A century of divorce: macroeconomic conditions and marital dissolution in Sweden 1915-2010

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1. Introduction

This paper addresses the relationship between changing macroeconomic conditions and the growth in marital instability in twentieth century Sweden. Empirically it focuses on three aspects of economic change often put forward in the discussion on increased divorce rates over time; macroeconomic conditions (typically economic growth and increased living standards) and change over the business cycle, the increasing economic integration of married women in market work, and the expansion of welfare state expenditure. The main rationale of the present paper is that although research on micro-level determinants of divorce is abundant (see Amato & James, 2010; Amato, 2010; Lyngstad & Jalovaara, 2010; Stevenson & Wolfers, 2007; White, 1990 for reviews), there are few studies that use inferential methods to assess the relationship between long-term macro-level change and divorce[1]. Further, most studies that investigate the impact of macroeconomic factors on the divorce rate focus on Anglo-Saxon contexts and on shorter parts of the postwar period, which implies that extant research misses out on a long-term time perspective and the experiences of the Nordic countries that served as socio-demographic precursors and were early representatives of the high divorce rate regime.

The present study investigates the relationship between macro-level economic conditions and the divorce rate in Sweden between 1915 and 2010. It is situated against the backdrop that the long-term development of divorce in Sweden shows a remarkable growth during the twentieth century (Figure 1). Divorce was uncommon until the early 1970s, where after it became a staple of modern family life.[2] In 1974 the divorce rate reached a peak of 14 divorces per 1,000 married women, which is 20 times higher than that of the first decade of the century.

Figure 1 about here

The increase in marital instability in Sweden is closely paralleled in other North European and Anglo-Saxon countries (Goode, 1993: 84, 139; Phillips, 1988: 585), making divorce one of the most profound demographic changes during the past hundred years. Increased divorce

[1] Exceptions are South (1985), Bremmer & Kesselring (2004), Nunley (2010), Amato & Beattie (2011) and Schaller (2013) on the US; Sander (1986) and Cameron (1996) on the UK; and Fischer & Liefbroer (2006) on the Netherlands.

[2] Developments can also be described along the lines of change in the 25-year probability of experiencing a divorce. Of the couples that got married in the early 1940s (during the first major upward shift in the divorce rate) only 10 per cent had divorced after 25 years (Statistics Sweden, 1967: 68–69). Comparing them to couples that got married 30 years later, in the early 1970s, the proportion that had divorced after 25 years had increased to almost 40 per cent (Statistics Sweden, 2010: 405).

rates commonly reflects changes in the economy, in the function of the family, and in gender relations, which are all prominent features of the twentieth century across industrialized nations. Generally, a positive association is assumed between economic conditions and the divorce rate, but the empirical foundations of this claim are rather weak. The purpose of this paper is to examine the impact of economic conditions, together with measures of female independence and welfare expenditures on the divorce rate through multivariate time series analysis of annual data from Sweden for almost a century, between 1915 and 2010. We test whether recessions glue people together rather than tear them apart? We also follow up on the claims that increasing female independence and welfare state expenditures boost the divorce rate. In these respects, Sweden is a fitting context for investigation because it has been a forerunner both when it comes to divorce, female independence and welfare state expansion. Compared to previous time series analyses of factors influencing the divorce rate, we use a superior alternative to the methods of analysis that others have used. The present paper thus provides both empirical and methodological contributions to the literature on divorce trends.

The paper will proceed as follows. Section 2 provides a description of previous research concentrating on the relationship between macroeconomic conditions, female independence, welfare state expansion, and the divorce rate. This section also provides a brief summary of relevant theory, which builds up the expected associations between the aforementioned indicators and the divorce rate. In Section 3, we describe data and methods applied in the analysis, and present the main regression results in Section 4. The empirical investigation indicates that change in the divorce rate in Sweden 1915-2010 is a long-run process of structural change rather than a response to change over the business cycle. Our results do not support the established claim that divorce increases when the economy is strong but rather the opposite. We find that, in the long-run, the divorce rate is negatively associated with GDP per capita increases and positively associated with unemployment. Welfare state expansion is positively associated with divorce in the long-run, making divorce possible through public sector employment and caregiving support, which serve female independence more than improvements in women's relative earnings. In the medium-run, people also divorce during economic downturns, especially when unemployment is high, although these effects have been balanced off by Keynesian politics in which welfare state expansion plays an important part. Section 5 concludes with a discussion of the results and their implications.

2. Previous research and theoretical considerations

The main explanations to the increase in the divorce rate across Western industrialized nations during the twentieth century include changing macroeconomic conditions with the development of market capitalism and long-term economic growth, increased female independence through the integration of married women in the labor force, and welfare state expansion. All three explanations suggest positive associations between the divorce rate and business cycle indicators, the economic position of women relative to men, and welfare state expenditure, yet there are surprisingly few empirical tests of whether these associations actually hold up on macro-level data.

2.1 Economic conditions and the divorce rate

Although the claim that divorces increase in times of prosperity and fall during economic downturns has been put forward since the 1920s (Goode, 1971; Thomas, 1927), it is supported by scant and mixed evidence, primarily from the United States.

By simply eye-balling the relationship between trends in GDP (alternatively GNP) and the divorce rate, a positive but quite modest association has been identified for the US but not for Europe (Goode, 1971; Norton & Glick, 1976; Phillips, 1988: 552). Simple correlations, also based on data from the United States, have established a positive association between the business cycle and divorce up until 1950 (Ogburn & Nimkoff, 1955; Ogburn & Thomas, 1922; Vigderhous & Fishman, 1978). For the postwar era, empirical results are mixed. Nunley (2010) estimates a structural time-series model that allow for a stochastic trend component for the period 1955-2004. He finds that divorces increase during economic upswings in the US. Nunley, however, uses the crude divorce rate as dependent variable, which is not standard since it does not adjust for changes in the size of the married population. Procyclical divorce is, however, confirmed by Hellerstein & Morrill (2011), Amato & Beattie (2011) and Schaller (2013)[3] using state-level vital statistics data for the period 1976-2009. South (1985) estimates an autoregressive econometric model on the more accurate divorce rate per 1,000 married women, finding a negative, countercyclical, relationship during 1947-1979. Contrary to other studies on US data, South finds increasing divorce rates during recessions as measured by changes in GNP and unemployment, controlling for female labor force participation and age structure of the married population. It is difficult to assess if the diverging results in the extant literature are due to different relationships between economic conditions and divorce during

[3] Amato & Beattie (2011) and Schaller (2013) both use measures that adjust for the married population.

different time periods or if the results are influenced by the choice of measures, models and methods used. Therefore, it is hard to draw any firm conclusions regarding the long-term association between economic growth and divorce.

From a theoretical point of view, long-term economic growth and increased living standards are linked to new demographic behavior including divorce. A positive association between increasing levels of affluence and divorce is suggested by social theories; explicitly in Goode's so called *socio-economic growth hypothesis* (Goode, 1993: 26–30), and implicitly in the theory of the Second Demographic Transition (Lesthaeghe, 2010; Lesthaeghe & Surkyn, 1988; Van De Kaa, 1987, 2001).[4] From an economic theoretical perspective, macroeconomic changes affect the gains to marriage by altering consumption, leisure, and household specialization. Economic booms and downturns (including family economic shocks such as job loss) are seen as unexpected events affecting marriage and divorce.

