INFLATION AND OTHER AGGREGATE DETERMINANTS OF THE TREND IN U.S. DIVORCE RATES SINCE THE 1960S

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Abstract

This paper extends empirical research on determinants of divorce in two ways. First, I examine the effect of inflation on divorce. Second, the use of a structural time-series modeling approach attributes unobservables and omitted variables to an unobserved component, which allows for the model's parameters to be estimated consistently. Inflation is statistically significant, positive, and persistent. I show that the effects of inflation are robust to the inclusion of additional explanatory variables and various trend specifications. The long-run implications of inflation are also substantial. I conclude that price stability has the potential to reduce divorce rates.

Key words: divorce, inflation, women's educational attainment, economic growth, unemployment, structural time series, unobserved component models

JEL Categories: J11, J12

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I. INTRODUCTION

Throughout the 1960s and 1970s, divorce rates in the United States (U.S.) increased dramatically. After peaking in the late 1970s, the number of new divorces declined throughout 1980s and continues to decline today.[1] Both the rise and fall of divorce rates has been a topic of much debate (Michael 1978; Johnson and Skinner 1986; Ruggles 1997a; Ruggles 1997b; Oppenheimer 1997; Preston 1997; Goldstein 1999).[2] However, evidence on aggregate determinants of divorce is sparse.[3] This paper fills a portion of that void by analyzing the effects of inflation on the number of new divorces using annual time-series data from 1955 to 2004.

A portion of the rise in divorce has been attributed to many states adopting no-fault or unilateral divorce laws (e.g., Friedberg 1998; Gruber 2004). However, Wolfers (2006) shows that the rise in divorce induced by divorce reform is small and temporary. I contend that inflation accounts for a considerable portion of the sharp rise in divorce throughout the 1960s and 1970s. I hypothesize that marriages are more likely to dissolve in an economic environment with rising prices. Inflation worsens the terms of trade for households and thereby decreases the returns from marriage through the reduction of household consumption and leisure. I also expect the effects of inflation on divorce to be persistent. Price instability may interfere with married couples' long-term financial plans, which could lead to an increase in divorce rates.

[1] See FIGURE 1.

[2] A few of these studies examine the increase and leveling of divorce rates, which refers to the stock of divorces, not the number of new divorces. This paper focuses on new divorces.

[3] For exceptions, see South (1985) and Bremmer and Kesselring (1999, 2004).

I implement a structural time-series model to circumvent potential identification issues associated with the trend in the divorce rate (see FIGURE 1).[4] Harvey (1989, 1997) and Koopman et al. (2000) advocate the use of structural time-series models when there is a clear trend in the data series. The estimation approach moves omitted or unobserved variables out of the error term and into a stochastic trend component so that unbiased estimates of included right-hand-side regressors can be obtained. Structural time-series models are also advantageous because they allow for structural change through time-varying trend components.

I estimate three different model specifications for the divorce rate: (*i*) a smooth-trend model that considers only inflation and unemployment, (*ii*) a stochastic-trend model that also considers only inflation and unemployment, and (*iii*) a stochastic-trend model that includes inflation, unemployment, the growth rate of U.S. Gross Domestic Product (GDP), and changes in women's educational attainment. I find that inflation is statistically significant, positive, and persistent. The estimated effects of inflation are robust to the inclusion of additional covariates and different trend specifications. The directional effect of unemployment depends on the specification of the trend and the inclusion of additional covariates. The final model (*iii* above) indicates that unemployment has a contemporaneous, statistically significant, positive effect on divorce, which differs from the first two models (i.e. *i* and *ii* above) but is consistent with previous work (e.g., South 1985). Estimates from the final model also suggest that increases in women's educational attainment and the growth rate of U.S. GDP are

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[4] I use the terms structural time-series and unobserved component models interchangeably throughout this paper.

statistically significant, positive, and persistent. The long-run effects of inflation, changes in women's educational attainment, and economic growth are also substantial.

I conclude that increases in the inflation rate contributed to the rise in divorce rates during the 1960s and 1970s. Economic growth and the rise in the economic power of women, for which their educational attainment provides a proxy, also appear to have contributed to the rise in divorce over the same period. The results found for the effects of recessionary and expansionary periods on divorce contest previous findings, which have suggested an inverse relationship between the two variables (e.g., South 1985). The effects of unemployment are largely inconclusive because of the contradictory estimates found for different model specifications.

This paper proceeds as follows. Section II describes the theoretical channels through which the explanatory variables are expected to affect divorce rates. Section III describes the data and the econometric methodology. Section IV presents results. Section V concludes.

II. THEORETICAL BACKGROUND

Changes in the macroeconomy and demographics should affect the returns from marriage by altering consumption, leisure, and household specialisation decisions.[5] The same dynamics may also affect fertility and marriage-specific investments, which the literature shows to have binding effects on marriages.[6] Becker et al. (1977) contend that surprises or unexpected events raise the risk of divorce because such changes alter the

[5] The returns associated with marriage are usually attributed to the couple's ability to specialize in market and household work. For example, increases in consumption, leisure, and the production of one's own children have been cited as determinants of marriage.

[6] See Becker et al. (1977).

returns from marriage. Previous studies use earnings shocks to estimate the impact of unexpected events on divorce (e.g., Becker et al. 1977; Weiss and Willis 1997; Charles and Stephens 2004; Hess 2004).[7] Variability in the inflation rate from the 1960s to the mid-1980s offers an alternative proxy for unexpected events. Likewise, aggregate measures of job availability and economic growth could be other proxies for unexpected events, as both have experienced perceptible fluctuations over time.

The United States (U.S.) experienced significant macroeconomic and demographic change over the last 50 years. Inflation rose in the 1960s and remained relatively unstable until the early- to mid-1980s, when it began to stabilize. Inflation erodes the purchasing power of money, which can place significant stress on marriages by reducing consumption of market- and home-based goods and of leisure. Periods of rising inflation could cause married couples to specialize in market and household work sub-optimally. Inflationary periods imply that the price of consumption increases. As a result, spouses may have to adjust their labour supply to achieve pre-inflation consumption and leisure levels. If market work increases for both spouses, the returns to marriage are reduced because less time will be allocated to leisure and household production. Inflation can also have a long-run impact on divorce. Because rising prices can cause greater uncertainty in the future returns to marriage, couples may be unable to invest in marriage-specific capital. Low levels of investment in marriage-specific capital lower the opportunity cost of divorce, which makes divorce more likely.[8]

[7] The results in the majority of these studies support the theory and findings of Becker et al. (1977). Charles and Stephens (2004) find that job displacement, measured as layoffs, increases the risk of divorce. However, they find that disability and plant closings have no effect on divorce. Their results cast doubt on pecuniary motives of divorce, since disability, plant closings, and layoffs have similar long-run consequences.

[8] Marriage-specific capital could be the production of children, investments in joint assets, and investing in additions to human capital for spouses.

The erratic behaviour of inflation from the 1960s to the mid-1980s was roughly concomitant with fluctuations in unemployment.[9] Unemployment began to behave erratically in the 1970s and continued through the early- to mid-1980s. Since the early- to mid-1980s, unemployment has remained relatively stable. The rise and fall of divorce appears to have been largely concurrent with the dynamics of inflation and unemployment.[10]

Compared to inflation, the channels through which unemployment affects divorce are less clear. On the one hand, divorce may increase because higher unemployment reduces consumption of market- and home-based good and of leisure. Consumption and leisure should decrease because layoffs occur and economic theory predicts that job seekers accept lower wages. On the other hand, it could be that the value of the outside option, which is divorce, is lower when unemployment is higher. If one spouse is considering divorce, high unemployment may stabilize marriages because of less job availability and lower wage offers. It could also be that unemployment insurance provides a means of consumption insurance, which may have binding effects on marriages.

