The reproductive revolution and the sociology of reproduction.

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> But where there is an equality by nature, there can be no superior power. There every infant at the hour it is born in, hath a like interest with the greatest and wisest man in the world. Mankind is like the sea, ever ebbing or flowing, every minute one is born another dies. Those that are the people this minute, are not the people the next minute. In every instant and point of time there is a variation. No one time can be indifferent for all mankind to assemble. (Filmer 1991 [1680]: 142)

> The standard categories of sociological research – individual, society, gender, class, action, structure, state, economy, and so on – continue to operate without reference to the fact that human beings exist in an interdependent relationship with both previous and succeeding generations. (van Krieken 1997: 447)

Sociology has devoted much attention to the political and industrial revolutions that ushered in modernity, through the way they transformed the social relations of production and gave rise to the modern state. However, despite the wave of interest in the 'sociology of the body' drawing on the work of Foucault in recent years (e.g Turner 1996), sociology has virtually ignored the important role sexual genesis takes in shaping social relations. Once proper account is taken of this, we wish to suggest that a *third* revolution becomes visible that has been equally fundamental to the rise of modernity and its evolution: *the reproductive revolution*.

The reproductive revolution

By reproductive revolution we mean the qualitative change in the quantitative efficiency of human reproductive labour such that the traditional relation between reproductive 'input' (in its simplest form 'births') and reproductive 'output' (in its simplest form 'population') has been subject to a revolutionary improvement over the last two centuries or so, and especially in the last fifty years. Note that both input and output can be defined in straightforward, readily measurable and therefore empirically testable terms. We are neither playing at the association and disassociation of concepts here, nor proposing some elegant but empirically untestable theory (Mills 1959). Of course this simple definition can be refined and expanded in various ways, rather like the concentric layers of an onion or Russian dolls. Thus, reproductive efficiency has various directly social dimensions as we discuss further below. We may take account not just of number of births but the socially and historically variable

labour thought to be necessary to caring for dependent children (Ariès 1973), changing definitions of what properly constitutes 'dependency' and the changing significance of age and age structure of a population as falling mortality and morbidity rates extend not only lifespan but the independence of the elderly (Pérez Díaz 1996). A key point is that this leap in the productivity of reproductive labour has taken place within quite diverse social arrangements regulating such work (for example the way in which the state redistributes resources between parents and non parents or shares the burden of reproductive work by providing education, health or childcare services to parents).

Demographers and others have shown that the reproductive potential of humans is very great. Under the right conditions populations might reach averages as high as nine or ten children per woman (Coale 1986). Given the primitive levels of social and material development characteristic of almost all human history till the very recent past, and the risky nature of human sexual reproduction for mothers and babies that we noted above, this potential has had to be used fairly fully simply to maintain population levels in the relentless battle against disease, famine and war. For example if we take the mortality rates for Spain at the start of the last century (1900) as our example, we find that just over a fifth of all children born died within their first year. A similar proportion of the survivors died before their fifth birthday. After that mortality rates decrease, but by their thirtieth birthday just under another fifth of these survivors died, leaving barely over half the original cohort alive at age 30, and only 43% by age 45. Childbirth was a dangerous time for moth mother and baby. For example in Scotland in the 1920s – a country much more advanced economically than Spain at the time – the maternal mortality rate per thousand live births was 7. That rate has now been reduced one hundredfold so that the lifetime risk of dieing in childbirth is tiny: one in twenty or thirty thousand. However in some African countries, where the reproductive revolution has yet to occur as many as two percent of all pregnancies end in maternal death, and the lifetime risk is as high as one in eight (World Health Organisation 2004).

Even these grim Spanish and Scottish figures represented a substantial *improvement* on only a few decades before. In conditions where so few children lived to an age where they themselves could become parents a stable population required each woman to have many children. Since not every woman could become a mother (in Spain at the start of last century one in ten women remained unmarried, principally through the lack of marriageable men), the burden on those who did so was still higher: as many as five or six children per woman. It is not difficult to see that for those women lucky enough to survive to childbearing ages, the bulk of their remaining life would be dominated by reproductive work. Women in Spain reaching 15 years of age in 1915 had an average remaining life expectancy of 43 years. We could guesstimate that at least a quarter, and often a half or more, of those years would be dominated by reproductive work. Within this time such women would be likely to see one or more of their children predecease them. Moreover, the precariousness of life would leave her little guarantee that either her or her husband would themselves survive to see their children reach adulthood. The widespread existence of the institution of godparents existed as insurance against the real possibility of the early death of both parents.

Contrast this with the situation once the reproductive revolution has occurred. The vast majority of those born now live long enough not only to become parents themselves, but also to enjoy a substantial and active period of life after that, not only seeing their children become independent but seeing them having children (and even grandchildren) themselves. For example in the UK in the year 2000, six out of ten babies had *all four* grandparents known to be alive when they were born, and a mere two per cent had only one or no surviving grandparent[i]. (This understates the demographic change in that a proportion of grandparents are alive but not known to be so.) This has two immediate key consequences. The first is *falling fertility rates* as fewer children are needed either to maintain overall population at a given level, or to ensure that any individual couple will have a surviving descendent (there need be no direct causal link between reproductive efficiency and fertility, but history shows few examples of societies where such efficiency gains, once established, have been devoted to multiplying their reproductive power rather diminishing the proportion of effort dedicated to reproduction). As the case of Spain shows with great clarity, as long as life expectancy is rising, population can actually keep growing even when the number of children born on average to each woman falls well below the mythical 'replacement level' of a TFR of 2.1. The proportion of reproductive labour within the total volume of productive activity *decreases*, freeing energy and resources for other activities.