In the economic analysis of divorce, individuals compare their relative well-being from staying married versus outside-of-marriage alternatives and the costs of divorce. When there are no longer gains to marriage, or when both partners are better off single than married, divorce will occur. Becker's (1973) model of divorce rests upon the assumption of rational choice; that individuals choose the most attractive alternative, and act in their own interest. If the outside-of-marriage alternative becomes relatively more attractive (or the expected utility of staying married decreases), divorce should increase. Similarly, when the costs associated with divorce increase (relative to family resources) divorce rates should decline. Much of the gains from marriage result from intra-household specialization among partners. New information or new developments is a critical part of the analysis of divorce, but whether divorce rates should covary with the business cycle in a pro- or countercyclical way is not straightforward from theory.

Unemployment and negative income shocks are predicted to spur marital instability (Jensen & Smith, 1990; Weiss & Willis, 1997; Charles and Stephens, 2004; Doiron & Mendolia, 2012).[5] According to Becker (1973) changes in men's and women's labor market conditions should

[4] While Goode argues that divorces increases due to changes in direct economic constraints, the proponents of the Second Demographic Transition argues that increased affluence rather affects values.
[5] Charles & Stephens (2004), however, find that job loss, measured as layoffs, increases the risk of divorce. They also find that disability and plant closures have no effect on divorce. These results cast doubt on the divorce due to pecuniary reasons since disability, plant closure, and layoffs have similar long-run consequences.

have differing effects on divorce over the business cycle. If the marginal utility of a married couple is higher than that of two individuals, a negative shock to male employment and income should decrease the gains to marriage. But, in line with specialization, a negative shock to female employment should increase the gains to marriage by reducing the opportunity cost of home production. If we do not know the magnitude of these effects, it is impossible to determine which one will dominate in times of recession. Given that men's employment and income often is more important to families than women's employment and income, and given that men's labor market opportunities suffer more in recession, this mechanism will cause a positive relationship between unemployment rates and divorce rates.

Becker et al. (1977) extended the basic Becker framework to marital instability and divorce[6], suggesting that that divorce begets divorce. As divorce become more common, women are more reluctant to specialize in home production.[7] Uncertainty and deviations between expected and realized utility from marriage becomes important in the extended (two-state) Becker model[8] to the extent that the business cycle-induced changes in the specialization gains to marriage described above should influence the divorce rate in the opposite direction. Decreases in male wages and employment opportunities cause the gains from marriage to fall, increasing the likelihood of divorce. Meanwhile, if couples increasingly view marriage as insurance against potential job loss or income shocks during recessions, an increase in unemployment rates would lead to a decrease in the divorce rate.

It may also be more or less costly to obtain a divorce. Poor economic conditions are commonly associated with difficulties outside of marriage, particularly if partners draw heavily on marital economies of scale. More recently, economists have put forward that gains from marriage come from joint consumption and insurance to earnings shocks (Weiss, 1997; Stevenson & Wolfers, 2007; Shore, 2009). It is more costly to maintain separate households after divorce than maintaining a joint household, which should matter more during a recession (Shore, 2009). If couples are economically constrained during economic downturns, they may be less likely to divorce because they cannot afford to do so. If the cost of getting a divorce varies over the business cycle, and further, in the presence of credit constraints, couples may

[6] Their extension included the proposition that couples choose to separate when the expected utility from divorce (and possibly remarrying) is greater than the expected utility from remaining married.
[7] Actually both partners are less willing to invest in marriage-specific capital.
[8] In the Becker et al. (1977) framework, the probability of divorce is inversely related with the expected gain from marriage and positively related with the variance in the distribution of expected gains from marriage.

change the timing of divorces depending on how the economy is doing, even if their overall likelihood of divorce is unchanged. Moreover, economic downturns commonly coincide with weak housing markets, which make it difficult for people to realize their real estate investments, and finance the costs of divorce and its subsequent expenses. Given the gains from joint consumption and insurance, and their importance during recessions, the relationship between unemployment rates and divorce rates will be negative.

While the Becker model of divorce (with extensions) is the basis for much of the economic analysis of marital decision-making, it is commonly acknowledged too simplistic for analysis contemporary divorce behavior. There are other reasons as to why divorce rates may covary with the business cycle. An economic shock can affect the net present value of marriage to all couples by the same amount. For example, if economic busts lead to increased marital conflict and stress, the relative value of marriage will fall for all couples, to the extent that some will divorce. Economic booms may, on the other hand, allow for people to escape from marital conflict divorce through better labor market opportunities, not least for women who, with increased earnings potentials, become more independent and likely value options outside of marriage more highly.[9] The prediction is thus that divorce rates will increase during economic upturns and good times.

Given these presuppositions, the expectation is that divorce should increase during periods of economic growth (and low unemployment) as married individuals experience less economic constraints working against separation. When demand for labor is high, wages will increase and it will be easier finding employment, especially for women who typically have less human capital than men. The opposite will occur in recessions when unemployment makes couples postpone or all together forgo union dissolution. For proponents of the Second Demographic Transition theory, increasing economic security during economic booms will also make it possible to prioritize higher order needs such as emotional fulfillment. In sum, divorce rates will increase during periods of economic prosperity and covary with economic growth in a procyclical way. But economic growth may affect divorce in the opposite direction, making it increase as a result of increased marital strain caused by deteriorating economic conditions within the household during an economic downturn, making the divorce

[9] With increased female labor force participation, it may also be more likely that people finds new partners on the job (McKinnish, 2004). Interestingly, similar results have been found for workplace sex composition and divorce in Sweden (Svarer, 2007) and the United States.

rate change in a countercyclical fashion. The end result depends on which of these forces outweighs the other. In the analysis we test which of these assumptions best fit the empirical record of Sweden by assessing the relationship between the divorce rate and the GDP *per capita* growth rate and aggregate unemployment.

2.2 Female independence and the divorce rate

As compared to the potential impact of economic conditions on the divorce rate, there is more consensus regarding the relationship between female independence and the divorce rate in the extent literature on divorce, at least in the one concerning the postwar period. South (1985), Bremmer and Kesselring (2004), Nunley (2010), Cameron (1996) and Kalmijn (2007) all find that female economic independence, proxied by changes in aggregate measures of female labor force participation or women's level of education, is positively associated with divorce. A study by Ruggles (1997) with a longer temporal scope that uses US census data between 1880 and 1990 finds that the probability of being divorced among females aged 20-39 is consistently positively related to the labor force participation rate on the county level for all census years.

Following Becker (1973), specialization maximizes the gains to marriage and reduces the probability of divorce. Men and women in married couples are complementary and more productive together than apart. The gains to marriage derive from differences in market and non-market productivity of men and women who trade with each other. It is actually not clear as to whether specialization is a "good" choice, and given that individuals differ in preferences it is not clear as to whether full specialization ever occurred. It is, however, evident that household specialization took on a different meaning, and that the risks of specialization, particularly on behalf of women, increased with developments over the course of the twentieth century. These developments included smaller family sizes, less connection to extended family and community obligations, the decline of the male breadwinner model, and increasing divorce rates. Improved labor market opportunities for women and rising female-to-male relative wages made being single a more attractive alternative by increasing women's material standards.

In family demography in general, and in divorce research more specifically, it is argued that changes in women's living conditions and behavior have been more important than that of men (Hewitt, Western & Baxter, 2006; Kalmijn & Poortman, 2006; Phillips, 1988;

Sandström, 2012; Stanfors, 2003). In divorce research, the emergence of the dual-earner family and increased economic integration of married women in to market processes outside the family have been the most commonly referenced explanation to increased divorce over time. Cherlin (1992: 51) concludes that: "every well-known scholar who has addressed this topic in the twentieth century has cited the importance of the increase in the employment of women." The theoretical perspective that most strongly emphasize this is Becker's neoclassical model (Becker, Michael & Landes, 1977; Becker, 1981: 30–79). The basic idea proposed by Becker in the so called *independence hypothesis* is that when the gendered division between market and non-market work disappears there are no longer any differences in skills that can be traded between the partners and the net utility of marriage is lowered as well as the opportunity cost of divorce for both spouses. Although the independence effect of female labor force participation is counteracted by an *income effect*—as both spouses will benefit from the increase in family income—the net effect on divorce is thought to be positive (Ross & Sawhill, 1975).

