ON ENDOGENOUS BUSINESS CYCLE UNDER CONSUMPTION GROWTH PREFERENCES

by

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Abstract

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The paper presents a computable general equilibrium model of deterministic endogenous business cycle with endogenous growth or steady state possibilities. The model is built on the consumption growth preferences (CGP) idea, the consequence of aspirations and achievements level theory from applied psychology. Under CGP, instantaneous utility is a function of both consumption and its growth rate. The resulting trade-off produces Pareto optimal cycles: high growth rate of consumption today implies high consumption level tomorrow; however, the resource constraint diminishes the capability to grow when consumption level is high. Under the long-run growth (either endogenous or transitory to the steady state), the tomorrow's growth opportunities are better than today's; thus, it is optimal to save today by reducing the consumption level. The empirical part of the paper tests the CGP assumption on the panel data from 51 countries.

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GLOSSARY

Endogenous Business Cycle – persistent fluctuations of macroeconomic variables which originates from the process that is itself dependent on other variables of the economy.

Consumption Growth Preferences – a situation when individual instantaneous utility function depends on both consumption and its growth rate.

INTRODUCTION

Despite the business cycle topic has deep historic roots, periodic popularity and numerous discussion literature, the opportunity to exploit the specification of individual utility function in order to produce business cycles has not been fulfilled yet. The reasons for this are very conservative utilitarian grounded beliefs in the mainstream economics from the one hand, and relatively recent start of incorporation of behavioral laws. The last fact is mainly due to the weakness of the psychology as a science until now.

The development of aspirations and achievements level theory from applied psychology allows deriving and formulating the consumption growth preferences (CGP) concept, which states that instantaneous utility function of a representative agent is a function of both consumption level and its growth rate. Application of the consumption growth preferences to the standard constrained life-time optimization problem has interesting implications.

The paper presents a computable general equilibrium model of deterministic endogenous business cycle with endogenous growth or steady state possibilities. The resulting from CGP trade-off between consumption level and its growth rate produces Pareto optimal business cycles. The mechanics is the following. High growth rate of consumption today implies high consumption level tomorrow; however, the resource constraint diminishes the capability to grow when consumption level is high. Under the long-run growth (either endogenous or transitory to the steady state), the tomorrow's growth opportunities are better than today's; thus, it is optimal to save today by reducing the consumption level.

We consider several versions of the model. The first one is a direct application of the optimization conditions of the market formulation, which is Pareto optimal since corresponding social planner formulation gives the same optimization conditions. However, technical reasons do not allow solving it appropriately with numeric methods. Thus, the necessity of approximate formulations forces introducing the linearized versions of the model under small departures of CGP model from the standard one. Hence, the second model arises as an approximation of the CGP model with the endogenously growing under AK production function standard Ramsey model. The third one uses a Cobb-Douglas production function and converges to the steady state in the long-run. All the versions of the model produce cycles.

The empirical part of the model tests the CGP assumption on the panel data from 51 countries in one single regression, and separately for individual countries.

Chapter 1

LITERATURE REVIEW

The most significant contribution to the understanding of endogenous economic fluctuations of the industrial economies was made by the pioneers of the field. The first part of literature review follows the framework of historical analysis of Zarnowitz (1985). Firstly, we compare the ideas in the early papers. Secondly, the papers with expectations under uncertainty and unstable investment are considered, while the third part concentrates on the price and wage rate dynamics. Next, we consider the capital accumulation and inventory investment fluctuations. After that the more recent models with monetary sector, liquidity constraints, increasing returns to scale, several sectors, and endogenous innovation accumulation are reviewed.

The first papers perceived the interchangeable growth periods with inflation and recessions with deflation as a result of oscillations in the bank credit which were induced by the gold standard reserve requirements (Hawtrey (1913)). Wicksell (1898) linked fluctuations to the differences between the natural and bank interest rates. At low rates of interest extra-available loans create excessive investment in the capital goods sectors while the other markets' incomes are distorted with the following inflation (Hayek (1933)). However, when banks decrease the credit supply and the consumer goods demand increases back the capital goods firms are curtailed. This results in the recession with deflationary pressure. According to Spiethoff (1925) and Tugan-Baranovskii (1894) these monetary effects are related to the discrepancies between aggregate investment and saving, or between capital and consumer goods industries.