The second immediate consequence is that this smaller volume of reproductive work not only forms a decreasing proportion of people's lengthening lives, but becomes *less concentrated in time across these lives*. Parents may expect help in performing it from their own parents, (whom prior to the reproductive revolution would have usually died before witnessing the birth of their grandchildren) and even their grandparents, while in return, they may expect to undertake such labour themselves both as parents and later as grand- or great-grandparents. The UK millennium cohort study, for example found that although only one in twenty babies shared a household with a grandparent, one half of those with working mothers were looked after by grandparents while their mothers were at work, and three out of four were cared for by grandparents at other times. Nor was childcare the only means of grandparental support. One third of mothers and a similar proportion of fathers reported receiving essential or financial help from their own parents (loans, money or physical capital gifts, domestic equipment, help with housing etc.) in addition to gifts or extras for the baby.[ii]

This redistribution of reproductive work across the life course has sometimes been seen, together with the extra gains in longevity by women as the 'feminisation' of old age (eg Pérez Díaz 2003). However this is, misleadingly, to apply a link between reproductive work and gender that is itself *weakening* because of this very change! Reproductive labour is being re-distributed between the sexes. What is occurring is not the feminization of old age but the partial *de-feminisation* of reproductive work and its redistribution across the life course. There has been a key shift from *gender* to *generation*. Within this altered scenario, the relevance and impact of the core biological division of labour itself is reduced. Heterosexual intercourse is still normally part of the process (but no longer an inevitable one given in vitro

fertilization and sperm and egg donation). Pregnancy is necessary for women, but, as in the past, is compatible with other work until its later stages. Lactation may be seen as desirable for biological or psychological reasons, but is readily substitutable by other feeding methods, or rendered more flexible by technology facilitating the expression and conservation of breastmilk. As well as increasing the efficiency of some aspects of reproductive labour (disposable nappies, bottled milk, pre-prepared foods, baby alarms and so on) technological innovation loosens the link between reproductive labour and sex so that it is no longer tied to women in quite the way it once was. Ideology may still portray women as 'naturally' more suited than men to infant care, and moral panics over male child abuse may even police such a division of labour more tightly, but it is no longer biologically imposed and is rapidly being socially redrawn. Thus as well as evidence of a slow but significant increase in the proportion of reproductive work done by men (Gershuny 1992), there is a overwhelming contemporary support, on the part of both men and women, for still greater participation by men. In a survey conducted in 2002 and 2003 in Britain and Spain, over nine out of ten women *and men* agreed that men should do more childcare[iii].

Mass maturity

The reproductive revolution thus has two principal components. One is the dawn, for the first time in human history, of 'mass maturity'(Pérez Díaz 2003). Over the last century, and more particularly over the last fifty years, people living in developed states have not only come to live much longer lives on average than their predecessors (gains in mean life expectancy), but survival to 'old' age has become widespread or, to borrow a phrase, 'democratised' (the proportions of each cohort surviving to given advanced ages have risen dramatically). Figure 1 charts this progress for women in Spain, while Figure 2 gives data for the first generations in Spain, Canada and Sweden where the proportion of those born who survived till their fiftieth year reached fifty per cent. the Hobbes famously remarked that in his 'state of nature' life was 'solitary, poor, nasty, brutish and short' (Hobbes 1991 [1651]). While much attention has been paid to the social relations of nastiness and brutishness, the importance of emancipation from cruelly short lives has not been sufficiently appreciated. Crucially, also, knowledge of this emancipation has become commonplace. Only in a world where people assume that reaching one's seventieth or eightieth year in robust health is normal can it make sense to discuss the provenance of threats to such an achievement in terms of 'risk'. Thus, for us, the contrasts made between 'risk' and 'fate' by sociological 'risk' theorists, such as Beck (Beck 1999) (Beck and Beck-Gernsheim 1998) Giddens (Giddens 1991) or Lash (Beck, Giddens and others) unhelpfully presents as the socially constructed *domination* of people's lives by necessarily opaque scientific expertise and specialization, what is experienced by most people as their *liberation* from the literarily fatal consequences of ignorance irrationality, disorder and the low level of the development of science and the productive forces. This development of mass maturity is no less fundamental than it is novel. Until not much more than a century ago, people in almost every corner of the globe could count themselves fortunate to survive much beyond their fortieth year. One in four routinely died before their first birthday (see e.g. data in Pérez Diaz 2003). Not only are lives now getting steadily longer, and people's quality of life at any given age better, but mortality is increasingly concentrated in older ages,

so that a long life is ever more a common expectation rather than seen as a stroke of fortune or God's special benediction.

The reproductive revolution: the decline of patriarchy

The other component is the irreversible atrophy of the force exerted upon wider social relations of the biological division of labour in reproduction. In populations with high rates of infant mortality and low average life expectancies, most women are condemned to spend the majority of their adult lives pregnant or breastfeeding neonatal infants. Until the last century this was true of almost all known societies on earth. Although there is room for debate over how best to analyse the precise nature of the causal link, this fact alone explains the hitherto ubiquitous dominance of patriarchy (but not the tremendously socially variable forms it has taken) (MacInnes 1998). While the mass of women were tied *by biology* to the overwhelming burden of reproductive work, and while for any given population control of women's bodies as a means of reproduction was central to securing the reproduction of any 'society' over time (Meillassoux 1981) (Rubin 1977) (Gil Calvo 1991), it is hardly surprising that social relations took a patriarchal form. Nor is it surprising that it has been precisely the liberation of women from the domination of such work over the last century that has created the material conditions to demolish patriarchy. The *idea* of equality between men and women has been around for millennia and at least since the time of Plato. Ideologically, liberalism, a discourse of human 'natural' rights has been defenceless against liberal feminism (Mann 1994). Once it is admitted that all men are equal it cannot logically be asserted that men and women are *un*equal. However the potential for its *practical* realization has only been released by the reproductive revolution, together with the evolution of potentially status-blind markets, bureaucracies and polities. This is what explains the great success of feminism over the last century. It has reduced the edifice of patriarchy in Western capitalist societies to ruins with hardly the slightest organised or formal resistance from men.

The gestation of the concept of a reproductive revolution began with the search within demography for better indicators of reproduction than simple fertility, and has been spurred on by recent empirical research on generational demographic change. The role of the 'French school' in demography, which along with family studies (de Singly 1993), always placed more emphasis on 'genealogy' was central to this development, and in particular the work of Henry (1965) and his concept of the reproduction of years of life. Unusually, Spain then played a key role in the development, through the work of two demographers who did their theses under the direction of the French school: Fernández Cordón (who went on to be director of the Instituto de Demografía) (1977; Fernández Cordón 1986; Fernández Cordón 1995) and Cabré I Pla (1979; 1999) who went on to become director of the Centre d'Estudis Demogràfics in Catalonia; and through the work of Luis Garrido (1992). It is in his article, 'La revolución reproductiva' (1996) that the expression itself is first employed.