The independence hypothesis has been important to empirical divorce research. But it has also been criticized for being too simplistic in its assumptions about how husbands and wives maximize their utility within marriage and for being unrealistic for contemporary dual-earner societies. Oppenheimer (1997) argues that in a setting where female labor force participation have become near universal and institutions have been adapted to the ideal of gender equality, acceptance of asymmetrical relationships should become less attractive, especially for women. Furthermore, the development of modern flexible labor markets has made employment more unsecure. Under these circumstances the reduced risks experienced by dual-earner families due to mutual income pooling will result in the utility of marriage being highest when both spouses work. Under these circumstances, the sum of the economic whole is greater than its parts, and a traditional division of labor might rather destabilize relationships. Consequently, the impact of female economic activity on divorce will likely not remain the same when the provider model is transformed and it might well change from a positive to a negative relationship over time.

2.3 Welfare state expenditure and the divorce rate: the role of welfare regime type and size of the public sector

Apart from the business cycle and the level of female economic independence it is also important to consider institutions as a factor determining the long-term development of the

divorce rate. The institutional setting may be assessed in terms of the role of the state and the size of the public sector. Although scholars argue that divorce constraints have been lessened by the spread of social insurance provided either by a mix of welfare state institutions or by market solutions, there is to our knowledge, no formal test of the long-term association between growth of welfare state services and divorce in the current literature.

The Nordic countries, belonging to the Social Democratic welfare regime type, have distinguished themselves by making individuals—and in particular women—less dependent on the family through, state support, for social security (Esping-Andersen, 1990, 1999). The Nordic model's emphasis of individual provisions, based on the principle of income replacement and tied to employment, is gender-neutral by design, guaranteed by the state and thus important for easing divorce constraints for both men and women. Esping-Andersen argues that the Nordic model is distinctly different from both the Anglo-Saxon and Southern European welfare states in that it primarily does not rely on either the market or the family and that: "social-policy has been explicitly design to maximize women's economic independence" (Esping-Andersen, 1999: 45–52). In the case of Sweden, the expansion of female employment opportunities after the Second World War have also been primarily driven by the increase in public consumption and expansion of welfare state institutions in social services, healthcare, and education (Leira, 1992; Sainsbury, 1994). Thus, the expansion of the welfare state and its services have provided women with both labor market opportunities and individual social security, which both are factors that have worked to lower divorce constraints by facilitating the capacity to sustain oneself independently of family ties. Women in modern welfare economies thus have more independence both economically and socially. As such, they are more able to walk away from difficult marriages with the knowledge that they will not be without means to support themselves and their children. Consequently, increasing welfare state expenditures and public sector employment will be positively associated with divorce.

2.4 Other factors of relevance for the divorce rate

Among other factors of relevance for the development of the divorce rate we find legislative changes, change in the age structure of the married population, and previous levels of marriage and divorce.

The rise in divorce rates in the United States has been, at least partially, attributed to the changes in divorce laws, especially the introduction of unilateral divorce laws (Peters, 1986; Friedberg, 1998; Wolfers, 2006), yet its impact on divorce rates is still an open question (see Lee & Solon, 2011, arguing against Wolfers). During the time that divorce rates were increasing, many states introduced no-fault[10] divorce, which made divorce easier and less stigmatizing. Further, separation was made easier though unilateral divorce, which allows one partner to obtain a divorce without the consent of the other partner. Becker et al. (1977) suggested that the divorce rate should not be affected by the introduction of unilateral divorce laws because it simply reallocated the property right – of oneself or one's spouse to remarry - from one partner to the other. Peters (1986) applied the Coase Theorem, emphasizing the roles of "transaction costs" and "property rights", to the issue of whether it matters for divorce if fault is ascribed or consent is enough. Using state-level variation in divorce laws as a natural experiment, she found that states that introduced no-fault divorce had higher divorce rates and lower settlements between partners than states which did not liberalize divorce laws. But, she also found that the law reform in itself did not increase the divorce rate and thus they reflected social norms already in place. While Friedberg, when replicating Peters' study, allowing for social and demographic trends within each state, found a strong effect on divorce rates, Wolfers (2006) focuses on the dynamics of divorce rate responses to legal change. He concludes that divorce rates rose sharply in the years following immediately upon reform, most likely from bottled up demand, but then declined to previous levels.

As for the role of age structure, Michael (1978) shows that large parts of the growth in the US divorce rate from 1960 to 1970 is attributable to couples in their 20s. Younger couples generally have higher divorce risks. The fact that people who marry early are more likely to divorce is related to imperfect information: about themselves, their partners, and the prospective marriage pool they forgo at an early stage after a short search period. Postponement of marriage, observed across industrialized nations, is thus stabilizing marriage.[11] Easterlin (1980), on the other hand, argues that the rise in divorce is not only related to couples marrying at a young age, but that relative cohort size also matters. The

[10] A no-fault divorce system implies that divorce can be obtained without ascribing a fault such as adultery or abuse to a partner. Instead, "irreconcilable differences" is a good reason for divorce.

[11] Postponement of marriage often involves cohabitation as a trial period or, as in the Nordics, a first stage of family formation. Oppenheimer (1997) makes the point that cohabitation serves to delay marriage, but not to replace. It is important to make the distinction between non-marriage and delayed marriage, which are two different phenomena, yet confounded in data. In the US, there is evidence for non-marriage among Afro-American women, but only delayed marriage for white women.

proportion of young adults in relation to older adults is assumed to be positively associated with divorce. According to the *relative income hypothesis*, young workers belonging to relatively small cohorts experience less competition in education and the labor market, they experience low unemployment rates, and hence they soon get high incomes relative to their parents' generation, which is their benchmark when it comes to aspirations. Individuals belonging to small cohorts thus find it easier to fulfill their aspirations, including marital roles, and, will both marry young and experience lower rates of divorce than others. Conversely, young workers belonging to large cohorts will have lower incomes compared to older workers, they will face difficulties meeting their aspirations, experience strain and stress, marry later, and be more likely to divorce. Easterlin argues that these cyclical changes in the incomes of younger relative to older workers, rooted in variation in relative cohort size, are the underlying causes of a number of social problems, including divorce.

The previous level of divorce is another example of factors suggested to determine the trend in divorce. To a high extent divorce begets divorce. Increasing divorce may be seen as indicative of more liberal attitudes towards divorce, lessening the stigma attached to it (Becker, 1981: 215). Moreover, a high level of divorce in one year increases the pool of marriageable partners for those who are contemplating divorce. Good prospects for repartnering make divorce more attractive (Chiappori & Weiss, 2000). Moreover, increasingly sex-integrated workplaces provide better opportunities for men and women to meet than before (McKinnish, 2004; Svarer, 2005). Conversely, high levels of marriages in the preceding years sets limits to the potential partner pool. Previous marriage rates are generally important, positively correlated, determinants of divorce rates.

3. Data and methods

3.1 Data and measures

The data used is in this study mainly consists of official Swedish statistics that document demographic and economic trends on an annual basis. Data required to test the hypotheses put forward are limited, mainly due to the historical orientation of the study. Some computations have been made in order to get consistent time series with annual data. In Sweden, population statistics date long back. Statistics on labor force participation and wages are, however, incomplete, inconsistent or of a lower quality.[12] We deem the data used to be unique in that

[12] Many time series, for example age- and sex-specific labor force participation and wage rates are only available on an annual basis, for the post-war period.

they are consistent time series covering a long time period. The data are of acceptable quality that makes it possible for us to assess the impact of economic conditions on aggregate level divorce, controlling for a number of relevant factors.