The U.S. also experienced perceptible fluctuations in the growth rate of U.S. GDP over the same period as the rise in divorce. The upper portion of FIGURE 3 suggests that the growth rate of U.S. GDP experienced greater growth volatility from 1955 to 1980 compared with growth volatility since the 1980s, which is roughly concurrent with both the rise and fall of divorce. South (1985) examines the role of expansions and recessions on divorce behaviour and finds that divorces increase in recessions and decrease during expansions. South's results may suggest that recessionary periods cause stress within

[9] See FIGURE 2.
[10] See FIGURES 1 and 2.

marriages and expansionary periods create additional returns to marriage. It is also possible for the opposite to be true. It could be that recessionary periods bind marriages because two incomes may be necessary to offset the effects of the economic downturn. Expansionary periods may induce individuals to become more self-reliant. That is, economic expansions may allow individuals to earn more and to become more independent, which could increase divorce rates.

A significant demographic transformation in the U.S. was the steady increase in women's educational attainment.[11] Using women's educational attainment as a predictor of the trend in divorce rates, instead of their labour-force participation rate, provides another way to examine the effect of increases in the economic power of women on divorce behaviour. A number of studies analyze the effects of female labour-force participation on divorce behaviour. However, estimating the effect of female labour force participation on divorce is complicated by the potential simultaneity bias between the two variables. The findings of Green and Quester (1982), Shapiro and Shaw (1983), Johnson and Skinner (1986), Bremmer and Kesserling (1999), and Lombardo (1999) compared with the findings of Spitze and South (1985, 1986) and Mincer (1985) suggest that the two variables may be simultaneously determined. The former finds that divorce increases women's labour-force participation and the latter finds the opposite. To circumvent identification issues associated with female labour-force participation, I use women's educational attainment as a proxy for the women's liberation movement that occurred in the 1960s and 1970s. After all, increases in the educational attainment of women create options for a single life that are independent of a current job.

[11] See the lower portion of FIGURE 3.

Goldin and Katz (2000) contend that affordable contraceptives gave women greater control of fertility decisions and reduced the opportunity costs associated with investments in human capital. Increases in human capital improved the prospects of women for high-wage employment, which gave them greater bargaining power within households (Costa 2000). Achieving greater bargaining power and independence in the labour market could increase divorce because women could become more self-reliant, which could increase divorce rates.

III. DATA AND ECONOMETRIC STRATEGY

Data on the divorce rate come from the *Historical Statistics of the United States*: *Millennium Edition* and U.S. Statistical Abstracts and span from 1955 to 2004. The measure for the divorce rate is the number of new divorces each year per 1,000 persons. TABLE 1 displays the variable abbreviations and variable definitions. Data on the inflation rate and the unemployment rate are taken from the Bureau of Labor Statistics (BLS). The measure of women's education attainment is derived from the higher education statistics of the U.S. Census Bureau by using the percentage of women enrolled in higher education relative to the total population enrolled. The measure of economic growth is the growth rate of U.S. Gross Domestic Product (GDP), which is calculated by the St. Louis Federal Reserve Board. TABLE 2 presents summary statistics and provides data sources for the variables considered. Note that the variable *weduc* is scaled to be made comparable to the other explanatory variables.

Tests for stationarity are shown in TABLE 3, which suggest that the variables *inflation*, *unemp*, and *growth* are stationary. However, the variable *weduc* is non-stationary and enters the model in first-differenced form. Since the divorce rate follows a trend, as TABLE 3 and FIGURE 1 indicate, it is necessary to include a trend in the empirical model to avoid spurious results (Harvey 1989, 1997). Harvey (1997) contends that deterministic-trend models are, in many cases, too restrictive. The unobserved component modeling strategy does not rely on unit root tests to dictate the specification of the trend.[12] The initial specification of the trend includes stochastic level and slope components. The flexibility of the modeling strategy allows me to test the level and slope components to determine if another simpler specification of the trend is more appropriate.

The inclusion of a stochastic trend permits omitted factors to be moved out of the error term and into a stochastic trend component. Capturing theoretically relevant variables in a stochastic trend allows for estimates to be unbiased assuming there is no simultaneity bias between the outcome variable and the right-hand-side variables. Unobserved component models also allow for structural change through time-varying level and slope components. Most other time-series models are sensitive to structural change and omitted variables (e.g., cointegration techniques and distributed-lag models).

The general form of the structural time series model is

$$y_t = \mu_t + \sum_i \sum_j \alpha_{ij}\, x_{i,t-j} + \varepsilon_t \qquad for\ t = 1, 2, ., T\ . \tag{1}$$

The dependent variable is y_t; μ_t is a time-varying intercept term; $x_{i,t-j}$ is the regressor variable i subject to time lag j; α_{ij} represents the coefficient associated with the variable $x_{i,t-j}$; and ε_t is a zero mean constant variance disturbance term. The term μ_t enables the

[12] Since unit root tests rely on autoregressive models, Harvey (1997) contends that such tests may exhibit poor statistical properties. In fact, Harvey and Jaegar (1993) show with simulations that unit root tests do not typically detect variables that are $I(2)$. Detecting a unit root process usually results in the researcher concluding that the series is $I(1)$.

researcher to capture unobservables and omitted variables that influence the dependent variable, which may be correlated with the variables in $x_{i,t-j}$. The μ_t process takes the form:

$$\mu_t = \mu_{t-1} + \beta_{t-1} + \eta_t \qquad \eta \sim NID\ \ 0, \sigma_\eta^2 \tag{2}$$

$$\beta_t = \beta_{t-1} + \xi_t \qquad \xi \sim NID\ \ 0, \sigma_\xi^2\ . \tag{3}$$

The term μ_t can be interpreted as the "level component" of a stochastic trend and β_t represents the drift parameter, which is the "slope" of the level component. The level component follows a random walk with drift and the slope component follows a random walk. The terms η_t and ξ_t are white noise disturbances. The white noise disturbances, η_t and ξ_t, are independent of each other and of ε_t. A Kalman filter recovers the state vectors μ_t and β_t.[13] Equations (1) through (3) are in their most general form. The model can be tested down to contain a fixed level, a fixed slope, or other specifications including a fixed level and no slope, which is equivalent to ordinary least squares (OLS).[14]

IV. RESULTS

I estimate three different models. Two of the models use only inflation and unemployment as explanatory variables. The third and final model considers inflation, unemployment, the growth rate of U.S. GDP, and the change in women's educational attainment. There are three reasons for estimating three different model specifications: (*i*) to resolve the mixed results found for unemployment in the first two models, (*ii*) to

[13] See Harvey (1989) for a detailed description of the Kalman filter and its application in structural time-series models. The statistical package used—Structural Time-Series Analyser, Modeller, and Predictor (STAMP)—offers a canned procedure for the Kalman Filter.

[14] If the variance of the disturbance term η_t equals zero and the variance of the disturbance term ξ_t is nonzero, the model takes the smooth-trend specification, which is integrated of order two (Harvey 1997).

attempt to explain a greater portion of the trend in the data for the divorce rate, and (*iii*) to check the validity of the robust, positive, and persistent effect of inflation on the divorce rate.