We are clearly making a bold - and for some, pretentious - claim when we argue that reproductive change has not only been revolutionary, but of such overarching significance as to compare with the other two, generally acknowledged, revolutions

fundamental to the rise of modern society (Hobsbawm 1962). As we elaborate below there are two senses in which the expression might be employed. One is a strictly quantitative measure of the efficiency of human reproduction. This is the sense in which Garrido (1996) used the term. However we wish to add that this strictly quantitative concept, allows us to see more clearly the qualitative leap in human reproductive efficiency over the last two centuries and particularly over the last fifty years. This dramatic change lies behind a 'revolution' in the second sense of far reaching and fundamental changes in the relationship of reproductive activity to almost all other social relations. Demographic change cannot simply be seen as an 'effect' or consequence of other social changes, changes that we might also use to understand the political and economic revolutions. Rather it forms an essential third pillar on which the social relations of modernity rest. We wish to argue that only by appreciating the interconnected nature and far reaching character of change within this arena can key aspects of modernity be understood. In this sense, we see approaches to the demographic transition which attempt to account for it in terms of material or cultural determinants or 'causes' as partial. Moreover, in developing what we see as a sociology of reproduction, we explicitly do *not* mean a sociology of the social context *within which* reproduction (understood in terms of other dynamics) takes place. On the contrary it is part of our argument that the failure to take sufficient account of the sexual genesis of human beings has been a key theoretical weakness of contemporary sociology, unlike its pre-Second World War antecedents (Wrong 1961; MacInnes 1998). One illustration of this is the almost total lack of any contemporary sociological study within any advanced western society of how and why potential parents choose to have children and at what stage of the life course they make such decisions, despite the tremendous changes in the extent and timing of relationship formation and childbirth of various parities in all countries over recent decades.

The relevance of sexual reproduction, or human sexual genesis

Sexual reproduction, regardless of its social form, has five key implications.

1. The existence of two sexes necessary for reproduction forms the basis for the existence of a sexual division of labour which may be extended beyond reproduction to other spheres of social life and also form the basis for the elaboration of gender distinctions. (We see social constructionist approaches that attempt to explain the analytic construction of biological categories of sex in terms of the social relations of gender (e.g. Kessler and McKenna 1978) as simply standing things on their head).

2. Sexual reproduction gives humans finite and variable life spans. Unlike society or culture which, especially after the invention of writing, become in some senses infinite and potentially everlasting, humans are mortal, and tied inevitably to an individual body located empirically in time and space (Craib 1994). This means, *inter alia*, that any society or population (we elaborate on the distinction between these terms below) that is to survive over time must devote some of its activity to reproductive labour in the sense of sexually reproducing infant human beings to replace the deceased (Coale and Demeny 1983). Social reproduction requires not just the reproduction of social roles,

structures, networks, ideologies or identities, but the biological reproduction of people to populate or carry them. The essence of the reproductive revolution is that this latter activity has become spectacularly more efficient over the last two centuries, and especially over the last fifty years, freeing human energies for other activities, including, of course, the elaboration of new patterns of reproductive activity itself.

3. The combination of a pelvis narrow enough to facilitate upright walking with a brain large enough to manage the complexity of human consciousness has meant that human sexual reproduction not only requires childbirth that is risky for the mother, but is also followed by a prolonged period of intense neonatal care by adults until such time as the human infant become reasonably capable of maintaining social relations autonomously (Dinnerstein 1987). It is also clear that such care depends heavily upon the long term and stable presence of a very small number of individuals, usually the biological parents or close relatives of the infant but not necessarily so. Such care, understood best in terms of 'attachment' (Winnicott 1965; Bowlby 1971) explains the universal existence of the family (e.g.Goode 1964; Elshtain 1982), in widely heterogeneous social forms of course, and also serves the analytical function of dividing off a private from a public sphere (MacInnes 1998). Reproduction can only with great difficulty be 'industrialised' or undertaken in other social institutions (pace Davis 1937). When aspects of it are consigned to them, the results are routinely negative (e.g. the experience of those raised in orphanages or children's homes). Of course this does not mean that families always perform reproductive work well, or that they are not, sometimes, the site of neglect, abuse, violence or murder of children (Kelly and Radford 1987; Dobash and Dobash 1992; Alberdi and Matas 2002).

4. Because of the universality of the family, it has hitherto been the key institution regulating the inheritance of private property, given the mortality of individual human beings, so that virtually all societies, have until now sought to define and regulate legitimacy (Malinowski 1927; Morgan 1995). This could even take the form, for example in ninetneenth century Britain or in Spain up until the second half of the last century, of defining illegitimate sexual relations (that might result in the birth of a child and potential inheritor) as a crime equivalent to theft of property because it put the inheritance of legitimate heirs at risk (Pateman 1988).

5. It is because of these four central consequences that sexual reproduction and sexuality has always been subject to intense forms of social control at both the level of society (both normatively and by the state or whatever other institutions of social order exist, for example councils of elders) and at the level of the family itself. Until very recently virtually all known societies segregated the sexes in various ways; made some distinction between legitimate and illegitimate offspring; and regulated sexual relations, for example through the institution of marriage, prohibition or penalization of extra-marital sexual relations or the prohibition of non reproductive forms of

sexual activity. It is one of the key consequences of the reproductive revolution that such controls have rapidly disintegrated in affluent Western societies, allowing the distinction to emerge between reproductive and plastic sexuality and other changes that some observers have argued constitute the 'transformation of intimacy' (Giddens 1992; Jamieson 1998).

The reproductive revolution, contemporary sociology and policy debate

Understanding the nature of the reproductive revolution has profound implications for theory and how we understand sociology. Indeed, the scale of the revolution only becomes properly visible when we use a longitudinal perspective, and go beyond a 'sociological imagination' that is flattened by too great a reliance upon a transversal perspective. It also casts new light on several contemporary sociological and policy debates.

1. It highlights the problems of using cross-sectional or 'transversal' evidence to analyse social change over time, and especially social processes involved in the reproduction of society over time. These problems are frequently obscured by the tendency to imagine societies as essentially discrete, two-dimensional structures whose essential characteristics may be captured by the social survey or census, and which change over time as they move up or down history as coherent units (Anderson 1991). On the contrary we wish to emphasise the significance of mortal biographies and generational and life course change within a human society that spills across both state frontiers and time periods.

2. It casts grave doubts on most of the positions taken in the debate over so-called 'population ageing' (e.g. OCDE; BANCO MUNDIAL 1994). 'Population ageing' refers to social changes that are more profound than a simple change in the shape of age pyramids. We will argue that the term 'population ageing' is something of an oxymoron, and too easily becomes a neoconservative rhetorical device that manages to present as a 'problem' what is in fact unprecedented social *progress*: far more people enjoying longer, healthier, and - in some important respects - less constrained lives. This is presented as a 'problem' only to legitimate attempts to roll back the welfare state. Rather it might be seen as the achievement, for the first time, of mass maturity: the ability of all but an unfortunate few to enjoy not only long lives, but lives that last well beyond the years dominated by reproductive work (Pérez Díaz). Any calculation of 'dependency ratios' over time that does not take account of the rapidly changing social determinations of 'dependency' is of little use.