Aftalion (1913), Clark (1917), Clark (1934) relate the cyclical features of the principle of acceleration to the longer life of the capital goods comparing to the consumer goods. Schumpeter (1939) saw the source of cycles in the shifts of technological progress and the following growth process when the old and exhausted investment opportunities were replaced by the new and more profitable ones. Since the fluctuations induce uncertainty they can be prolonged forever by the constant errors in investment expectations. The expansions and recessions, thus, result from the waves of excessive optimism and pessimism, accordingly (Pigou (1927)). The exogenous shocks to demand and supply significantly influence the specific industries with high sunk costs associated with indivisible and durable fixed capital and high costs of adjustment, while other industries are left untouched and the effect comes with some lags. This creates disparity between the industry resulting in the aggregate fluctuations (Robertson (1915)). In Mitchell (1913) and Mitchell (1927) the costs of labor and output are decreasing before and after the expansion, and increasing before and after the recession, which reflect shifts in productivity and capacity utilization, and, in its turn, influence the profits, thus, explaining the fluctuations in investment and output.

Even though the early models of endogenous business cycles are very different emphasizing either monetary or real factors as the main source of the fluctuations and the details of circumstances, they agree on the importance of the interaction between the shifts in money and credit with changes in output, mostly through the business investment (Haberler (1964)).

Despite of much criticism of being data unsatisfactory, restrictive and outdated the value of these models is in their endogeneity based on persistent cyclic interaction of the internal components of the economic system. Even though the fluctuations may often originate from some external shocks, their role is secondary relative to the following dynamics of internal variables.

All of the mentioned papers mostly represent the classical paradigm. However, they also stress the importance of economic instability, trying to resolve the puzzle of inconsistency between the equilibrium or convergence to equilibrium theoretical predictions and the real-life economic dynamics and not perceiving cycles as a merely temporary departures from the long-run steady state. Another common feature of these papers is in the acceptance of the high correlation between the nominal and real variables with the frequent causal referral.

The next wave of the cycle research is related to the 1920-30s crises in Britain and the US. Keynes (1936) explains the large declines by the sharp decrease of the marginal productivity of capital. In the upturn the supply of capital goods and associated costs rise, this leads to decrease in the profitability of investment projects. The effect deepens because of the inter-temporal substitution of investment based on the expectation of the future drop in costs. The current level of optimism consequently drops which increases the volatility of investment expectations and decreases the predictive power of the data from the past. The more reliable predictions can be done for the stock market which is highly influenced by the crowd effects. Market shortly reacts to the expected fluctuations in profits encouraging or discouraging present investment decisions. If the market values the firm higher than the costs of establishing the same new one, the investment will be discouraged.

The last argument constitutes a basis for Tobin (1969). Investment depends on the ratio of the market value of the firm to the costs of its capital. Even though intellectual attractiveness and testability of the relation between expectations and investment made this approach popular, the numerous empirical tests reject this hypothesis (Clark (1979), Blanchard and Wyplosz (1981), Abel and Blanchard (1983), Gordon and Veitch (1984)). However, the reason for this is seen in non-realistic assumptions of homogenous capital and perfectly liquid financial markets, which contradicts to the financial instability results in Keynes (1936).

The last paper emphasizes specific patterns of financial crises when the market drops are sharp and the upward trend takes much more time. The main reason for this asymmetry lies in the peculiarities of expectations formation of investors: the virus of pessimism spreads immediately while the recovery of optimism is long and painful.

The decrease of investment pushes down the interest rates, however not deep enough for investment to go back. The uncertainty shits demand from interest-bearing securities and investment to the money balances. And only after the resulting decrease of capital stock restores the profitability of the investment projects the recovery will take place Keynes (1936).

Keynes argues that the source of decline lies not in optimistic over-investment since there are no profitable investment opportunities at full employment, but in the failure of the private demand to maintain full employment resulting from the low propensity to consume during the recession combined with unstable investments.