A. Results from Models with only Inflation and Unemployment

This section presents two of the three unobserved component models, which use only inflation and unemployment as explanatory variables: (*i*) the smooth-trend model and (*ii*) the stochastic-trend model. The reason for the two trend specifications relates to different ways that I follow the general-to-specific methodology. The results suggest that the ways in which the methodology is carried out has a significant impact on the parameter estimates for unemployment, especially its long-run effect.

I begin with a stochastic level and slope specification with two lags of all variables including the dependent variable. The general specification applies to equations (1) through (3). The estimates from the general specification indicate that the variance of the disturbance term in equation (2) equals zero, which suggests that the trend should contain a fixed level; however, the slope remains stochastic. When the level is fixed and the slope is stochastic, the trend is smooth. This implies that—conditional on the included explanatory variables—the rate of new divorces is integrated of order two. I restrict the model to contain a smooth trend throughout successive parameter restrictions. After restricting the level component to be fixed and the slope to be stochastic, I test the model down to a more parsimonious form.[15]

[15] I adopt the empirical methodology advocated by the London School of Economics (LSE). Each set of parameter restrictions are validated by checking the statistical properties of the model. The LSE approach assumes that all models are false. The goal of the LSE approach is to find an adequate model; one that captures the data generating process.

The second model reverts back to the general, stochastic specification each time a parameter restriction is made. I estimate the models with the stochastic specification to determine if restricting the model to contain a smooth trend throughout successive parameter restrictions is appropriate. After making a parameter restriction and reestimating the model with a stochastic level and slope, the estimated variances of the disturbance terms in equations (2) and (3) indicate that the stochastic-trend specification is appropriate. However, there is only one parameter restriction because all explanatory variables are at least marginally statistically significant different from zero after the first parameter restriction is made.

TABLE 4 shows the results from the smooth-trend model and TABLE 5 shows the results from the stochastic-trend model. For both models, I check for non-normality of residuals, higher-order autocorrelation and heteroskedasticity in the residuals, and the model's out-of-sample forecasting properties. I rely on the model's out-of-sample forecasting properties to validate any further parameter restrictions. The estimates for the smooth-trend and stochastic-trend models do not indicate any statistical adequacy problems, as evidenced by the battery of statistical adequacy tests shown at the bottom of TABLES 4 and 5 and the residual graphics shown in FIGURES 4 and 5.

The remaining level and slope components from the two specifications are shown in FIGURES 6 and 7. The fact that neither the level nor slope components are flat but show distinctive patterns suggests that the included explanatory variables do not fully capture the data generating process. However, the fact that the unobservables or omitted variables can be isolated and that the estimates are not sensitive to structural change allows for the effects of inflation and unemployment to be identified.

Consistent with my hypotheses, inflation is statistically significant, positive, and persistent in both specifications. Regardless of the trend specification, unemployment has a contemporaneous, statistically significant, negative effect on divorce. The smooth-trend specification does not indicate any persistent effects with respect to unemployment. However, when the model takes the stochastic trend specification (i.e. TABLE 5), unemployment's long-run effect is positive and substantial. The contemporaneous, negative effect found for unemployment may be due to the value of divorce being lower when unemployment is higher, as obtaining a job would be more difficult and wage offers would be lower.

The long-run effects of inflation and unemployment on divorce are shown in TABLE 6. The long-run effects indicate that inflation has a considerable effect on divorce, regardless of the trend specification; however, the effects are larger in the stochastic-trend model. There are wide discrepancies with respect to the long-run effects of unemployment, as evidenced by the negative effect in the smooth-trend model and the positive effect in the stochastic-trend model.

The results for the stochastic-trend model seem more plausible. Persistent unemployment is likely to generate greater marital instability because jobs are scarce and wage offers become lower over time. Lower job availability and lower wage offers would reduce consumption of market- and home-based goods and of leisure both today and in the future. As a result, the long-run gains from household specialisation are reduced when there is persistent unemployment. A comparison of FIGURES 6 and 7 provides further support for the stochastic-trend model, which indicates that it accounts for a larger portion of the trend in the divorce rate compared with the smooth-trend model.

Although the results presented in this section do not indicate statistical problems, two issues remain unaddressed: (*i*) a large portion of the trend in divorce rates is not explained by the included explanatory variables and (*ii*) the results found with respect to unemployment are conflicting. I attempt to address these issues in the next section by including measures of economic growth and changes in women's educational attainment. Using a measure of economic growth provides an alternative proxy for the health of the economy, which may help resolve the differing long-run effects associated with unemployment in the first two models. Changes in women's educational attainment offer a proxy for the women's liberation movement that occurred over the same period as the rise in divorce. The inclusion of these covariates should account for a larger portion of the trend in divorce rates and may aid in resolving discrepancies found with respect to unemployment. The final model, including additional covariates, also provides a way to check the robustness of inflation's persistent effect on divorce.

B. Results from Model with Additional Explanatory Variables

As in the first two specifications, I begin with a stochastic level and slope specification with two lags of the dependent variable and all explanatory variables except the change in women's educational attainment, which I only include one lag because it is differenced to be made stationary. Following the estimation of the general specification, I test the model down to a more parsimonious form. The estimated variances of the disturbance terms in equations (2) and (3) suggest that the trend should take the stochastic specification. The variances of the disturbance terms are also nonzero through successive parameter restrictions; thus, all of the models take the form of equations (1) through (3).

TABLE 7 shows the results from the final model, which considers all explanatory variables. In the final model, I also check the statistical adequacy of the model and follow the same methodological approach as outlined above. The statistical adequacy measures for the final model do not indicate any problems, as shown in TABLE 7 and FIGURE 8. The remaining trend components for the final model are shown in FIGURE 9. As was the case for the first two models, the included explanatory variables do not fully explain the trend in the divorce rate. However, adding other covariates to the basic specification does account for a larger portion of the trend in divorce rates. The long-run effects for the final model are shown in TABLE 8. The long-run effects from the other two models are also included in TABLE 8 in order to compare the long-run effects across different models. Note that the magnitude of inflation's long-run effect is similar in all models, especially the stochastic-trend models.

Consistent with my hypotheses, inflation remains statistically significant, positive, and persistent when additional regressors enter the model. The change in women's educational attainment and economic growth are statistically significant, positive, and persistent. The results for economic growth are opposite to the findings of South (1985), who contends that the divorce rate rises in recessions and falls in expansions. Unemployment has a statistically significant, positive effect, which is consistent with South's (1985) findings. The reversal of the sign associated with the coefficient for unemployment in the final model is believed to be due to the inclusion of the growth rate of U.S. GDP, as the two variables measure similar aspects of the macroeconomy.

The final model shows the robustness of inflation's effect on divorce, explains a larger portion of the trend in the divorce rate, and aids in resolving conflicting estimates found for the effect of unemployment on divorce. The robust, positive effect of inflation on divorce may be due to the additional strains placed on marriages through decreases in purchasing power, which may affect consumption, household specialisation, and investments in marriage-specific capital. The positive effect associated with unemployment is in line with Becker et al.'s (1977) theory, which suggests that increases in unemployment would reduce the returns to marriage by altering consumption, leisure, and household specialisation decisions; therefore, divorce should be more likely when there is higher unemployment.