3. Similarly, understanding the distinction between transversal and longitudinal approaches to measuring fertility (as in the comparison of period total fertility rates and cohort completed fertility rates) should also make us much more cautious about the likelihood of imminent population decline, while understanding the reproductive revolution should also makes us less certain about whether such population decline, should it ever occur, is something to

be feared. 'Population' reductions might pose policy challenges to particular states, and alter the coefficients of their global power base. They pose no conceivable threat whatsoever to the reproduction of the species. Such a conclusion turns on the misuse of the term 'population' if transplanted too directly from biology to demography. Species may have populations. The earth has a human population. States have inventories of citizens, residents, those present within the territory who are not resident (a category significantly lacking from the standard terminology) and so on. To refer to such inventories as a 'population' is to apply a naturalistic term to what is a thoroughly social definition, determined by the way states are able to monopolise control of territory, define citizenship or nationality, control migration and so on. This application is facilitated by a sociological imagination that substitutes the transversal for the longitudinal.

4. It also helps us to understand both the strength of, and limits to, the social forces changing the nature of the contemporary family. These may well be diversifying, politicizing and socializing it, but the reproductive revolution and mass maturity has transformed relations between (grand)parents and children, redistributing reproductive work from a gender to a generational axis.

5. The reproductive revolution is also behind the changing relationship between diverse family forms and employment. Recognising this shows much of the debate currently undertaken in terms of 'work life balance' or 'conciliation of work and family life' to be superficial in its analysis, insufficiently aware of the demographic concerns of states in its construction, or of the changing patterns and complexities of 'family life'.

6. Finally, the reproductive revolution helps us understand the feminizing force of modernity (Segal 1987) and he contemporary seismic shifts in what is commonly termed gender relations (Connell 2002) but which we prefer to analyse in terms of a sexual division of labour or power relations between men and women. Central to contemporary change is the rise and fall of the male breadwinner system (Crompton 1999) (Fraser 1994; Creighton 1996) the rise, and more importantly, the material success of feminism, the decline both of formal patriarchy and the relative material power of men (MacInnes 1998), the decline of the sexual division of labour and in particular the shifting of the determination of distribution of much of the burden of reproductive work from sex to the life course, or gender to generation.

Clearly these are complex and wide-ranging issues. As a result we may be forgiven for adopting a somewhat didactic approach, in the remainder of this piece and also for concentrating our remarks on the reproductive revolution and population ageing and on the importance of generational or longitudinal perspectives in sociological analysis.

Economic progress, the visibility of labour, individual autonomy and time

The great leap forward in efficiency of reproductive labour associated with the rise of modernity has to some extent been hidden from view by a simultaneous but quite separate development: the trend rise in a market based society of the relative cost of 'technologically non-progressive' (Baumol 1967) and physically inalienable labour. (By the latter we mean activity whose results are inseparable from the presence of the person performing it.) Most reproductive labour has these two features. This yields a paradoxical result which is key to any adequate understanding of current fertility trends in affluent societies. Just at that point in human history where the efficiency of sexual reproduction has been revolutionised, and the social controls on sexuality have all but disappeared, it comes to *appear* as something that is becoming so much more costly that it is only possible to maintain at all if an ever greater share of its burden is assumed by the state. Falling fertility rates reflect two developments: a fall in the level of fertility needed for replacement, and changes in the distribution of people's activity between reproductive and other labour: a distribution which is increasingly under their own control.

There are two, distinct issues here. One is the social visibility of costs, an issue Baumol (1967) addressed in distinguishing technologically non-progressive activities. Within a market mechanism, the fantastic cheapening of commodities subject to technological innovation appears, paradoxically, as the relentless rise in cost of those commodities and activities which are not subject to this process. A useful illustration is opera. Live music requires the presence of large numbers of performers for relatively long periods of time, especially in relation to the size of its audience, and no technical innovation can reduce this volume of labour. (As Baumol noted, audiences might complain were performers to 'speed up' a piece, or 'downsize' the group of performers.) Live opera has thus become progressively more costly in proportion to the general standard of living, to the extent that it often now survives at all thanks only to considerable state subsidy. Where the level of the productive forces is low, the high labour input of opera is little different from many other activities, and the choice of alternative activities is restricted, so that the opportunity cost of opera need not appear very high. When everything is equally 'expensive', live opera can be a popular pastime. Conversely where the level of productive forces and general standard of living has grown, a vast rage of cheaper alternatives opens up making live opera appear a hopeless luxury. This becomes clearest if we compare it to recorded opera; something made possible in the first place only by technological advance and which becomes, along with other technologically progressive activities, fantastically cheap. The essential point for our purposes is that the general cheapening of other commodities makes activities requiring social interaction *relatively* costlier compared to the purchase (although not always the consumption) of inanimate technology.

The second issue is the changing nature and content of reproductive labour itself. It is clear that pregnancy, childbirth, lactation and the construction of a secure and intimate parental relationship with an infant are not only activities which are overwhelmingly technologically non-progressive, but are also, almost uniquely in modern societies, *status specific*. That is to say, it matters *who* does them. A sales assistant, a manager, even a nursery teacher, are readily substitutable on the labour market. The parents or guardians of an infant are not. Moreover, as the productive forces develop, and the

level and specialization of skills needed both in production and in other spheres of social life increase, or in Marx´s language, the value of labour power rises, (e.g. the development of general literacy, writing, communication and language skills, domination of common mechanical and later information and other electronic technology) not only does the volume of reproductive labour increase, but it becomes impossible for the family itself to sustain it: hence the development of universal education once industrialization has taken hold. Later still, as life chances, autonomy and mass maturity increase to the point where the mass of the population can imagine that they might plan their lives reflexively, assuming the construction of an 'identity', then the reproduction of infants capable of such an adventure might be seen to require still greater investment. Such developments lie behind Becker's (1981) contrast between the 'quantity' and 'quality' of children, although we disagree entirely with the theoretrical framework within which he places this, and the conclusions he draws. They also lie behind the trend rise in (increasingly 'expensive') time devoted to rearing children in affluent societies. Thus in Britain, over the last four decades or so, time diary evidence suggests that time devoted to childcare may have trebled (Gershuny and Fisher 2000).