Despite the wide popularity of Keynesian reasoning critique argues that his analysis of depressions applies only to 1930s, since all the other recessions are not as deep and harsh, and the investment drops are not as sudden. Also during the downturns the capital stock is not decreasing, even though its growth rate certainly does, while the short-run propensity to consume is unstable and the sensitivity of the money demand to the interest rates is low (Laider (1969)).

Classical mechanism failed to cure the depression of the 1930s because the real wages were not decreasing as they should according to the theory. Even though Keynes did not consider the wages as fully rigid to decrease, he argued their adjustment is lagged comparing to the shifts in the labor demand. This does not allow income, consumption and prices to decrease in order to decrease the profits and increase the investment. The resulting deflation is slow, thus expected, which urges individuals to defer their consumption. As a result, the money demand pushes out the demand for equity and goods.

Also the unexpected deflation increases the real value of debts which worsens the positions of active borrowers, investors and consumers. This decreases their ability to raise credit funds, and causes defaults. The depth of recession depends highly on the scope of deflation and real debt creation according to Fisher (1932), Fisher (1933). Thus, the straightforward anti-cycle policy action is the increase of the money supply with resulting reflation. However, this one-time unexpected decrease in wages is hardly manageable in practice because of the complicated structure of labor markets and relative wages.

Keynes (1936) emphasizes only disequilibrium approach of a comparative statics looking at the levels of wages and prices. However, business cycle analysis requires dynamic approach which has to concentrate also on the changes in the growth rates of the variables (Leijonhufvud (1968)).

From 1950s economies start demonstrating new patterns of dynamics. Now the recessions are not as deep as before, but inflation becomes a persistent problem. Consequently arises the trade-off between inflation and unemployment Phillips (1958), Lipsey (1960), Samuelson and Solow (1960).

The classical reaction was to introduce the concept of the natural, equilibrium rate of unemployment dependent on the real wages (Friedman (1968)). The predicted inflation cannot influence the real wages, while the difference between actual and forecasted inflation distorts the real wage causing disequilibrium on the labor market. Since in equilibrium expected inflation rate is the same as actual there is no long-run trade-off between inflation and unemployment. The last conclusion constitutes the so called natural rate hypothesis (Friedman (1966), Friedman (1968), Phelps (1967)). The expected inflation rate here determines the short-run Phillips curve.

Tobin (1975) introduced the dynamic model with slowly adjusting expectations which shows high negative influence of the prices on the aggregate demand, low influence of the expected prices, and slow adjustment of the expectations to the past price pattern. Aggregate demand shocks will be followed by weak price adjustment, thus the price-level effect on aggregate demand will be lower than the price change effect, causing disequilibrium dynamics.

Keynes (1936) does not use the principle of accelerator under which changes in investment cause changes in capital stock, which in turn effects production and investment. However, there are various papers which model endogenous cycles resulting from this kind of approach (Harrod (1936), Kalecki (1937), Samuelson (1939), Metzler (1941), Hicks (1950)).

They claim that net investment depends on the growth of output, thus more complex production stages will have deeper fluctuations through consumption. Even though the general empirical support made this methodology popular, it has problems too. For instance, serial correlation in investment is much stronger than in output differences, and the relationship between investment and change in output is not strong in the short run, since the first one also highly depends on changes in technology, wages, and expectations.

When the model has several multipliers, like in Hicks (1950), when consumption is a function of the lagged values of income and investment again depends on the output growth, the system of the difference equations produce damping or increasing amplitude endogenous fluctuations depending on the scope of parameters. The long-run growth can be added through exogenous technological change. In this case fluctuations occur along the long-run trend.

The flexible accelerator principle represent more general approach: investment decision is based on the difference between the actual and aspired level of the capital stock. Since the aspired level of stock is a function of current level output the output is used as an approximation variable for it (Kalecki (1935), Kaldor (1940), Goodwin (1951)). After Tinbergen (1939) the methodology was significantly enriched by introduction of the variable speed of the capital gap adjustment which depends positively on the cost of capital. The dynamics under this assumption is more gradual.