The change in women's educational attainment also appears to explain a portion of the rise in divorce over the sample period. This suggests that the addition to human capital may have given women greater independence and bargaining power within households. Additions to the human capital of women enable them to compete effectively in the service-based economy, since service-oriented work requires larger additions to human capital.

The persistent, positive effect found for economic growth suggests an alternative channel through which increases in economic opportunities affect divorce. Since economic growth implies greater job availability, higher wage offers, and higher returns on investment, divorcees have the potential to earn more and earn higher returns during expansionary periods. Thus, economic growth could induce a rise in divorce because the value of becoming divorced may be higher, as there is greater job availability and higher earnings potential.

V. CONCLUDING REMARKS

This paper adds to empirical research on determinants of divorce by examining the effect inflation on divorce. I construct three unobserved component models for the divorce rate using annual data for the U.S. from 1955 to 2004. Two of the three specifications consider the effects of only inflation and unemployment on divorce. The final model includes inflation, unemployment, changes in women's educational attainment, and the growth rate of U.S. GDP as predictors of the divorce rate.

The empirical methodology circumvents potential identification problems because I model the trend in the divorce rate as an unobserved variable. The inclusion of an unobserved component allows for unobservables and omitted variables to be moved out of the error term into a stochastic trend component, which allows for the model's parameters to be estimated consistently. The empirical approach does not impose restrictive assumptions regarding the trend in the dependent variable. Instead, the approach allows the data to generate the appropriate model specification.

Because level and slope components remain significant in all models, the included explanatory variables do not fully explain the rise and fall in divorce. The fact that the included explanatory variables explain only a portion of the trend in the divorce rate suggests that further research is necessary to explain the rise and fall of the divorce rate since the 1960s. For example, part of the unexplained portion of the divorce rate could be due to changes in the legal environment, increases in female labour-force participation, or changes in the availability of potential mates.

The effects of inflation are statistically significant, positive, and persistent regardless of the trend specification and inclusion of additional explanatory variables. Of the three unobserved component models, the final model explains a considerable portion of the sharp rise in divorce rates during the 1960s and 1970s. The results from the final model also indicate the importance of other macroeconomic and demographic covariates. I conclude that a monetary policy meant to stabilize prices can indirectly reduce divorce rates.

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TABLE 1
VARIABLE NAMES AND VARIABLE DEFINITIONS

Variable	Variable Definition
divorce	Number of new divorces per 1,000 persons
inflation	Log of the ratio of the Consumer Price Index (CPI) at period *t* relative to the CPI at period *t*-1
unemp	Percentage of the workforce that is unemployed but is actively pursuing employment
growth	Log of the ratio of U.S. Gross Domestic Product (GDP) at period *t* relative to U.S. GDP at *t*-1.
weduc	Percentage of women enrolled in higher education relative to the total population enrolled in higher education

Notes: All data relate to the United States and cover the period 1955 to 2004.

TABLE 2
SUMMARY STATISTICS AND VARIABLE SOURCES

Variable	Mean	Std. Deviation	Minimum	Maximum
divorce	4.0933	0.9708	2.20	5.30
inflation	4.2901	3.0475	0.67	13.26
unemp	5.9183	1.4415	3.49	9.71
growth	3.3700	2.1938	-1.90	7.20
weduc	4.9401	0.7238	3.54	5.89

Notes: All data relate to the United States. The data span the years 1955 to 2004 (obs. = 49). Data for the divorce rate come from the *Historical Statistics of the United States*: *Millennium Edition* and U.S. statistical abstracts. Data for inflation, unemployment, and the growth rate of GDP are accessed through www.economagic.com. Data for women's educational attainment come from the U.S. Census Bureau and are accessible at http://www.census.gov/population/www/socdemo/school.html. The variable *weduc* is scaled to be made comparable to the other explanatory variables.

TABLE 3
TESTS FOR STATIONARITY

Variable	KPSS Test	
	Trend {H0 = *I*(0)}	**No-trend {H0 = *I*(0)}**
divorce	0.7892**	0.2550*
inflation	0.2103	0.2099
unemp	0.1584	0.2060
growth	0.0487	0.1734
weduc	0.2218*	1.0295**

Notes: * indicates statistical significance at the five percent level and ** indicates statistical significance at the one percent level. Details of the KPSS test are outlined in Kwiatkowski et al. (1992). The KPSS uses stationarity as the null and tests against the alternative hypothesis of a unit root.

TABLE 4
EMPIRICAL RESULTS FOR THE DIVORCE RATE (SMOOTH TREND)

Variable	Model 1		Model 2		Model 3		Model 4		Model 5	
	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)
μ	5.625	0.000	4.842	0.000	5.156	0.000	5.311	0.000	5.240	0.000
β_t (last year)	-0.264	0.015	-0.247	0.021	-0.218	0.032	-0.210	0.041	-0.166	0.090
$divorce_{t-1}$	-0.474	0.002	-0.398	0.002	-0.393	0.003	-0.409	0.002	-0.336	0.011
$divorce_{t-2}$	-0.135	0.336								
$inflation_t$	0.015	0.072	0.015	0.086	0.009	0.213				
$inflation_{t-1}$	0.027	0.004	0.028	0.003	0.020	0.004	0.020	0.005	0.015	0.018
$inflation_{t-2}$	0.036	0.000	0.036	0.000	0.033	0.000	0.031	0.000	0.024	0.000
$unemp_t$	-0.036	0.088	-0.043	0.032	-0.050	0.011	-0.060	0.001	-0.062	0.000
$unemp_{t-1}$	0.029	0.200	0.028	0.219						
$unemp_{t-2}$	0.042	0.041	0.044	0.031	0.032	0.085	0.030	0.112		
Statistical Adequacy Measures:										
R^2	0.9907		0.9904		0.9899		0.9895		0.9888	
AIC	4.3883		4.4065		4.4088		4.4115		4.3894	
SIC	3.9378		3.9969		4.0402		4.0838		4.1027	
Het. $F(13,13)$	0.9807		1.0934		1.0730		0.9846		1.0577	
Cusum (6)	-0.6447		-0.6253		-0.4738		-0.3973		-0.1971	
Cusum (10)	-0.4289		-0.3672		-0.2638		-0.1966		-0.1576	
p-values:										
Normality (2)	0.5852		0.2718		0.3421		0.1271		0.4295	
Box-Ljung (6)	0.3758		0.3914		0.5088		0.4028		0.7883	
Forecast (6)	0.9730		0.9701		0.9436		0.9453		0.9836	
Forecast (10)	0.9895		0.9875		0.9726		0.9879		0.9851	

Notes: There are 44 observations for each of the models. Columns (a) and (b) represent the coefficient estimates and the corresponding p-values, respectively. AIC represents the Akaike Information Criterion developed by Akaike (1974). SIC is the Schwarz Information Criterion. The SIC is sometimes referred to the Bayesian Information Criterion (BIC). Het. is an *F*-test for Heteroskedasticity. The critical value for the Heteroskedasticity test is 2.58. The Doornik and Hansen (1994) tests for normality; it has normality as the null hypothesis. The test Box-Ljung represents the Ljung and Box (1978) test for higher-order autocorrelation. The test Forecast (*h*) is a one-step-ahead χ^2 predictive test *h* observations into the future. Cusum (*h*) is a one-step-ahead predictive *t*-test *h* observations into the future for the residuals.