The key to this enigma is to realise that it is only the tremendous development of the productive forces and general standard of living as a whole, intimately related with the reproductive revolution, that has so advanced the opportunities and life chances available to people, while simultaneously liberating them from direct obligations to perform reproductive work at all, should they so choose, that the latter appears as a 'costly' choice, or indeed as any choice at all. Again while moral conservatives lament that as a result the family has become a mere 'lifestyle choice' (Morgan 1995) or declining fertility rates attributed to shelfish hedonism (McDonald 2000) or shirking the collective obligation to reproduce the very basis of society (Myrdal 1968 [1939]) this is really vital (in every sense) *progress*.

Linder (1970) following Becker (1965) used conventional economic theory (along with its particular simplifying assumptions) to demonstrate that a logically inevitable consequence of economic growth was an increase in the shortage of time and a rise in its price. This takes us back to the contrast outline earlier between the infinite character of society and individual human mortality. As the *social* range of available opportunities increases choosing how best to enjoy them becomes more difficult, because an individual body can only be in one place at one time. However, the simplified model of 'society' used in such theories abstracts from both the variety of human lifespans, their changing average length, and individuals knowledge of both their own age and these general facts. While it is true that, as Keynes (1923) once remarked and is relentlessly quoted, 'in the long run we are all dead' this is true in two importantly different senses. First it draws attention to the inevitability of mortality in general in contrast to its unpredictability in particular. In the short run we are very much alive, but have little way of knowing, with precision, just where the boundary lies between 'short' and 'long'. Second, however, this aphorism highlights the fact that society or culture endure beyond the span of individual lives, introducing a fatal divergence between biography and history that not only marks a dividing line between individual and collective interests, but between the kind of thing that 'society' and the 'individual' are. We return to this issue below when we discuss the

transversal and the longitudinal. It is also true that in the short to medium term, not only are far fewer of us dead, but we are aware of this fact, and can, to some extent, plan for it. While the 'transversal' opportunity cost of any activity or course of action at any point in time becomes higher, this must be set against an increasing ability to plan across a much longer life course. This situation is often described in terms of the rise of reflexivity and self-identity (Giddens 1991). It might also usefully be seen in terms of a trend increase in what Dahrendorf (1979) called 'life chances' created by longer lives in which to pursue them.

The future of the family

The reproductive revolution, progressively frees sexual reproduction from normative or state regulation; the prohibition of contraception or abortion or other forms of state regulation of reproduction, weaken or disappear. Legitimacy becomes less relevant. Along with the rise of personal autonomy, the expression of sexuality is gradually disconnected from reproduction, permitting the rise of 'plastic' sexuality (Giddens 1992) together with its vast commodification. Norms and values, such as those discussed within the debate over the 'second demographic transition' (Van de Kaa 1990; Cliquet 1991; Lesthaeghe 1991), change so as to re-define sexuality as a private matter over which the individual ought to be sovereign. The current legalization of homosexual marriage and moves to prevent discrimination on grounds of sexual orientation, together with the dismantling of legislation that regulated sexual activity (adultery, sodomy etc) and the transformation of sexual activity into something firmly in the realm of the 'private sphere' represent some of the final stages of this process. Marriage regulated by church or state declines, supplanted by cohabitation and what Davis once called 'unconventionalised intimacies' (Davis 1937). The substitution of the family by the state as the institution which serves as the ultimate guarantor of subsistence, and the replacement of the household by the labour market as the main institution governing production weakens the family from outside, while inside it is undermined by the increase in the force of liberalism and personal autonomy (de Singly 1993; Flaquer 1998). People's status as citizen becomes progressively to supplant their status as family member (Mann 1994). At the same time as the family is socialised and hollowed out, it moves, paradoxically, towards the centre of politics, both as an object of state population policies, and as an institution charged with realising the rapidly expanding social rights of the infant, as well as their social obligations. This raises the question of the 'survival' of the family as the location of reproductive sexuality.

However it would be quite wrong to conclude from this, and from the atrophy of 'gender' that the family is destined to wither away. Rather it will assume a greater diversity of forms, all of which contain as their distinguishing feature the attempt (usually successfully realized) to maintain stable relations of attachment over time between at least one adult and an infant, and the later legacy of these relations in terms of feelings of love, mutual loyalty and obligation, or indeed, resentment hostility and alienation. Within all this vertical, generational relations between (grand)parents and (grand)children will continue to become *more* important than 'horizontal' relations between siblings, primarily because of the redistribution of reproductive labour, and its money costs, between parents and grandparents, and also because of the decline, along with fertility rates, of the absolute number of siblings

and other relations within similar age cohorts. Mass maturity, paradoxically, strengthens and extends the family, in the simple but basic sense that more generations of any family are likely to be alive at any point in time, as we have already seen.

The state and the collectivization of reproduction

Because the revolution in efficiency of reproductive labour has been outpaced by technological progress elsewhere, because it requires much more time and effort to producing autonomous adults capable of contributing to a complex, highly rationalised, scientific knowledge based society with an ever widening division of labour and because parents wish to endow their children with the capacity to purue their own, autonomous 'identity projects'; the relative cost of children rises inexorably, pulling the state further into the socialization of reproduction in the effort to arrest falling fertility rates. The current form this process takes is the debate over 'work-life balance' or 'conciliation of work and family life'. This is doubly ironic. States do not, in general, socialize the costs of childcare willingly. Compared to all taxpayers or workers or-voters those who are currently parents of dependent children (and those children themselves) form a rather small (and decreasing) group, especially compared to those who are, or are confident of becoming, old enough to draw a pension. However their fears of population decline, fuelled by their own neoconservative rhetoric of population ageing (see below), lead them to look for measures to boost fertility. If states thus address a real issue for the wrong reasons, their likely solution, (pro-natalist policies based on socializing further the costs of children through the extension of childcare services, fiscal transfers and subsidies to parents of dependent children) will, on past experience, have positive unintended effects on female and child poverty, but only insofar as they fail in their stated intention of increasing fertility rates (Folbre 1997).

An earlier phase of this same process was the rise and later decline in the male breadwinner system. As living standards rose, it became possible, for the first time in human history, to push the sexual division of labour in reproductive work to its limit such that women were largely confined to such work. This was especially the case where this development came before the generalization of domestic labour saving technology (running water, washing machines, gas or electric cookers etc) as in the Spain in the late 1950s and early 1960s, so that even within the reproductive revolution the volume of reproductive work increased. Elsewhere, such as the US, or Britian, where such technological innovation came earlier, women entered the labour market in increasing numbers from the 1900s (in the US) and the 1950s (in Britain) However this system quickly became a victim of its own success. As the efficiency of reproductive labour increased still further, women not only became freed to enter other areas of productive labour again, but were increasingly pushed there by the absence of domestic reproductive labour to perform. Moroever within a labour market rather than a patriarchal household economy, they could do so on increasingly equal terms with men. The male breadwinner system, was in some respects, like the flaring of a candle before it goes out: a last flourishing of patriarchy before it entered its terminal decline.