The development of applied mathematics opened new insights to the business cycle modeling. The singularities in differential equations allow to model harsh crises, recessions and fast upturns, based on interaction of the variables which change either fast or slow (Varian (1979)).

The criticism of this kind of models consists of the negligence of monetary and financial variables, expectations and technological change, which were proved to be significant determinants of fluctuations before. And introduction of monetary sector indeed allows observing deeper amplitudes (Hicks (1950)). Tobin (1955) models the cycles emphasizing the importance of money supply and rigid wages.

Despite the life-time and adjustment costs of inventories are much lower that those in the fixed capital, the apt inventory management highly depends on the errors in expectations of future demand for goods and the speed of reaction to the demand shocks. Since the aggregate demand is more volatile than the one in the specific industry the inventory investment is a factor which rather destabilizes the economy, not helping on the aggregate level.

The pioneering papers Metzler (1941) and Metzler (1947) introduce the accelerator models for the inventory investment. They claim that the aspired stock of goods changes with expected demand which depends on the actual demand patterns in the near past. Consumption is a function of the lagged output levels and current income. The exogenous shift in non-inventory investment decreases inventory stock causing management to raise it. However, since the inventory investment also depends on the income and consumption, its stock is small anyway. The resulting attempts to increase inventories cause new cycles in inventory investment and output. This process is bounded by the market demand. When the output is excessive inventory investment starts falling, causing the reverse process which endures until the market demand is higher than the output. Here the next upward trend evolves. Coppock (1965) and Hillinger (1979) support this model empirically. The main criticism of Metzler's model is similar to the other accelerator business cycle model and stresses the lack of the monetary variables, financial sector and other factors.

Mitchell (1913) thought that the business cycles result from the changes in profit expectations, the experience of sales, and the price-cost relation which, in turn, depends on the level of capacity utilization and unemployment rate. Since in the upturn the costs of production increase faster than the market prices which decreases the investment opportunities and expectations. Thus, the investment decisions are taken before the stabilization of output to the demand level. Income and consumption depress, inventories grow, while the output decreases. After the decrease in the price-cost ratio during the recession it starts again increasing, shifting the industry to the equilibrium level. These findings are widely supported in empirics (Fabricant (1959), Moore (1975), Boehm (1982)), especially important is the explanations of pro-cyclical lagged costs of labor per one unit of production, while the wage itself does not exhibit much fluctuations.

The introduction of the monetary sector in general and the liquidity costs specifically allows obtaining different qualitative solutions, particularly with the fluctuations (Benhabib and Day (1984), Grandmond (1985), Reichlin (1986)). The liquidity constraints under profit maximization also give the cyclic solutions (Goodwin at al. (1984), Foley (1988), Gabisch and Lorenz (1987)). However, the myopic expectations in these models contradict to the rationality of the agents which must predict replicating fluctuations. Foley (1992) solves this problem showing that the cycles may arise even with the perfect foresight.

Stadler (1990) develops a monetary business cycle model with endogenous technological progress, and shows that the properties of cycles differ much from those in the exogenous models. The monetary shocks are no more neutral in the long-run, and the output is non-stationary even in the absence of exogenous shocks because the aggregate demand shifts have a permanent impact on the aggregate supply though the numerous channels.

Another class of endogenous cycle models is based on increasing returns to scale (Farmer and Guo (1994)) or variable difference between the price and production costs (Gali (1994), Schmitt-Grohe (1997)). However, since these assumptions are far from empirical results, the models with different sector-specific and realistically small returns to scale were developed (Benhabib and Farmer (1996)).

The criticism of those new models emphasizes that they are of little value-added since they cannot explain more than the real business cycle models do. However, in Schmitt-Grohe (2000) allows also for counter-cyclical dynamics of the difference between price and marginal costs, which predicts pro-cyclical dynamics of consumption. And Dosi et al. (2005), under the assumptions of heterogeneous capital goods and adaptive expectations of firms, show not only long-run growth and cycles, but also more specific facts, such as higher volatility in investment and lower in consumption comparing to output, pro-cyclic behaviour of employment, consumption and investment.