TABLE 5
EMPIRICAL RESULTS FOR THE DIVORCE RATE (STOCHASTIC TREND)

Variable	Model 1		Model 2	
	(a)	(b)	(a)	(b)
μ	5.625	0.000		
μ_t (last year)			4.320	0.000
β_t (last year)	-0.264	0.015	-0.206	0.025
$divorce_{t-1}$	-0.474	0.002	-0.279	0.043
$divorce_{t-2}$	-0.135	0.336		
$inflation_t$	0.015	0.072	0.017	0.052
$inflation_{t-1}$	0.027	0.004	0.028	0.002
$inflation_{t-2}$	0.036	0.000	0.033	0.000
$unemp_t$	-0.036	0.088	-0.038	0.061
$unemp_{t-1}$	0.029	0.200	0.037	0.099
$unemp_{t-2}$	0.042	0.041	0.042	0.042
Statistical Adequacy Measures:				
R^2	0.9907		0.9905	
AIC	4.3883		4.3719	
SIC	3.9378		3.9214	
Het. $F(13,13)$	0.9807		1.0865	
Cusum $t(6)$	-0.6447		-0.8073	
Cusum $t(10)$	-0.4289		-0.5336	
p-values:				
Normality (2)	0.5852		0.3095	
Box-Ljung (6)	0.3758		0.2868	
Forecast (6)	0.9730		0.9504	
Forecast (10)	0.9895		0.9794	

Notes: There are 44 observations for each of the models. Columns (a) and (b) represent the coefficient estimates and the corresponding p-values, respectively. AIC represents the Akaike Information Criterion developed by Akaike (1974). SIC is the Schwarz Information Criterion. The SIC is sometimes referred to the Bayesian Information Criterion (BIC). Het. is an *F*-test for Heteroskedasticity. The critical value for the Heteroskedasticity test is 2.58. The Doornik and Hansen (1994) tests for normality; it has normality as the null hypothesis. The test Box-Ljung represents the Ljung and Box (1978) test for higher-order autocorrelation. The test Forecast (h) is a one-step-ahead χ^2 predictive test h observations into the future. Cusum (h) is a one-step-ahead predictive t-test h observations into the future for the residuals.

TABLE 6
LONG-RUN EFFECTS FOR VARIOUS TREND SPECIFICATIONS

Variable	Smooth Trend	Stochastic Trend
inflation	0.039	0.068
unemp	-0.062	0.041

Notes: Long-run multipliers are calculated by dropping the time subscripts in the final models and solving for the dependent variable. Note that the long-run multiplier for *unemp* in the smooth-trend specification equals the impact multiplier.

TABLE 7
EMPIRICAL RESULTS FOR THE DIVORCE RATE (WITH ADDITIONAL REGRESSORS)

Variable	Model 1		Model 2		Model 3		Model 4	
	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)
μ_t (last year)	2.406	0.005	2.622	0.002	3.016	0.000	3.026	0.000
β_t (last year)	-0.101	0.142	-0.113	0.088	-0.129	0.049	-0.129	0.051
$divorce_{t-1}$	0.097	0.568	0.051	0.743				
$divorce_{t-2}$	0.073	0.656	0.053	0.722				
$inflation_t$	0.023	0.026	0.023	0.016	0.023	0.013	0.023	0.011
$inflation_{t-1}$	0.020	0.049	0.021	0.019	0.021	0.012	0.021	0.010
$inflation_{t-2}$	0.021	0.051	0.022	0.017	0.023	0.008	0.023	0.007
$unemp_t$	0.059	0.183	0.059	0.073	0.060	0.059	0.058	0.064
$unemp_{t-1}$	-0.007	0.875						
$unemp_{t-2}$	0.002	0.961						
$growth_t$	0.036	0.027	0.035	0.002	0.035	0.002	0.035	0.001
$growth_{t-1}$	0.021	0.275	0.023	0.031	0.023	0.019	0.023	0.019
$growth_{t-2}$	0.007	0.396	0.009	0.163	0.009	0.120	0.010	0.094
$\Delta\ weduc_t$	0.026	0.541	0.022	0.564	0.018	0.612		
$\Delta\ weduc_{t-1}$	0.095	0.029	0.090	0.020	0.086	0.017	0.074	0.007
Statistical Adequacy Measures:								
R^2	0.9928		0.9928		0.9928		0.9928	
AIC	4.2110		4.3028		4.3940		4.4313	
SIC	5.5352		3.7065		3.8772		3.9543	
Het. F(14,14)	0.5163		0.5234		0.5332		0.5499	
Cusum (6)	-0.6634		-0.5919		-0.6076		-0.5957	
Cusum (10)	-0.8333		-0.4831		-0.5369		-0.5347	
p-values:								
Normality (2)	0.9040		0.8953		0.9761		0.9962	
Box-Ljung (6)	0.8240		0.9012		0.9008		0.8230	
Forecast (6)	0.9098		0.9119		0.8964		0.8788	
Forecast (10)	0.9924		0.9928		0.9882		0.9829	

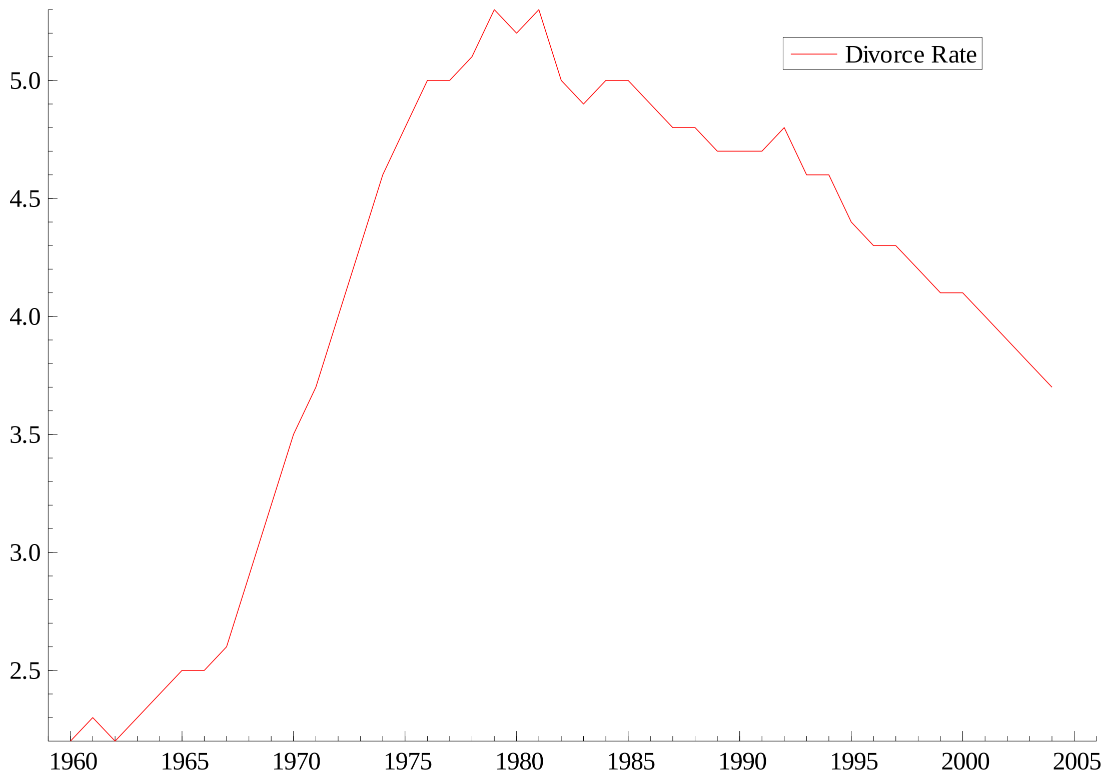
Notes: There are 44 observations for each model. Columns (a) and (b) represent the coefficient estimates and the corresponding p-values, respectively. AIC represents the Akaike Information Criterion developed by Akaike (1974). SIC is the Schwarz Information Criterion, which is also referred to the Bayesian Information Criterion (BIC). Het. is an F-test for Heteroskedasticity. The critical value for the Heteroskedasticity test is 2.48. The Doornik and Hansen (1994) test is used to check for non-normality. The test Box-Ljung represents the Ljung and Box (1978) test for higher-order autocorrelation. The test Forecast (h) is a one-step-ahead χ^2 predictive test h observations into the future. Cusum (h) is a one-step-ahead predictive t-test h observations into the future for the residuals.