Our dependent variable is the refined divorce rate, defined as the number of divorces per 1,000 married women. The refined divorce rate is insensitive to the age composition of the married population but preferable to the crude divorce rate and the ratio of divorces to marriages. Since we include a measure of age structure (relative cohort size, see below) as an independent variable in the model, the insensitivity of the refined divorce rate to the age composition of the married population should not harm the results. Calculation of the refined divorce rate is based on annual data for the number of married women and the number of divorces from vital registration data published by Statistics Sweden from 1871 and onwards.[13]

We examine the impact of macroeconomic conditions on divorce by approximating macroeconomic conditions with the growth in GDP *per capita* and aggregate unemployment rates as alternative proxies for the business cycle. GDP *per capita* are retrieved from the Swedish Historical National Accounts (available 1650-2010, administered by Lennart Schön and Olle Krantz). The measure is in SEK (constant prices, 1910/1912 price level). The unemployment rate series, which began in 1911, first denotes unemployment among union members; then (beginning in 1956) it denotes unemployment among members of an approved unemployment insurance fund; and from 1963 and onwards, the unemployment rate is measured as the percentage of individuals unemployed or seeking work in relation to all individuals in the labor force. The unemployment rate is since 1963 available from the Swedish Labor Force Surveys.

In order to capture an assumed impact of female independence, we use a female-to-male relative wage measure, which begin in 1913. The relative wage, indicating women's economic position relative to men, is measured by the hourly female wage in manufacturing industry divided by the corresponding male wage rate. Consistent time series on male and

[13] Own computations by Sandström and Stanfors from Statistics Sweden, *Bidrag till Sveriges officiella statistik. Del A, Befolkningsstatistik* (Population statistics) 1859-1910; *Befolkningsrörelsen* (Population movements) 1911-1962; *Folkmängdens förändringar* (Population changes) 1963-1966; *Befolkningsförändringar Del 3, Hela riket och länen m m.* (Population changes, part 3) 1967-1990; *Befolkningsstatistik. Del 4, Födda och döda, civilståndsändringar m m.* (Population statistics, part 4) 1991-2000; *Tabeller över Sveriges befolkning* (Tables over the Swedish population); 2000-2010.

female wages in manufacturing industry have been constructed for a long period by Svensson (1995) and updated by Stanfors (2003, and here)[14]. These wage series are weighted by the share of female and male workers in each branch of the manufacturing industry in order to get an industry-specific relative wage. In 1913, a female worker in Swedish manufacturing earned 58 per cent of what the average male worker earned by the hour. In the early 1990s, the relative wage had improved considerably, reaching 90 percent of what men in manufacturing earned.[15]

Welfare state expenditure and the size of the public sector is proxied by the share of public service employment in relation to total employment. It is retrieved from the Swedish Historical National Accounts.

Four other independent variables are included as controls in the model. Relative cohort size is a proxy for relative income designed to reflect the social and economic pressures felt by members of large cohorts predicted by Easterlin. Here it is a simple ratio of the male population aged 35 to 64 divided by the male population aged 20 to 34.[16] This implies that when the ratio falls, the relative situation is assumed to deteriorate for the young.[17] According to Easterlin's theory, this proxy is negatively related to divorce. The other three are 1) the previous divorce rate, measured as the refined divorce rate in the previous year; 2) the previous crude marriage rate, measured as the number of marriages in one year divided by the total number of women aged 20-64 in the population at the end of the same year; and 3) female age at first marriage. The first two capture the pool of potential new partners, which may affect the divorce decision. The previous marriage rate is also a standard determinant of divorce. Previous marriage rates may also capture the impact of attitudes towards family

[14] Own computations by Svensson and Stanfors from Statistics Sweden, *Sociala meddelanden* (Social Reports) 1915-1927; *Lönestatistisk Årsbok* (Statistical Yearbook of Wages) 1928-1951; *SOS Löner* (Wages) 1952-1999. Consumer Price Index is found in Statistics Sweden, *Statistiska meddelanden Priser och konsumtion 15 0201* (Statistical reports SM PR 15 SM 0201).

[15] That said, manufacturing has never constituted a large labor market for women in Sweden. Up to the mid-1960s, around 30 per cent of all women in gainful employment worked in industry and after that the share decreased to around 10 per cent. But the wage material for the industry sector, is the best if we want to cover an extended time period. It has, however, been possible to identify a similar pattern of the development of the relative wage in sectors which have constituted bigger labor markets for women. There is evidence that relative wages change in much the same way over time right across the labor market.

[16] Easterlin, in a study on fertility variation in England and Wales, used the ratio N 35-64/N 15-34. But, given the comprehensiveness of compulsory schooling, and the longstanding high and increasing ages at marriage and family formation in Sweden, using the age group 20-34 seems to be more appropriate than using the group 15-34.

[17] This rests upon the assumption that young and old male workers are not perfect substitutes and that women are only marginal workers.

formation and how people value marriage at a certain point in time. A non-traditionalist view on family relations implies delayed or no marriage together with more divorce, generating a negative relationship between the marriage rate and the divorce rate. According to search theory, corroborated by previous studies, the age at first marriage should be negatively related to divorce. We use the same sources (vital statistics from Statistics Sweden) as for the calculation of the refined divorce rate.

3.2 Method

The empirical model is estimated using a band spectrum regression (see Engle, 1974; Andersson, 2011a). The band spectrum regression is an estimation technique, which is used to separate between short-run, medium-run and long-run effects.[18] The estimation is carried out in two steps. First, all the variables are transformed to the frequency domain using a band pass filter. In the frequency domain the high frequencies capture the short-term variation in the data and the low frequencies the long-run variation in the data and the frequencies in the middle of the frequency band the medium-run variation. The three time horizons are thus easily identified in the frequency domain. Second, parameter estimates for each time horizon are then obtained for each time horizon by estimating the models on a sub-set of frequencies representing a given time horizon rather than on the entire frequency band whereby the short-run and the long-run parameters are obtained (for more information see Engle, 1974; Andersson 2011a).

The band spectrum analysis, in general, performs better in a small sample compared to other estimation techniques that separates between short- and long-run effects such as standard cointegration techniques (Corbae, Ouliaris & Phillips, 2002; Andersson, 2008) or a simple moving average. An additional strength of the method is that it can be used to consider more than just two time horizons, such as in our model, where we consider three time horizons (i.e. short run, medium run, and long run).

[18] The band spectrum regression is not limited to three time horizons and the model can include several additional time horizons. But, in line with Ramsey & Lampart (1998) and Andersson (2011b) we consider three time horizons. The short run is defined as shocks varying up to 4 years, the medium run is defined as the business cycle cyclical variation 4 to 8 years and the long run is defined as 8 years and beyond. The length of the business cycle (8 years) follows the definition in Baxter & King (1999), Assenmacher-Wesche & Gerlach (2008a, b) and Andersson (2011b) show that the business cycle in general lasts between 4 to 8 years, and we consequently define the short-run as fluctuations lasting up to 4 years.