The myth of population ageing and catastrophic population decline

Much of the contemporary debate on population ageing (which turns upon the assertion that longer lifespans must mean an increase in the 'dependency ratio' between those in productive employment and those who are not) rests on an utterly false and misleading analogy between individuals and societies. Individuals do 'age' and as they do so they eventually become less capable of some activities. However ageing is a social as well as biological process, and one of the key results of the increase in the social forces of production has been an increase not just in average life expectancy, but in the standard of health and activity of people for any given calendar age. Sir Mick Jagger, for example, remains a sex symbol and rock star at an age which, a century ago, would have rendered him infirm had he been fortunate enough to survive at all.

What matters in dependency ratios is the balance between the productivity of those who work and the consumption levels of those who do not, as well as the relative size of these two groups. The dynamic forces of capitalism and disenchanted rationalization will continue to increase the productivity of the former. The consumption levels of the latter depend *inter alia* on the relative costs of maintaining retired and inactive people versus that of maintaining and educating those who have yet to enter the labour force. Insofar as the debate about population ageing is about concern over worsening 'dependency ratios' as the number of elderly inactive increases it is simply empirically mistaken. First, as we have seen the elderly take on an increasing amount of reproductive work, which facilitates much higher rates of incorporation of prime age women in the labour market, as well as maintaining high rates of male participation despite trends towards equalization in the domestic and childcare sexual division of labour (thus improving rather than worsening dependency ratios). Second fewer younger 'dependents' to some extent offset the increases in older 'dependents'. Third, improved health and morbidity restricts the increase in the consumption levels of elderly dependents (by restricting their 'demand' for health and social services). Finally, general productivity increases can be spread across rises in living standards and increases in the dependency ratio as long as they such increases are greater than that of the dependency ratio itself: something which has always been the case in the short to medium as well as the long term. 'Population ageing' has, at least, contradictory implications for dependency ratios. It is hard to avoid the conclusion that the language of 'population ageing', with the attendant imagery of social stagnation has been a convenient tool for conservatives looking for rationales to restrict the welfare state.

Demography and the state

Demography as a discipline has to an extent a certain vested interest in 'population' 'problems' that it might hold out the possibility of understanding and solving. These 'problems' are those of the state. For example states looking for sufficient conscripts for its armies, or contributors to its tax or social security systems, or concerned to gauge the demand for its health or education services. It is no accident, for example, that the British Census had its roots in the Revolutionary War with France (the British Government wished to know how many men of fighting age it might have at its disposal) (Colley 1994), nor that demographers happily conceive of 'populations' in terms of the physical boundaries of states and legal definitions of citizenship. States have routinely feared population decline as leading in the short or long term to the erosion of their power (Teitelbaum and Winter 1985). And demographers have frequently solemnly clothed such fears with scientific respectability. In an ironic twist of fate they have done the same with fears about population 'explosion' and the consequent impoverishment of the developing world: impoverishment that might, in the era of the cold war, nourish the growth of communism. But just as the dire predictions of population and national collapse in Europe in the 1930s and population and communist explosion in the South in the 1970s and 1980s proved mistaken, we might treat the current predictions of dire European population decline with appropriate caution. Let us make only three observations. First as long as life expectancy continues to increase (and there is evidence that it will probably continue to increase at much the same rate until the biological limits of ageing are reached – probably at something over 100 years) the 'replacement level' for fertility can lie below the oft-cited figure of 2.1 children per woman. This is graphically illustrated for Spain in Figure 3, which shows the difference between conventional reproduction measures and one based on Henry (1965), that is, the proportion of 'person years' being replaced. Second, any problem of population 'decline' is a purely political one in the context of a planet whose population has almost trebled in the last half century. It is about state rather than personal potency. Third, 'population ageing' is actually a simply a perverse way of describing one of the greatest modern accomplishments of mankind: the 'democratisation' of the chances of enjoying a long, and lengthening lifespan, together with a reduction in the proportion of that span dedicated to reproductive labour, and especially 'wasted' reproductive labour: an anodyne phrase for what it represents – the emancipation of the vast majority of people from the trauma of witnessing the death of their child. Compared to the ugly fate of those 'populations' condemned to live in states still blighted by war famine and disease, a fate all the more dreadful because readily avoidable, 'population ageing' is an achievement to be heartily wished for.

The transversal, the longitudinal and the demographic transition

Let us conclude with some methodological and theoretical observations and speculations. The first concerns the disciplinary division of labour between sociology and demography. It is only because the links between these two disciplines have recently been so weak that the kinds of gaps in knowledge and distorted conceptualisations that we have discussed above can come about. Sociology ought to pay more attention to 'reproduction' in the sense of the supply of mortal human beings as well as to the reproduction of social 'structures' such beings might fill. Demography ought to pay more attention not only to the social relations within which

the variables it tries to understand develop, but also to the constellations of state power within which it has developed as a discipline (MacInnes 2003).

The second concerns the relationship between the transversal and the longitudinal. Insofar as it has led to a world in which people have a more limited direct experience of the death of relatives or others they know personally and in which such experience occurs later in life, the reproductive revolution has helped contribute to the elaboration of a specifically transversal '*sociological* imagination' of societies, imagined as 'flat' self-reproducing structures which move through time, and in which the question of which particular individuals comprise a given population is for practical purposes irrelevant. Private trouble, to use Mills' formulation, is simply the microcosm of public issue. Thus, for example, the population of Spain in 2004 can be compared with that of 1994 or 1904, as if it were a matter of comparing something with a common element: Spanish society in 2004 with Spanish society in 1994. The sociological imagination effortlessly (and, we suspect, largely unconsciously) transforms longitudinal flows into transversal stocks. Thus, e.g. we might observe that population has 'grown' by x thousand, or that the working class has grown smaller or that a greater proportion of fathers are changing nappies and so on. Were we to assume that social self reproduction were perfect, that 'Spain' in its 2004 edition was essentially similar to 'Spain' in its 1994 (or for that matter 1904) edition, and that individuals were either immortal or entirely socially constructed, then this would not matter, because we would simply be measuring the 'same' social units at different points in time. It would not matter if we used (for example) the experience of those who are currently 'middle aged' in a cross sectional survey to represent either the future experience of the young or past experience of the old, or represent the life course as the progression from the experience of the currently young to the currently old. But since the *raison d'être* of sociology is precisely the need to understand the 'constant revolutionising' of modern society, this is an unhelpful, if not self-defeating assumption.