TABLE 8
LONG-RUN EFFECTS OF THE EXPLANATORY VARIABLES ON THE DIVORCE RATE

Variable	Smooth Trend	Stochastic Trend	Final Model
inflation	0.039	0.068	0.069
unemp	-0.062	0.041	0.058
growth			0.068
Δ *weduc*			0.074

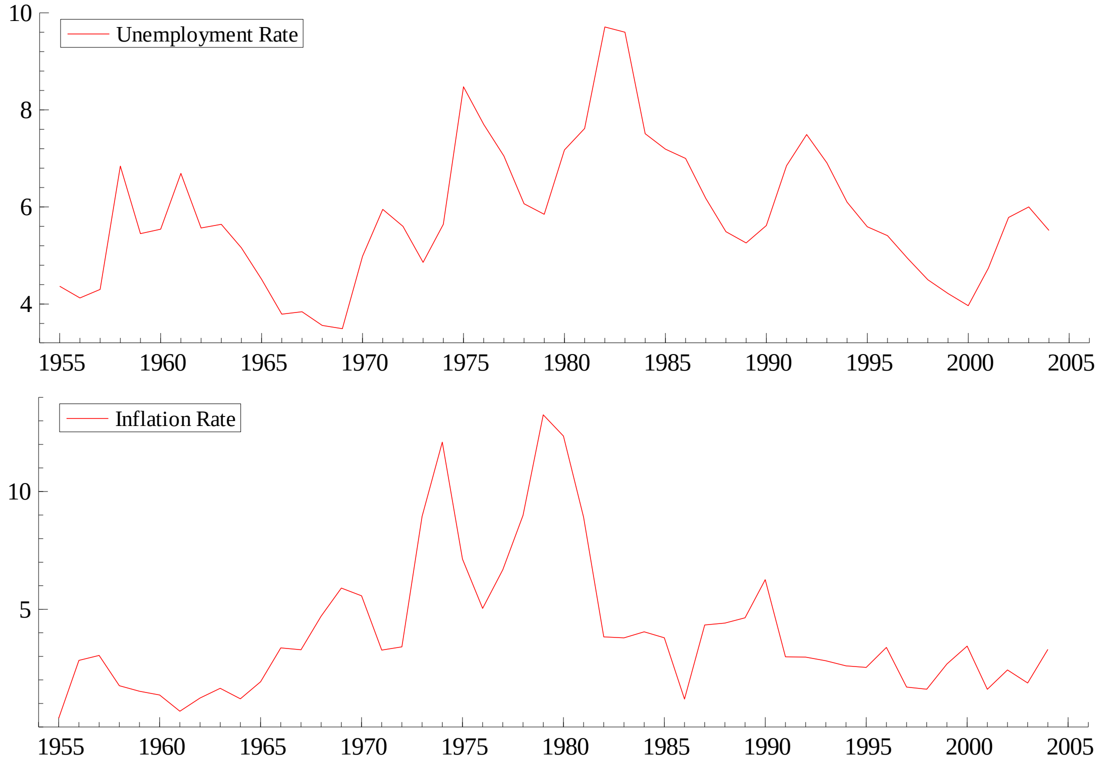
Notes: The long-run effects under the heading Smooth Trend are from the Model 5 in TABLE 3. The long-run effects under the heading Stochastic Trend are from the Model 2 in TABLE 4. The long-run effects under the heading Final Model are from the Model 4 in TABLE 5. Long-run multipliers are calculated by dropping the time subscripts in the final models and solving for the dependent variable. Note that the long-run multipliers for *unemp* under the headings Smooth Trend and Final Model equal the impact multipliers.

FIGURE 1: THE RATE OF NEW DIVORCES OVER TIME



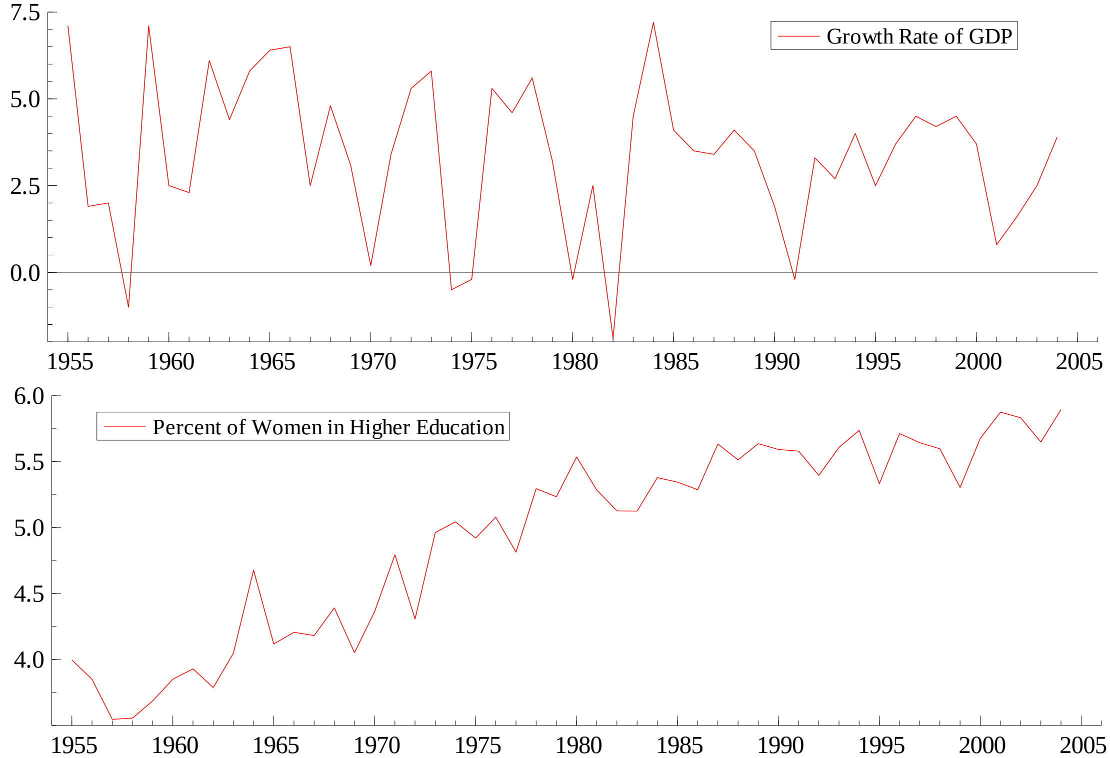
Note: The y-axis measures the number of new divorces per 1,000 people.