Any band pass filter can be used to transform the series to the frequency domain. Here we use the Maximal Overlap Discrete Wavelet Transform (MODWT)[19]. This transform is chosen because it combines time and frequency resolution, whereby the transform is suitable to transform series that contains nonrecurring events such as structural breaks and outliers (Percival & Walden, 2006).[20]

The main advantage of our approach is that we are able to separate out different processes from each other, which a standard OLS approach cannot. Here we filter out the long-run trend from medium-run fluctuations around this trend, and furthermore separate noise from fluctuations around the trend and the business cycles together. In a standard OLS, short-to-medium run variations dominate the results and thereby bias the estimations. For the purpose of our research, it is important to be able to separate out different time horizons in order to really understand how people behave and whether the same logics apply to change in divorce behavior in the long-run, and in the medium- and short-run. If there is no statistically significant difference in behavior across the three time horizons our method will yield the same results as an OLS. In our analysis, we assess whether the same factors mattered for change in the long-term trend in divorce as for shorter-term fluctuations in divorce around this trend.

We estimate the following regression model,

$$\Delta divorce_t = \beta_0 + \rho \Delta divorce_{t-1} + \beta_1 x_{t-1}^{SR} + \beta_2 x_{t-1}^{MR} + \beta_3 x_{t-1}^{LR} + \varepsilon_t, \quad (1)$$

where $\Delta divorce_t = ln(DIVORCE_t) - ln(DIVORCE_{t-1})$ and x_{t-1}^{SR} is a vector with the short-run explanatory variables (see above), x_{t-1}^{MR} is a vector with the medium-run control variables (see above) and x_{t-1}^{LR} is a vector with the long-run control variables (see above) β are the parameters to be estimated, and ε is a stochastic error term. The short-run and long-run

[19] To employ the maximal overlap discrete wavelet transform one can use several different sets of basis functions. We chose to use Haar wavelet basis functions because they minimize the potential effect of boundary coefficients (see Percival & Walden, 2006). Alternative basis have been employed such as the Daubechie (4) and Daubechie (6) wavelets but the results are similar irrespective of filter.

[20] For more information about the MODWT, see e.g., Ramsey & Lampart (1998), Percival & Walden (2006), Crowley (2007), and Andersson (2008).

components of *x* have been obtained by applying the MODWT.[21] By definition, $x_t = x_t^{SR} + x_t^{MR} + x_t^{LR}$.

All independent variables appear on the right hand side with a one-year lag with the anticipation that economic conditions, etc. in the previous year are what matters for divorce in a given year. We have taken the first difference of the data to make it stationary such that standard hypothesis tests can be applied to the data (results from tests of stationarity are presented in Table A1). Taking the first difference does not affect our ability to model the long-run effects since we are using a band spectrum regression. Using the band spectrum regression, short-run, medium-run and long-run effects can be explored using either non-stationary levels data or stationary first-differenced data. The regression results are asymptotically the same for a linear model (see Andersson, 2008).

4. Results

4.1 Descriptive analysis

From Figure 1 (see above), which plots the divorce rate, it is evident that divorce became an increasingly common feature of family life in Sweden over the twentieth century. It is also evident that there is a strong trend in the long-term development of the divorce rate. In the 1910s, approximately 450 couples per year filed for divorce out of a total married population of about 1.7 million. Driven by concerns over falling marriage rates, the Swedish parliament passed a divorce law in 1915, which included no-fault grounds for divorce, which considerably reduced the legal constraints against divorce. After that long-term growth in divorce gained momentum. There is only one "blip" in the trend in the early 1970s, which is due to further liberalization of divorce laws. The divorce law passed in 1974 still remains in effect today. This legislation made divorce available without any requirements for a prior separation or for the plaintiff to state the reasons for divorce.[22] In the very same year the number of divorces per 1,000 married women reached the all-time high of 14.33, a figure which has not yet been surpassed although the divorce rate has stabilized at a high level. Figure 2 illustrates that, although starting from a very low level, growth in the divorce rate was substantial during the first part of the twentieth century, and actually tapered off after

[21] The MODWT decomposes the data into several frequency bands, which are called details and smooths. We have defined the short-run as detail 1, the medium-run as detail 2 and the long-run as smooth 2. For more information see Percival & Walden (2006).

[22] The only limitation in the individual right to an immediate divorce the 1974 divorce law is a mandatory waiting period of six mounts if the couple has children under the age of 16 or if one of the spouses actively opposes the divorce.

1974. Figure 2 shows that the development of the increasing trend has not been even and continuous over time, but rather concentrated to two time periods (1941-1951 and 1963-1974). These are periods of economic growth with increasing labor market opportunities, not least for women, particularly during the latter period. But, they are also periods of marked expansion of government expenditures. During the selfsame periods, it can be argued that there were also liberalization when it comes to attitudes concerning family formation and sexuality (Sandström, 2012: 85)**.** The question is how great these indicators of socio-economic change were relative to each other and the divorce rate. The concentration of change in the divorce rate to certain periods is clear in Figure 3, which shows the (detrended) variation from year to year in the divorce rate. Taken together, Figures 1-3 show that it is important to apply a long-term perspective when analyzing the relationship between the divorce rate and economic conditions and other potentially important factors.

Figure 2-3 about here

Table 1 presents correlation matrices for variables used in this study. The bivariate correlations between the independent variables and the divorce rate, shown in the top row of Table 1 are available for the long-run, medium-run, and short-run instead of being presented as mere averages. Generally, the correlations are quite modest, which indicates that multicollinearity should not be much a problem when estimating our models. Some correlations provide support for our theoretical considerations. For example, in the long-run, the divorce rate is positively correlated with the female-to-male relative wage, public sector expansion, and the previous marriage rate. Also, in the long-run, the divorce rate is negatively correlated with age at first marriage. These long-run correlations indicate existing relationships of relevance for structural change in divorce behavior. Contrary to the much accepted view of the relationship between divorce and economic conditions, the correlation between GDP per capita (with a one year lag) is negative, which means that the divorce rate tends to fall during economic booms. The correlation is, however, weak. Equally weak is the negative correlation with unemployment, which supports the expectation that people stay together during economic downturns and divorce when the economy improves. The latter two counteracting correlations are of equal magnitude and net each other out in the long-run.

If we instead consider correlations over the business cycle (over a 4 to 8 year period), we again find a weak correlation between the divorce rate and unemployment but a strong

negative correlation with GDP per capita, which means that the divorce rate tends to fall during economic booms. Over the business cycle, the divorce rate is negatively correlated with the female-to-male relative wage and public sector expansion. This is not entirely intuitive. But if we scrutinize other correlations over the business cycle, we find two interesting correlations. Of relevance to note, there are very strong positive correlations between 1) public sector expansion and unemployment, and 2) relative income and age at first marriage. These correlations indicate that in twentieth century Sweden 1) public sector expansion served to balance out economic downturns, especially periods when unemployment was high, all in line with Keynesian politics. Public sector expansion may therefore muddle the impact of economic conditions on the divorce rate. Thus, the correlation between public sector expansion and the divorce rate turns into a negative one in the medium-run. 2) Relative cohort size and the relative income of young workers were important factors for the decision to start a family, rather than to end a marriage. When the relative income of young workers decreases (as relative cohort size increases), over the business cycle, people put off marriage and the age at first marriage increases. This indicates that economic conditions, especially for the young, matter more for family formation than for divorce, but it also indicates that in the medium-run demographic developments are rather determined by economic opportunities than family attitudes.

In the short-run, which more or less indicates responses to shocks, there are (weak) correlations providing support for our theoretical considerations. This confirms that the short-run perspective is not really relevant for the purpose of the present paper.

Table 1 about here

4.2 Multivariate analysis

Results of the multivariate regression analysis are reported in Table 2. Summary statistics for the variables included in the analysis are presented in Table A2. In the second column of Table 2, the divorce rate is regressed on GDP per capita, the unemployment rate, the female-to-male relative wage, public sector employment as a share of total employment, a proxy for relative income, the marriage rate, and the female age at first marriage. All independent variables are lagged by one year, referring to the situation in the previous year. Before estimation, the series have undergone an outlier-detection test. This is particularly important for the divorce series where increases, connected with law reforms, in 1916 and 1974 are so

big that they may violate frequencies and result in an incorrect distinctions between short-, medium- and long run. When using wavelet transformations, this approach is preferable to using dummy variables representing change in legislation. All models are estimated with Newey-West robust standard errors.