This is not just because the confusion of the transversal and longitudinal yields empirically misleading results, although it certainly does do that. For example the total fertility rate, much cited in debates about population decline and population ageing, routinely overestimates fertility decline in contemporary Europe because it assumes (as any transversal measure must to) that the best estimate of future behaviour is the reproduction (on a age pyramid adjusted basis) of current behaviour. It is because this confusion makes a simplifying assumption about the nature of social relations that is at once analytically crippling and politically convenient. Social relations are promiscuous across both time and space. Writing and later mechanical reproduction allow the long dead to communicate with the yet to be born. Everywhere. However for practical purposes it is often impossible to think of 'society' in terms of the global historical existence and evolution over time of civilization, or of 'history' as the manifold imaginings of the nature key aspects of the past must have assumed in order to give rise to social relations as we know them now. It has therefore been easier to think in terms of 'societies' with relatively discrete histories and diverse contemporary structures. It has been easier still to align the spatial boundaries of these societies with the contemporary states. Population metamorphoses into states' *populations*.

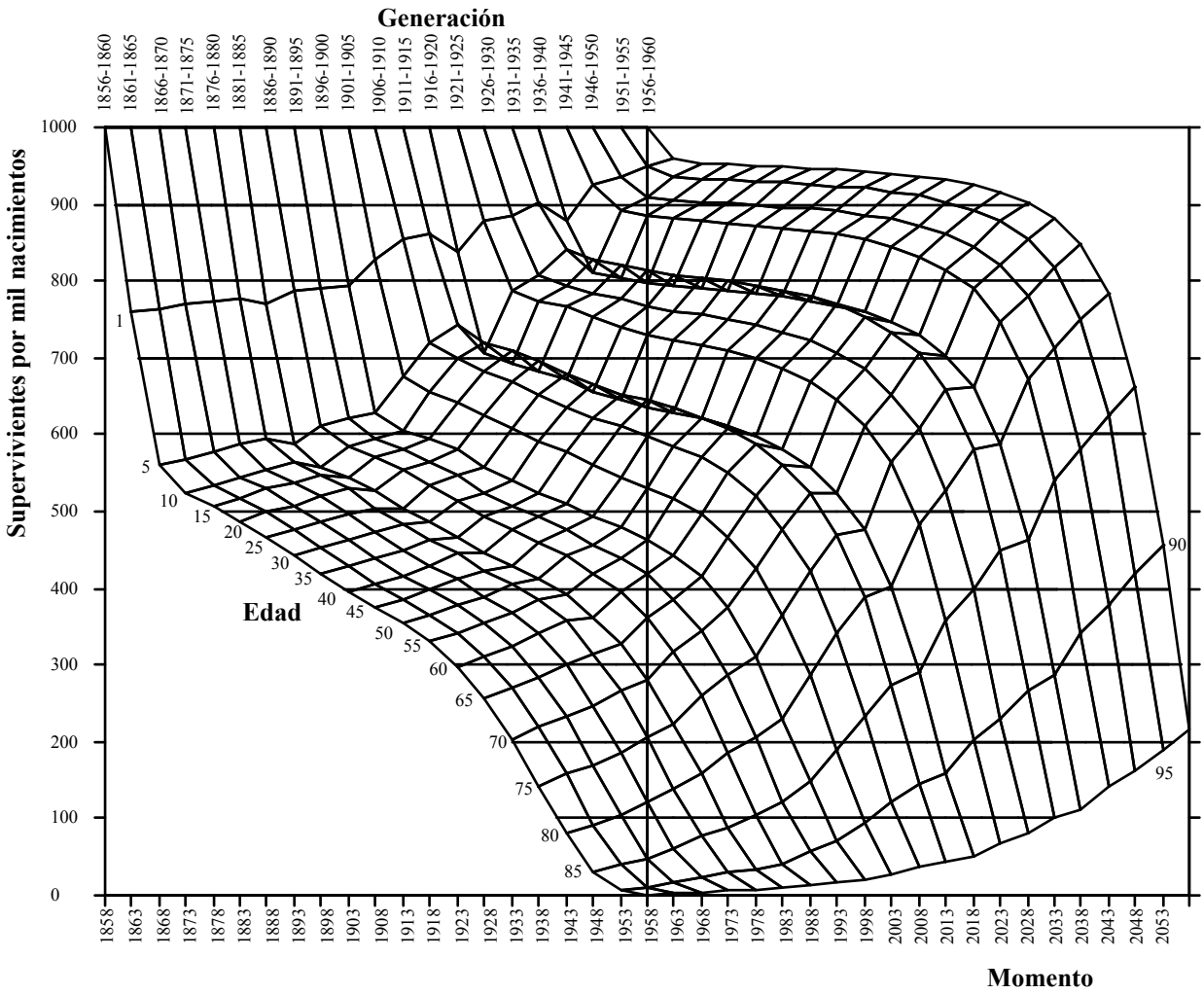
The demographic transition is based on transversal measures, while the concept of a reproductive revolution adopts a consistently longitudinal perspective, based on generational demographic indicators. This is decisive. In the demographic transition , mortality and fertility are not 'real' in the sense of phenomena actually experienced by any actual group of people, and take account neither of the passage of time in the life course nor the effects of changing mortality levels on peoples' actual lives. 'Reproduction' is the reproduction of 'stocks' as it were, rather than the reproduction of lives. That is why the issue of whether mortality falls produce lower fertility, and if so, what are the mechanisms which link the two phenomena remain unresolved. The demographic transition takes the form of an empirical generalization rather than a theory in the proper methodological sense of the term. In fact, it has been shown that mortality declines do not always precede fertility falls, as happened for example in Catalonia. It does not establish causal mechanisms that demonstrate how mortality falls produce a demographic transition. On the contrary, the concept of the reproductive revolution is a 'theory' in that it specifies causal mechanisms and directions. The demographic transition account is 'exogenous' to demography and depends upon rather general concepts of development and modernization. However the concept of a reproductive revolution can be developed within demographic terms that are themselves quantifiable.