FIGURE 2: INFLATION AND UNEMPLOYMENT OVER TIME



Note: The y-axis measures the rate of the explanatory variable.

FIGURE 3: ECONOMIC GROWTH AND WOMEN'S EDUCATIONAL ATTAINMENT OVER TIME



Notes: The y-axis in the upper graph represents the rate of the explanatory variable. In the lower graph, the y-axis represents the percentage of the explanatory variable. However, in the lower graph, the percentage is scaled to be made comparable to the other explanatory variables.

FIGURE 4: RESIDUAL GRAPHICS FOR THE SMOOTH-TREND MODEL

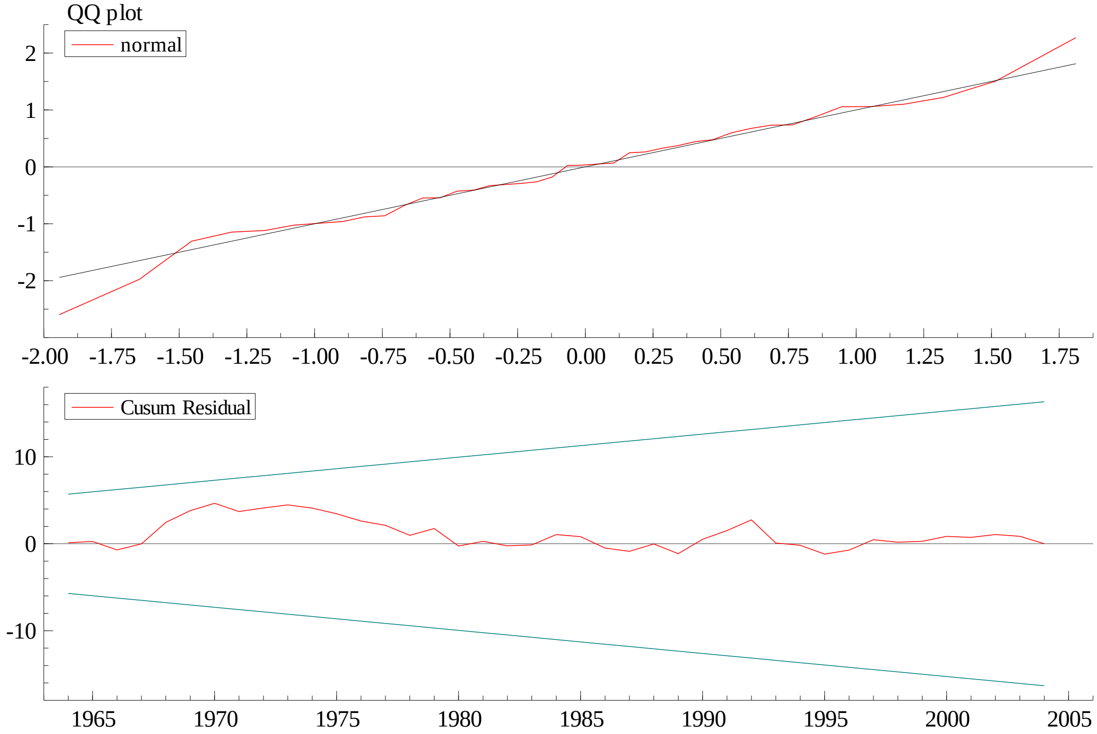


FIGURE 5: RESIDUAL GRAPHICS FOR THE STOCHASTIC-TREND MODEL

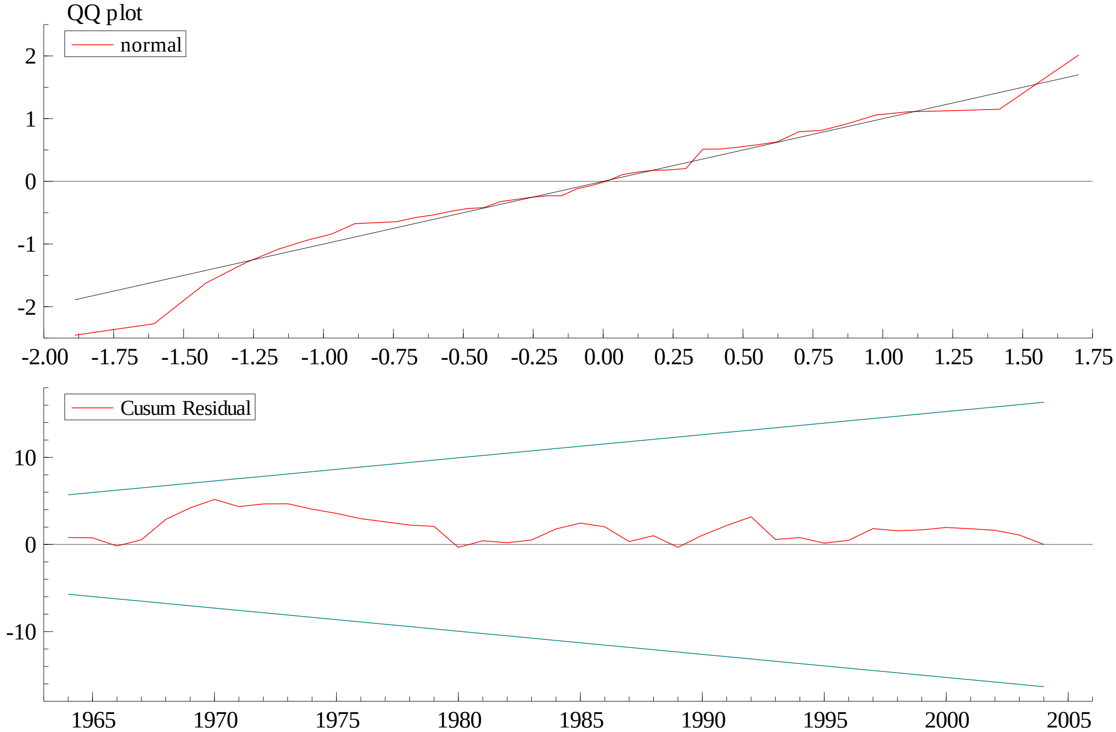


FIGURE 6: REMAINING COMPONENTS FROM THE SMOOTH-TREND MODEL

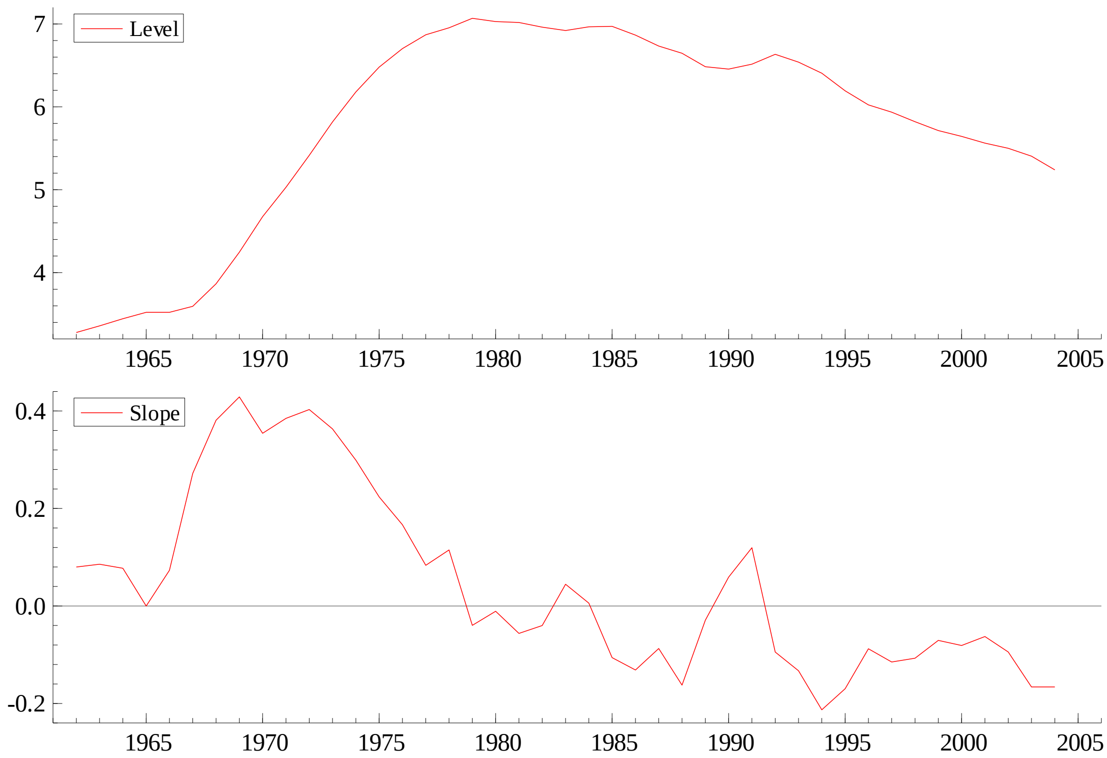


FIGURE 7: REMAINING COMPONENTS FROM THE STOCHASTIC-TREND MODEL

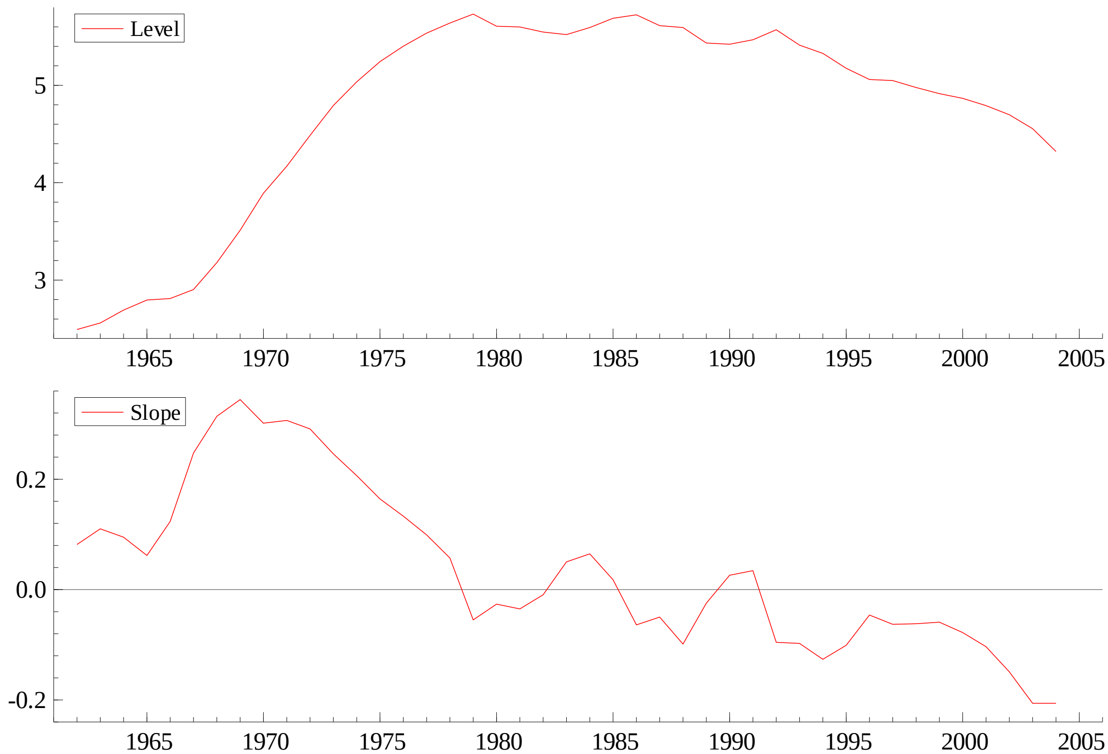


FIGURE 8: RESIDUAL GRAPHICS FOR THE FINAL MODEL

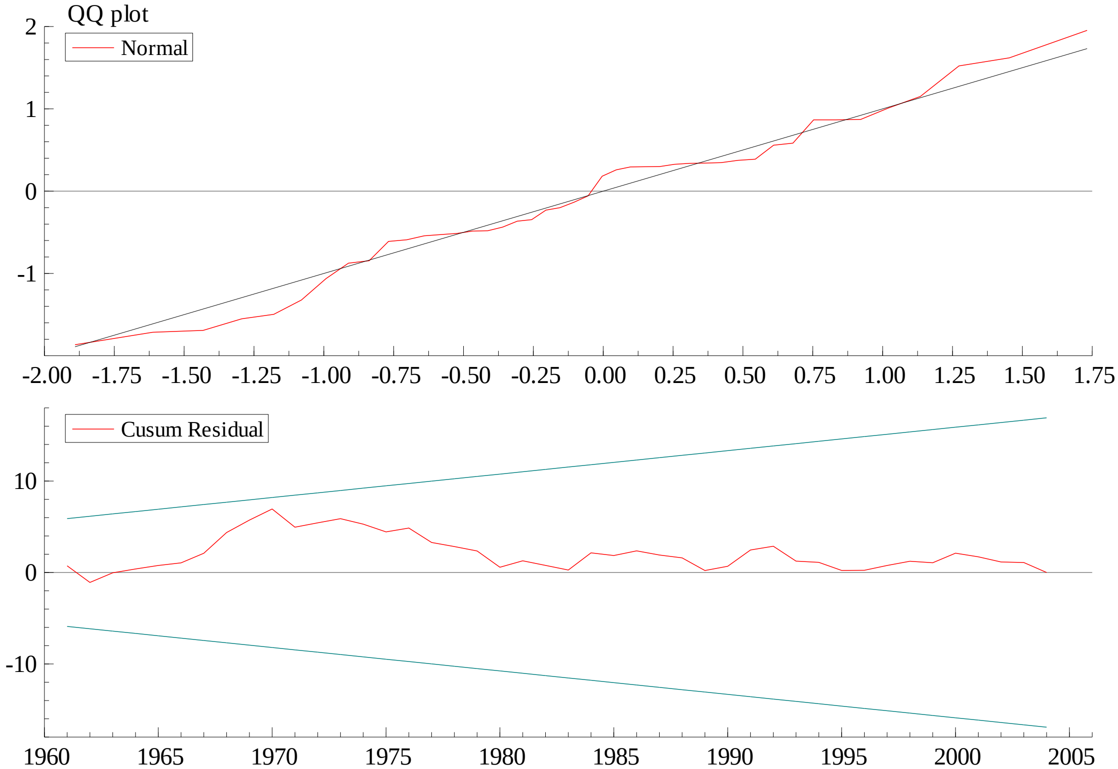


FIGURE 9: REMAINING TREND COMPONENTS FROM THE FINAL MODEL