Turning to the multivariate results of model I, in the long-run, we find that, as expected, the divorce rate responds positively to public sector expansion and the marriage rate. The response to female independence, as measure by the relative wage, is also positive yet not statistically significant. The divorce rate does not respond to improved macroeconomic conditions in line with theoretical assumption of a procyclical divorce pattern, but rather in line with a countercyclical pattern; the coefficient for GDP per capita is negative and the coefficient for the unemployment rate, while not statistically significant, is positive. In the medium-run, what seems to matter for the divorce rate is female independence and public sector expansion, although not in the predicted positive way. In the medium-run estimates, the coefficients are reversed into a negative impact of female independence and public sector expansion on divorce. It should, however, be remembered that this negative impact, at least for the public sector indicator, is affected by its strong correlation with the unemployment rate. During economic downturns, when unemployment was high, there was also public sector expansion, a result of Keynesian politics, which provided employment opportunities (and better earnings potentials), particularly for women. It also brought about income and caregiving support through increased public services, and made divorce possible despite dire times. In the short-run, none of our regression estimates are statistically significant, which is what we expected.

Table 2 about here

In the third column of Table 2, we find estimates of a second model specification where the divorce rate is regressed on all the variables included in model I, except for GDP per capita. When excluding GDP per capita, the results from model I are confirmed, and in some cases attenuated, when it comes to the magnitude of coefficients but do not change when it comes to sign or level of significance. The only coefficient that change substantially is, as expected, that of unemployment, which increases significantly. Similarly, the exclusion of unemployment in model III (column four), render the same results as the first model. Thus there is no evidence of a procyclical divorce pattern in twentieth century Sweden.

Since many parameters of the models estimated are insignificant, we estimate a very parsimonious model. Model IV only includes GDP per capita, public sector as a share of total employment, and the marriage rate. The estimates from model IV tell us that change in the divorce rate in Sweden 1915-2010 is a long-run process of structural change rather than change over the business cycle. If anything, there is a countercyclical relationship between macroeconomic conditions as measured by GDP per capita, indicating growth in living standards of the population, and divorce. Moreover, the expansion of the welfare state is of importance in this process, enabling people to break up from unhappy marriages, irrespective of economic conditions. The welfare state was important for female independence in the provision of employment, but also income and caregiving support, to the extent that it mattered more than improvements in the female-to-male relative wage. In the long-run, the marriage rate also matters for divorce but not in the partner pool- or attitudinal way as we discussed above.

Our results are robust, not only to different model specifications, as shown above, but also to the inclusion of an autoregressive term of the divorce rate in the previous year. It should also be noted that there are no structural break during the time period we study. It should also be noted that temporary shocks, such as the enormous increase in the marriage rate due to legislative change in 1989, are captured by the short-run regression component and thus do not affect our long-run and medium-run estimates.

There is, however, one shock that we have not considered, that is the impact of war on the economy and on divorce behavior. South (1985) finds significant effects of the Vietnam war on US divorce rates when investigating the post-World War II period.[23] Although Sweden was not directly involved in neither of the world wars, they affected the Swedish economy considerably. The world wars also mark important structural breaks with old orders; politically, financially, but also when it comes to attitudes and social mores. A quick glance at Figure 3 gives us reason to believe that this included divorce behavior. Thus, it is of relevance to investigate as to whether the war years are associated with divorce. Table 3 reports the results for models I through III, including dummies for war years (1917-1918=WW I and 1940-1945=WW II). The war-adjusted estimates confirm a long-run countercyclical

[23] The Korean war renders no significant effects.

relationship between macroeconomic conditions (primarily the unemployment rate, but also GDP per capita in model III) and the divorce rate. There are indications, particularly in model III, of that female independence mattered for divorce, in that there is a positive association between the female-to-male relative wage and the divorce rate. The war-adjusted results also confirm a strong negative association between female independence (i.e. the female-to-male relative wage) and divorce for the medium-run fluctuations around the trend. This means that over the business cycle there was a temporary, additional, negative effect of improved female wages, which made people stay together rather than divorce. War dummies render strong and highly significant coefficients. When including war year dummies the previously observed strong impact of public sector services disappears, which indicates that this impact was disproportionately a result from these years.

5. Concluding discussion

We examined the impact of macroeconomic conditions, together with increased female independence, and welfare state expansion on the divorce rate through multivariate time series analysis of annual data from Sweden during almost a century, 1915-2010. We set out to test the established, yet not very well documented, claim that there is a positive association between macroeconomic conditions and divorce, and followed up on claims that female independence and welfare state expenditure also may influence the divorce rate. Compared to previous time series analyses of factors influencing the divorce rate, we used a superior method, namely an estimation technique that separates between short-run, medium-run and long-run effects, and thereby renders us with more precise estimates than standard OLS regressions.

We find no evidence of a procyclical divorce pattern in Sweden. For the period 1915-2010 it seems as recessions tear people apart rather than glue them together. We also find that change in the divorce rate is a long-run process of structural change to be distinguished from shorter-term fluctuations. We separated between long-term processes, variation over the business cycle, and short-term responses to shocks, in order to see whether the same relationships were at play during different time horizons. We find that different factors determine the trend and the short-run fluctuations around it. This puts previous time series estimates into perspective. It may very well be that previous results, which are mainly relying on OLS estimates of averages, are affected by shorter-term responses and shocks that we, by our method of analysis, are able to filter out.

Our study complements the literature with empirical findings from a non-Anglo-Saxon context. Our findings indicate that while procyclical divorce may be true for the United States and Great Britain, it may not apply to the rest of the world. Clearly Sweden is of interest being a precursor in family demographic developments, but also because it is an example of how the welfare state expansion may counterbalance macroeconomic disturbances and change the relationship between macroeconomic conditions and the divorce rate by making divorce an option for all even when the economy is bad. While being a forerunner when it comes to gender equality in the labor market and the home, it should not come as a surprise that women's improved earnings opportunities and female independence impacted positively on the divorce rate. It should rather come as a surprise that the long-run effect of female independence was limited, and that the temporary, medium-run impact, was negative, indicating that couples decided to stay together over the business cycle, despite improved female earnings, choosing the jointness of a dual-earner couple over singlehood. Similarly, it is interesting to find that these relationships hold for the entire time period, 1915-2010. There are no structural breaks, not even around 1980 or 1990 when the gains to marriage through specialization had been considerably reduced. This favors Oppenheimer's (1997) claims about specialization, marriage, and divorce over those of Becker and suggests that the organization of modern households favor two earners over one. It also suggests that the male breadwinner model of the 1950s, which social theorists like Becker (1973, 1981) related to while laying out his theory of family behavior, was a historical anomaly rather than the rule. It is also interesting to find that the war years mattered significantly for divorce behavior in Sweden, although the country was not directly involved in the world wars. While netting out economic growth, welfare state expansion, etc., our results show that these years were important for other reasons, and that they served as breaks with old, established, structures relating to family and gender roles, and attitudes towards divorce.

