 (cohort 1930-1934) shows the typical structure of the traditional employment profile: a bi-modal distribution with the highest top at post-school ages (with a participation rate of 60% at age 20-22). This peak is followed by a steep and long fall (mainly due to motherhood) to a level of well over 20%, which, after the age of 40, gradually leads to a second top with a participation rate of a good 30% at the early 50’s. Thereafter another decrease, caused by early retirement, completes the profile. The very last age group is showing a slight recovery, due to the fact that full-time jobs are split up into part-time jobs. Figure 4.1 also shows that up to the age of 40, nearly all women with a paid job were employed full-time. Afterwards the number of part-timers is growing. This category consists of both women that changed from a full-time to a part-time job, as well as of mothers of older children (re-)entering the labour market. When assuming that women with full-time jobs within the age group 25-44 years (being 20% of the whole female population) are mainly unmarried or childless married women, the
extremely low part-time employment rates indicate that only few women in this early cohort had a parallel career.

The figures 4.1 till 4.7 give us an overview of the changes that took (or will take) place between the oldest cohort 1930-1934 and the most recent cohort 1960-1964. At the level of total employment figure 4.8 sketches the differences between 3 cohorts. It shows that the profile’s original and outspoken bi-modal structure has underwent drastic changes. As a result of prolonged education and postponed motherhood, the top of the employment profile is decreasing with about 10% points, and inclines at the same time to shift gradually to a higher age group. The profile as a whole is gradually getting flatter, whereas it’s volume (intensity) is substantively growing. The typical 'children gap' (low participation rates in the period when women have younger children) is becoming less articulated. The intensity value Y.PP (the surface under the overall profile) increases from 15.3 years for the oldest cohort, to 17.4 years for the interjacent cohort, and to nearly 20.6 years for the youngest cohort. Since Y.PP consists of the sum of the 'hour per week'-specific subprofiles it is of interest to determine which profile contributes most to the overall development. A closer look shows that the increase in Y.PP values is the result of a decrease in full-time employment and a relatively stronger increase in part-time employment. As far as the former is concerned it turns out that the Y.PP,3~ values fall from 11.5 years via 10 years to 9.8 years. The decline is almost totally explained by strongly decreasing full-time participation rates at ages under 30. Within the group of part-time workers the stronger increase can be found in Y.PP,~, the category of women working less than 20 hours per week, with respective values of 1.9 years, 4.0 years and 6.0 years. Comparable numbers for Y.PP,~ are 1.9 years, 3.4 years and 4.8 years. A combination of these figures learn that the proportion of part-time work in overall employment has been doubled from 24.5% (cohort 1930-1934) to 51.0% (cohort 1960-1964). In this respect the position of Dutch women may be considered rather exceptional.
Figure 4  Employment profiles cohorts 1930-1964
According to cross-sectional Eurostat data for 1989, presented by Bernhardt (1993), 60% of all employed women in The Netherlands in the age group 25-44, was working part-time, whereas the average percentage of all (12) members of the European Community was only 28%.

The analysis of employment profiles is up to now based on participation in persons, aggregated into the average number of years spent by women in a given cohort in the status of having a paid job, regardless the actual duration of the working week. From this point of view a woman that works only 8 hours per week makes the same contribution to the value of Y.PP than a colleague working the full 40 hours. As the proportion of part-time work in The Netherlands is very substantive it is appropriate to calculate a quantity that takes into account differences in working hours. This quantity, Y.PPY, expresses employment in so-called person-year equivalents.

A selection of the results is depicted in figure 5. The first figure (5.1) is showing the age profile in person-years for 3 cohorts. It is obvious that only a relatively small part of the (theoretical) female employment potentials have been, or are being utilized. For the eldest cohort the gross percentage is about 25%, whereas the youngest cohort scores 31%. The figure also makes clear that after the age of 30 there is hardly any difference in the contribution of each age group to Y.PPY - the lines are almost flat. In figure 5.2 a comparison is made between Y.PP- and Y.PPY-values of all cohorts. Lines are running parallel, with an exception for both the oldest and the youngest cohort, where Y.PP is slightly growing and Y.PPY shows a decrease. A plausible explanation could be the splitting up of the total number of jobs in more and more smaller part-time jobs. Considered over the period as a whole and for all ages, the growth of Y.PPY (78%) is slightly stronger than the growth of Y.PP (75%). Confined to the ages of motherhood (22-49 years) the comparable figures are 45% and 51%. To complete this overview figures 5.3 and 5.4 give an idea of the changes over time by comparing the age profiles of the oldest and youngest cohort for respectively employment in persons and employment in person-years.