Individuals may aspire to promiscuity, but find their lives anchored in a material body confined to only one place at any one time and limited, even after the reproductive revolution, to a lifespan that is definitely finite, but of unknowable duration. Their sense of self, identity or agency resides in their ability to think of their lives in terms of a biography over which they have determination, but not control. In a disenchanted era, they may discard a view of their lives in terms of fate, calling, God's will or the push and pull of nature or supernature, and seek instead to understand it in terms of the collision of their individual agency with the legacy of history and agency of others. This is, of course, a Herculean task. Little wander that Weber could use such terms as 'unprecedented inner loneliness' (Weber 1930) to describe the soul of those with 'no choice but to choose' (Weeks 1995). Moreover, that same Enlightenment and rise of scientific rationalization that dethroned God also demanded (in theory if not in practice) that men henceforth make history in a way that respected each other's agency, forcing social order to contend with liberty. One way to simplify this task has been to appeal to the old bases of order and structure: nature and faith. These may be and remain surprisingly effective strategies, but in the longer term run up against the problem that since the will of God or nature rests upon human interpretation, they merely project the making of a choice onto others.

Another way to simplify this task has been the sociological imagination. Perhaps in the absence of Divine or Natural laws, men might discover 'social' laws to guide their understanding of social action and consequence. But this imagination can actually obscure the processes of social change if it is exercised in too simple a form, giving us over socialized conceptions of people (Wrong 1961)whose life courses are read off from transversal data or 'snapshots' at a given point in time of what is imagined to be social structure. Thus a major challenge posed to sociology in understanding the reproductive revolution is to develop ways of imagining or theorizing society that

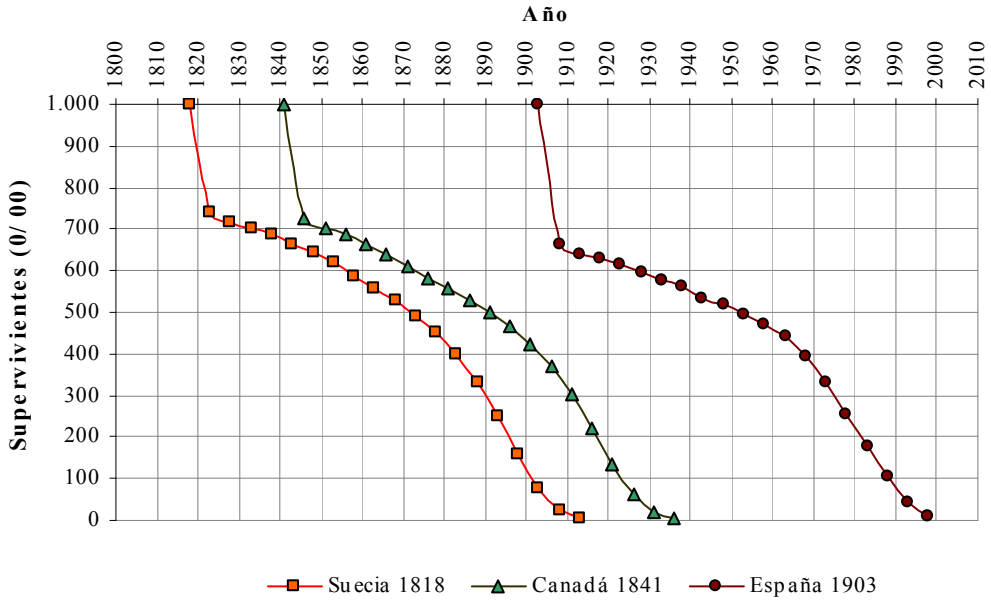
enable us to see the longitudinal, and see the construction of the social through the prism of the development over time of biographies, constructing the transversal from the longitudinal, rather than vice versa.

Figure 1. Spain: Survival curves for women by generation 1856-1960



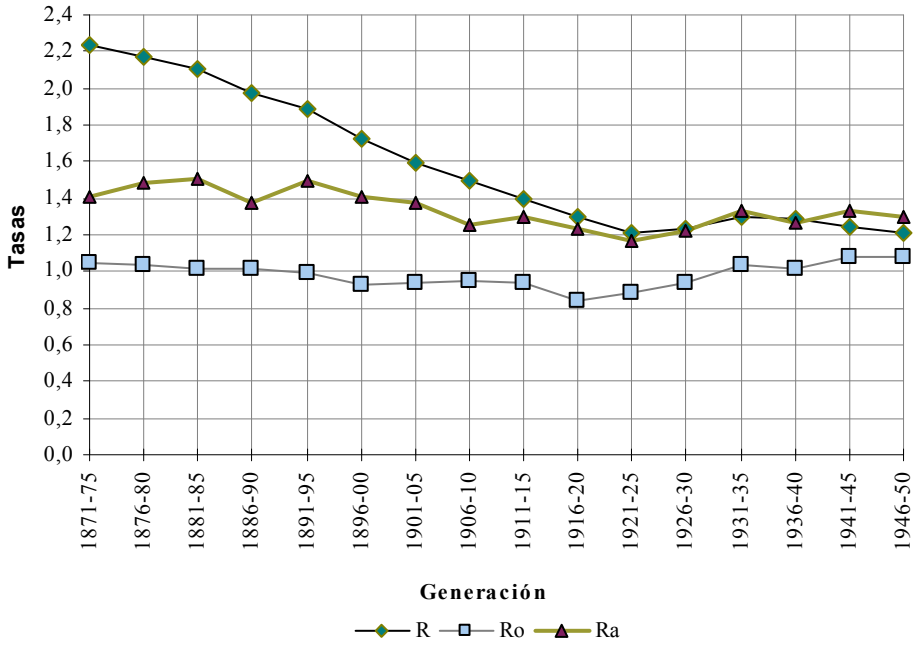
Fuente: Datos tomados de Cabré Pla, A. (1999), *El sistema català de reproducció. Cent anys de singularitat demogràfica*, Barcelona, Ed. Proa, Col. "La mirada".

Figure 2 Survival curves by agae for the first generastions to reach 'mass maturity' in Sweden, Canada and Spain.



Fuente: Pérez Díaz, J. (2002), pg. 16.

Figure 3 Evolution of gross and net reproduction rates, and reproduction of years of life. Spain by generation 1871-1950.



Fuente: (Cabré i Pla 1989)

Nota: R (Gross reproduction rate) average number of daughters per woman.
R_0 (Net reproduction rate); average number of daughters per woman who reaches fertile age.
R_a (Rate of reproduction of years of life).

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[i] Author's analysis UK Millenium Cohort Study. UK Data Archive SN 4683.
[ii] Author's analysis UK Millenium Cohort Study. UK Data Archive SN 4683
[iii] Authors analysis ISSP Family and Gender Roles III survey (GB UK Data Archive SN xxx; Spain Centro de Investigaciones Sociologicas 2529).