It may be that previous results, mainly from Anglo-Saxon contexts and primarily from the United States, are indications of that particular context rather than of general relationships between macroeconomic conditions and the divorce rate. It may be that divorce is more expensive and less available in the US and the UK, where individuals are more dependent on the market and where the welfare state is limited, making the family more important for distribution of risks than in a more comprehensive welfare state, like Sweden. This is of importance for the present paper, because it's most important, and perhaps surprising,

contribution is the findings that there is no evidence of procyclical divorce. Instead, there is a countercyclical relationship between macroeconomic conditions and divorce. Our first set of estimations indicate that welfare state expansion is of importance in this process, enabling people to break up from unhappy marriages, irrespective of economic conditions. These results support Sandström's (2012) claim for the period up till 1974. They confirm that public sector expansion was an important policy measure, which served female independence. Our final estimations, including war year dummies, also indicate the positive associations between welfare state expansion, female independence, and the divorce rate, although they are no longer significant.

To conclude, this paper argues that the long-term development from a low to a high divorce regime in Sweden during the twentieth century was a countercyclical process, but also related to female independence, and a change in attitudes towards divorce. These results together with the fact that the war years in the late 1910s and early 1940s boosted divorce rates support the thesis that divorce begets divorce. This process was in Sweden facilitated by increasing individual independence, not least female independence, which made divorce more accessible, allowing growing numbers to act on a demand for divorce independent of macroeconomic conditions. In this process, the welfare state played an important part. It can be observed that the most marked periods of growth in divorce, for example the 1940s, were characterized by institutional restructuring in terms of a rapid welfare state expansion. The marked increase in government services and social security at these (and other) points in time reinforced economic restructuring in a defamiliarizing way that made individuals, especially women, less dependent on family ties for income and social support and thus more likely to divorce. This makes the Swedish experience different from previously explored Anglo-Saxon contexts where couples still are trapped in unhappy marriages because of economic constraints.

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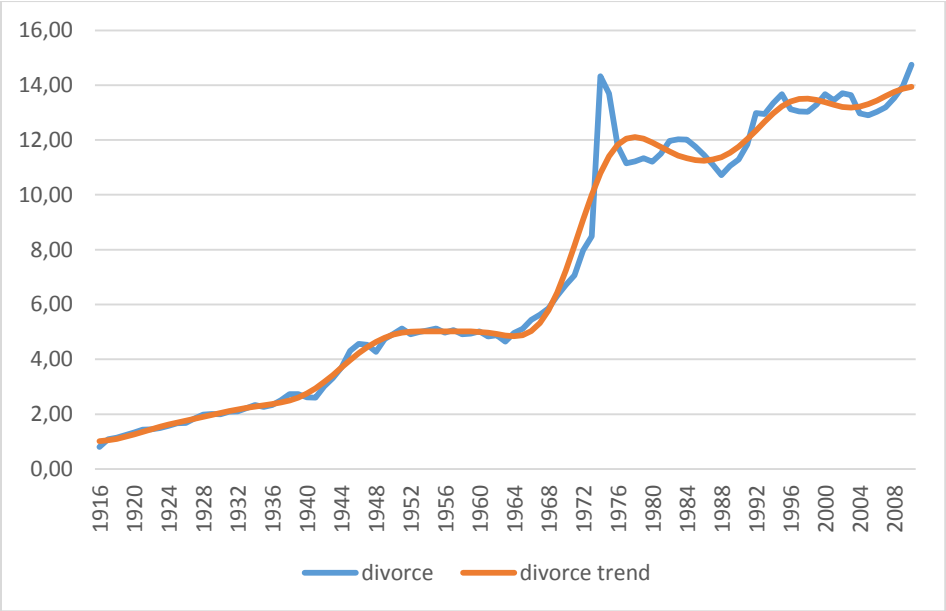
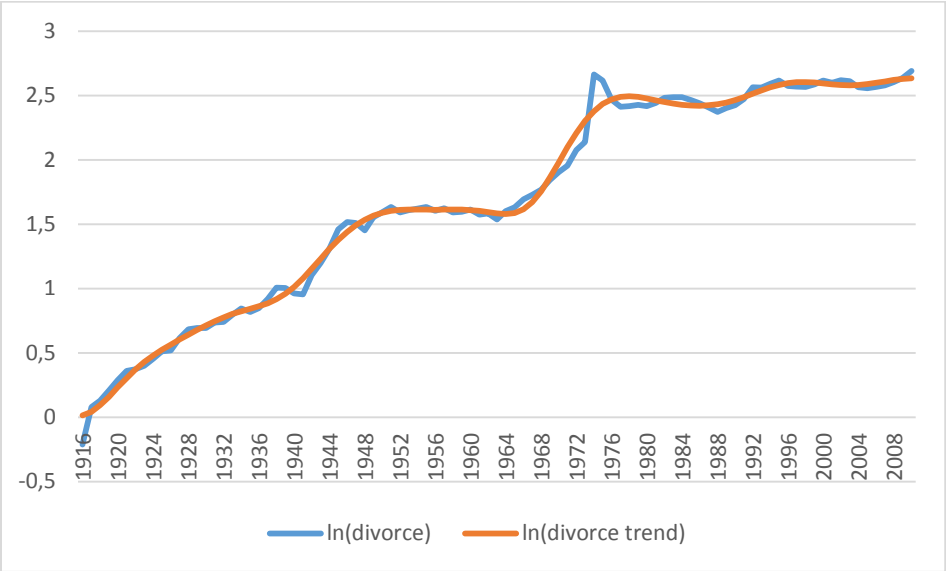
Figure 1. Divorce rate per 1,000 married women in Sweden 1915-2010.



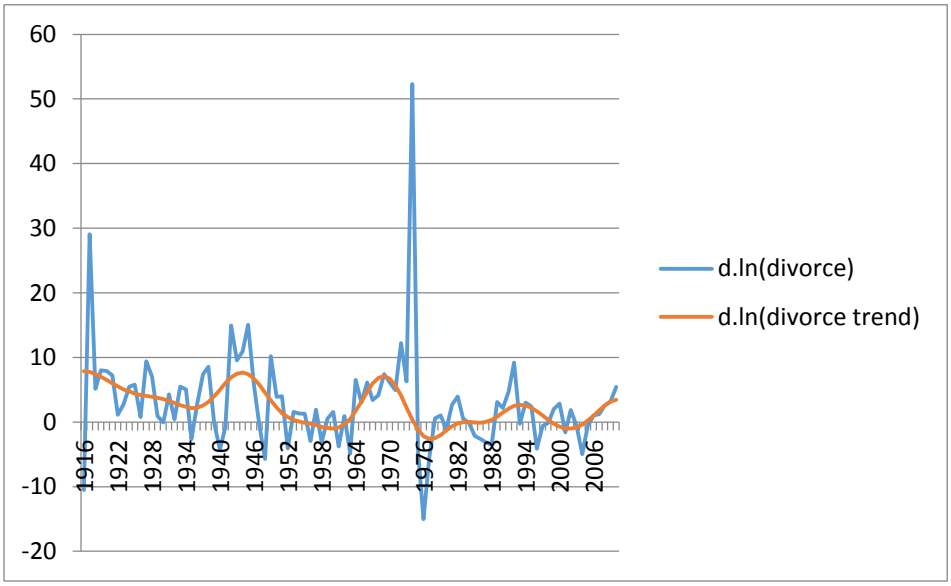
Source: Statistics Sweden, see footnote 6.

Figure 2. Growth in the divorce rate (ln divorce per 1,000 married women) in Sweden 1915-2010.



Source: See Figure 1.

Figure 3. Yearly growth rate (in log points) the divorce rate and its trend in Sweden 1915-2010.



Source: See Figure 1.

Table 1. Correlation matrices for variables in analysis of the divorce rate in Sweden 1915-2010.