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2These percentages have been calculated by dividing the cohort's Y.PPY value by the age interval 17-64 years. When narrowing the interval, percentages do of course increase.
We can summarize this part of the analysis as follows. We have seen from the longitudinal perspective that female employment in The Netherlands, in persons as in person-years, has grown considerably, and in a relatively regular way. As far as the shape of the employment profile is concerned, we observed that the 'children gap' has disappeared for a great deal, and that the profile as a whole has been smoothed out considerably. We also saw that the share of part-time jobs in total participation is very substantive. These are all indications that The Netherlands - during the period under study - has been (and partly, still is) witnessing a structural process, that analogous to the demographic transition, could be called the employment transition. Although our data, due to their longitudinal format, do not enable a direct international comparison, transversal indicators learn that The Netherlands have always been lagging behind in female labour participation and is only recently catching up seriously. The strong growth of female employment from 25% in 1960 and 30% in 1971 to 56% in 1991, is mainly caused by a massive entry of married women into the workforce, who usually are working in part-time functions. This explains that, in spite of the fact that about 56% of the Dutch adult women (and 82% of the men) have a paid job nowadays, only 30% of all paid work is done by women (Sociaal en Cultureel Planbureau, 1993). There have been a lot of research efforts to explain the late entry of Dutch women into the workforce (for an extended overview see e.g. Pott-Buter, 1993). Some researchers find the main cause in a very persistent motherhood ideology, strongly supported by influential church parties, not allowing mothers to leave the care of their children to other people. Others, especially (socio)economists, refer to late industrialization, high male salaries, and social security arrangements and fiscal legislation that always favoured families with a mother at home. Recent growth in the participation of married women would be caused by raised educational levels and the growing supply of part-time jobs.

5 Relationship between employment and motherhood

After a separate analysis, we will now look for a relationship between the two profiles. Common sense logic, as well as empirical evidence, learns that having (young) children, generally spoken, hinders women to be active in a paid job. When transposing this connection from the micro level (individual women as unit of analysis) to the macro level (cohorts as the unit of analysis), we could expect to find a comparable relationship. Before actually
investigating this relationship, it should once again be emphasized that we will only assess a simple statistical association between the two variables, without any pretention of explaining employment characteristics of a cohort by aspects of its demographic behaviour. More specifically, the following descriptive hypotheses will be tested:

a) there will be a negative relationship between the average number of years lived in a birth cohort in the status position 'mother of a younger child' (Y.MYC) and the average number of (person)years spent on the labour market by the same cohort (Y.PP and Y.PPY).

b) this relationship will be stronger as the children's age is lower

In order to get a first impression of this association, figure 5 combines some results of the last two sections. In figure 5a the course of Y.PP and Y.MYC variables is represented in absolute values, whereas figure 5b is showing index-values (cohort 1930-34=1000). From both figures can be learned that a decrease in Y.MYC-values is indeed coupled with an increase in Y.PP and Y.PPY-values. Besides, the decline in Y.MYC_{0.5} values is stronger than the decline in Y.MYC_{0.11} and Y.MYC_{0.17} values. So, at face value only, one can expect that both hypotheses will be confirmed.

To formalize the relationship, however, simple linear regression analysis has been carried out. The resulting regression equations, as well as accessory R (multiple-correlation coefficient), R² (proportion explained variance) and the parameters’ t-values (within square brackets) are presented in table 1. The equations in the upper part of the table are determined with Y.PP as dependent variable, and the equations in the lower part show the regression results when the dependent variable is expressed in terms of person-years (Y.PPY). In spite of the small number of observations (7 cohorts, and thus only 5 degrees of freedom) all coefficients have significant t-values (tested at a 95% significance level). As we already could assume, both hypotheses are supported by the regression analysis. The sign of the regression coefficient is negative in all cases, confirming the expectations
Table 1  Results of the regression analysis