Long-run	Divorce	GDP per capita	Unempl	F-to-M relative wage	Share public services	Relative cohort size	Age at first marriage	Marriage rate
Divorce t	1.00	-0.06	-0.04	0.32	0.45	-0.33	-0.15	0.58
GDP per capita t-1	-0.06	1.00	-0.36	0.01	0.23	-0.30	-0.02	0.16
Unemployment t-1	-0.04	-0.36	1.00	0.34	0.11	0.19	-0.25	-0.38
F-to-M relative wage t-1	0.32	0.01	0.34	1.00	0.42	0.04	-0.10	-0.08
Share public services t-1	0.45	0.23	0.11	0.42	1.00	-0.08	-0.41	-0.03
Relative cohort size t-1	-0.33	-0.30	0.19	0.04	-0.08	1.00	0.03	-0.75
Age at first marriage t-1	-0.15	-0.02	-0.25	-0.10	-0.41	0.03	1.00	0.30
Marriage rate t-1	0.58	0.16	-0.38	-0.08	-0.03	-0.75	0.30	1.00
Medium-run	Divorce	GDP per capita	Unempl	F-to-M relative wage	Share public services	Relative cohort size	Age at first marriage	Marriage rate
Divorce t	1.00	-0.35	-0.10	-0.40	-0.18	-0.12	-0.13	0.11
GDP per capita t-1	-0.35	1.00	-0.27	-0.11	-0.07	0.22	0.38	0.15
Unemployment t-1	-0.10	-0.27	1.00	0.16	0.78	-0.01	-0.17	-0.06
F-to-M relative wage t-1	-0.40	-0.11	0.16	1.00	0.10	0.15	0.08	-0.23
Share public services t-1	-0.18	-0.07	0.78	0.10	1.00	0.03	-0.11	0.00
Relative cohort size t-1	-0.12	0.22	-0.01	0.15	0.03	1.00	0.86	0.24
Age at first marriage t-1	-0.13	0.38	-0.17	0.08	-0.11	0.86	1.00	0.32
Marriage rate t-1	0.11	0.15	-0.06	-0.23	0.00	0.24	0.32	1.00
Short-run	Divorce	GDP per capita	Unempl	F-to-M relative wage	Share public services	Relative cohort size	Age at first marriage	Marriage rate
Divorce t	1.00	0.17	-0.13	-0.18	0.10	0.03	0.01	-0.13
GDP per capita t-1	0.17	1.00	-0.61	0.09	0.38	0.04	0.10	0.11
Unemployment t-1	-0.13	-0.61	1.00	0.15	-0.47	0.02	-0.07	-0.08
F-to-M relative wage t-1	-0.18	0.09	0.15	1.00	-0.04	0.09	0.08	0.03
Share public services t-1	0.10	0.38	-0.47	-0.04	1.00	-0.01	0.04	-0.04

Relative cohort size t-1	0.03	0.04	0.02	0.09	-0.01	1.00	0.96	0.71
Age at first marriage t-1	0.01	0.10	-0.07	0.08	0.04	0.96	1.00	0.77
Marriage rate t-1	-0.13	0.11	-0.08	0.03	-0.04	0.71	0.77	1.00

Table 2. Determinants of the divorce rate in Sweden 1915-2010.

	I	II	III	IV
Constant	3.894***	1.206*	4.110***	3.90
Long-run				
GDP per capita	-1.131**		-1.190***	-1.25***
Unemployment	0.323	1.233*		
Relative wage	0.347	0.288	0.393	
Share public services	1.746*	1.202*	1.687*	2.18***
Rel cohort size	1.148	2.573***	0.977	
Age at first marriage	-0.096	-0.212	-0.099	
Marriage rate	2.934***	3.641***	2.778**	2.03***
Medium-run				
GDP per capita	-0.180		-0.214	-0.31**
Unemployment	0.258	0.369		
Relative wage	-2.815**	-2.833***	-2.733**	
Share public services	-1.634*	-1.510**	-1.231**	-1.21
Rel cohort size	1.744	0.874	1.897	
Age at first marriage	-0.232	-0.132	-0.251	
Marriage rate	1.113	0.540	1.110	1.44
Short-run				
GDP per capita	0.243		0.283	0.26
Unemployment	-0.113	0.106		
Relative wage	-1.552	0.103	-1.647	
Share public services	-0.042	0.337	0.025	0.05
Rel cohort size	0.742	-0.094	0.658	
Age at first marriage	-0.038	-0.008	-0.026	
Marriage rate	-3.857	1.161	-3.955	-2.23
R2	0.58	0.59	0.49	0.42
Adjusted R2	0.45	0.49	0.36	0.34

Note: All variables appear in their logged and first-differenced form referring to the previous year. Durbin-Watson statistics indicate that our model estimates are not afflicted by serial correlation. * $p < .10$, ** $p < .05$, *** $p < .01$

Table 3. Determinants of the divorce rate in Sweden 1915-2010, including dummies for war years 1917/18 and 1940/45.

	I	II	III
Constant	1.582	1.267	4.110***
Long-run			
GDP per capita	-0.136		-0.711*
Unemployment	2.067*	2.297**	
Relative wage	0.466	0.471	0.603**
Share public services	0.958	0.873	1.146
Rel cohort size	1.520	1.628	0.830
Age at first marriage	-0.148	-0.153	-0.139
Marriage rate	2.462**	2.478***	2.041
Medium-run			
GDP per capita	-0.117		-0.158
Unemployment	-0.005	0.013	
Relative wage	-3.271**	-3.274**	-3.164***
Share public services	-0.768	-0.773	-0.810
Rel cohort size	1.526	1.550	1.814
Age at first marriage	-0.210	-0.222	-0.242
Marriage rate	1.225	1.275	1.171
Short-run			
GDP per capita	0.130		0.238
Unemployment	-0.139	0.203	
Relative wage	-1.389	-1.254	-1.593
Share public services	-0.172	-0.137	-0.085
Rel cohort size	0.683	0.679	0.612
Age at first marriage	-0.027	-0.025	-0.018
Marriage rate	-3.998	-3.982	-4.055
War years	7.666***	8.256***	5.183**
R2	0.60	0.60	0.60
Adjusted R2	0.46	0.48	0.48

Note: All variables appear in their logged and first-differenced form referring to the previous year. All model specifications include dummies for the war years 1917-1918 and 1940-1945. Durbin-Watson statistics indicate that our model estimates are not afflicted by serial correlation. * $p < .10$, ** $p < .05$, *** $p < .01$.

Table A1. Tests for stationarity – ADF automatic lag length selection, constant no trend.

	Level	First difference	Integration order
ln(divorce)	-2.27 (0.18)	-8.94*** (0.00)	I(1)
ln(GDP per capita)	-0.66 (0.85)	-7.99*** (0.00)	I(1)
unemployment	2.23 (0.20)	-8.67*** (0.00)	I(1)
ln(relative wage)	-1.86 (0.35)	-6.97*** (0.00)	I(1)
ln(share public service)	-1.47 (0.54)	-8.32*** (0.00)	I(1)
ln(relative cohort size)	-2.90** (0.05)	-8.94*** (0.00)	I(1)
ln(age at first marriage)	1.42 (1.00)	-13.39*** (0.00)	I(1)
ln(marriages per 1,000)	-1.85 (0.35)	-13.39*** (0.00)	I(1)

Table A2. Summary statistics.

	Average	Max	Min	St dev
Divorce	2.56	29.07	-15.04	5.53
GDP per capita	2.13	9.28	-7.89	11.25
Unemployment	0.02	21.20	-10.40	2.88
Relative wage	0.53	8.83	-3.01	1.55
Share public service	4.75	21.96	-14.79	3.01
Relative cohort size	-0.53	4.24	-3.96	1.80
Age at first marriage	0.23	10.54	-11.62	1.76
Marriages per 1,000	-0.08	89.32	-99.73	14.81