<table>
<thead>
<tr>
<th>dependent variable</th>
<th>intercept</th>
<th>regress. coeffic.</th>
<th>indep. variable</th>
<th>$R$</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y.PP</td>
<td>28.82</td>
<td>-1.93</td>
<td>x Y.MYC_0-5y</td>
<td>.89</td>
<td>.80</td>
</tr>
<tr>
<td></td>
<td>[11.69]</td>
<td>[-4.45]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y.PP</td>
<td>31.75</td>
<td>-1.41</td>
<td>x Y.MYC_0-11y</td>
<td>.92</td>
<td>.85</td>
</tr>
<tr>
<td></td>
<td>[12.05]</td>
<td>[-5.27]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y.PP</td>
<td>33.26</td>
<td>-1.12</td>
<td>x Y.MYC_0-17y</td>
<td>.93</td>
<td>.86</td>
</tr>
<tr>
<td></td>
<td>[11.97]</td>
<td>[-5.53]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y.PPY</td>
<td>20.35</td>
<td>-1.26</td>
<td>x Y.MYC_0-5y</td>
<td>.84</td>
<td>.70</td>
</tr>
<tr>
<td></td>
<td>[9.79]</td>
<td>[-3.44]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y.PPY</td>
<td>22.34</td>
<td>-0.92</td>
<td>x Y.MYC_0-11y</td>
<td>.87</td>
<td>.76</td>
</tr>
<tr>
<td></td>
<td>[9.73]</td>
<td>[-3.97]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y.PPY</td>
<td>23.36</td>
<td>-0.73</td>
<td>x Y.MYC_0-17y</td>
<td>.88</td>
<td>.77</td>
</tr>
</tbody>
</table>
of hypothesis a). At the same time the ranking of the value of this coefficient is in accordance with our hypothetical expectations, stated in hypothesis b).

When comparing the upper and lower part equations it is evident that, at least in terms of explained variation, Y_PP performs better as dependent variable than Y_PPY. This might mean that having young children has a stronger influence on the choice between being employed or not, than on the amount of working hours per week. Given, among others, the presence of the risk of ecological fallacy, this conclusion should be handled with reserve. The same goes for the interpretation of the values of R and R^2. Although relatively high, an interpretation in terms of a direct and substantive causal relationship would be premature. It is not improbable that a part of the correlation is spurious. The presumption that the variables Y_PP and Y_MYC are both influenced by, for instance, the variable 'a cohort’s average number of children', and thus contributing to a statistical association between Y_PP and Y_MYC, seems justified. An elaboration of this kind could, however, not be carried out, due to the minor number of observations. For the same reason an attempt failed to investigate the assumption that the 'rupture' in the trend of 'years spent as a mother of a young child' (figure 3.6), and even more obviously manifested in its timing counterpart A_MYC (figure 3.7), might have had something to do with changing employment patterns.

6 Discussion

As international comparisons have shown, both the reproductive and the employment history of Dutch women is quite different from the historical patterns in other modernized societies. The fall in fertility started relatively late, whereas only recently labour participation rates begin to equal more common employment rates. Besides, female employment in The Netherlands is predominantly part-time work. These observations ask for a scientific explanation. The first step in this connection is looking for an adequate theoretical frame of reference, built up around the specific causal structure between motherhood and employment. In the first part of this paper an attempt was made to design an 'ideal' conceptual model, based on the bringing together of existing theoretical and empirical knowledge. Basically, it was assumed that both parallel careers are interacting in a circular, cumulative way (Bernhardt, 1993). Besides it was underlined that, strictly speaking, explaining behaviour demands knowledge of underlying aspirations, intentions.
and plans. It is obvious that a complete, all encompassing implementation of the model is of course going far beyond the capacity of a single research program. Still, it can have a directive function, and it at least makes clear the complexity of the object at stake. In a research project starting within short, the frame of reference will be used to design an empirical typology of actual parallel motherhood/employment-careers in The Netherlands, based on retrospective survey data. In expectation of these data, a longitudinal analysis was carried out, using unique microsimulation output. The main results of a separate description of motherhood and employment careers of Dutch women, born between 1930-1964, have been presented in the second part of this paper. As far as motherhood concerns, the total number of years spent as a mother of a (young) child decreased over time with 50% from 16 years to 11 years. In accordance with the hypothetical (negative) relationship between this variable and labour participation, the latter indeed increased substantively. This goes for participation in persons, as well as for participation in person-years. Both were showing a 75% growth. At this moment the statistical relationship between motherhood and employment is elaborated with a third variable, indicating the parity progression rates-pattern for each cohort. It is expected that the original statistical association between motherhood and employment is partly 'explained' by this new variable. To do so, however, the number of longitudinal observations (cohorts) has first of all to be enlarged. The extension of observations will also enable a closer inspection of the relationship between the development of motherhood and employment according to longitudinally versus cross-sectionally organized data.
References


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