Several papers try to model endogenous growth and business cycle under the same setup. Francois and Lloyd-Ellis (2003) introduce a quality-ladder model where the innovation accumulation occurs. Freeman, Hong and Peled (1999) gives similar model where innovation accumulation results in long-run cyclic growth. In the other group of models the trade-off between investment in innovation and capital accumulation, and endogenous productivity shocks produce either deterministic growth with cycles (Matsuyama (2001)) or stochastic growth with cycles (Bental and Peled (1996), Wälde (2002)). The resulting counter-cyclical innovation investment in these models has controversial empirical support. As a reaction to this fact, Wälde (2003) introduces a stochastic Poison model with high-frequencies endogenous cycles and growth. The minor technological progress follows significant aggregate fluctuations in this model.

C h a p t e r   2

THEORY

2.1. Consumption growth preferences.

Here we derive the CGP.

Assumption 1. Under the aspiration level theory (Michalos (1991), Inglehart (1990)) happiness depends positively on the gap between achievements and aspirations, for C_t – a consumption at time t, U_t – the instantaneous utility function:

$$U_t = v(C_t - Aspired(C_t))$$

Assumption 2. Under the adaptation level theory (Frederick and Loewenstein (1999)) because of adaptation happiness would rather depend on the relative gap, not the absolute one: $U_t = v\left(\frac{C_t - Aspired(C_t)}{Aspired(C_t)}\right)$

Assumption 3. For rational agent aspirations cannot consistently differ from expectations, other the agent is not rational: $Aspired(C_t) = E_{t-1}(C_t)$

Assumption 4. The agent forms expectations in the simplest myopic way:

$$E_{t-1}(C_t) = C_{t-1}$$

Combining the last three equations we get: $U_t = v\left(\frac{C_t - C_{t-1}}{C_{t-1}}\right)$

or, for continuous time: $u = v\left(\frac{\dot{c}}{c}\right) = v(m)$

Adding traditional consumption level component we obtain the consumption growth preferences: $u = u(c, m)$

2.2. The model.

We consider several versions of the model. The first one is a direct application of the optimization conditions of the market formulation. The second one is its social planner formulation. The third model arises as an approximation of the CGP model with the endogenously growing under AK production function standard Ramsey model. Finally, the last one uses a Cobb-Douglas production function and converges to the steady state in the long-run.

2.2.1. The market economy setup.

The economy consists of individuals and firms. The identical individuals sell their labor services L and receive wages w. They can also hold assets $a = \frac{Assets}{L}$ in the form of capital $k = \frac{K}{L}$ or loans and receive equal interest r on them. Since the economy is closed, the value of loans of representative agent is zero. Agent can save by accumulating assets or purchase consumer goods $c = \frac{C}{L}$. Thus, the representative agent's budget constraint is $\dot{a} = w + ra - c$. Each agent maximizes overall utility $\int_0^T e^{-\rho t} u(c,m) dt$, where ρ is a discount rate.

Hence, the representative agent's problem is

$$\max_{a(t),c(t)} \int_0^T e^{-\rho t} u(c,m) dt \tag{1.1}$$

subject to

$$\dot{a} = w + ra - c \tag{1.2}$$

$$\frac{\dot{c}}{c} = m \tag{1.3}$$

$$a(0) = a_0 \text{, given} \tag{1.4}$$

$$a(T)e^{-\bar{r}(T)T} \geq 0,\ \bar{r}(t) = \frac{1}{t}\int_0^t r(z)dz \tag{1.5}$$

Here the (1.5) is the so-called transversality condition, which ensures the optimal solution by claiming that individual cannot end up with a negative present value of assets.

The corresponding present-value Hamiltonian for (1.1)-(1.5) is:

$$H(a,c,m,\mu,\eta) = e^{-\rho t} u(c,m) + \mu[w + ra - c] + \eta[mc] \tag{1.6}$$

The first order conditions are:

$$\frac{\partial H}{\partial c} + \dot{\eta} = 0 \Leftrightarrow e^{-\rho t} u_1(c,m) - \mu + \eta m + \dot{\eta} = 0 \tag{1.7}$$

$$\frac{\partial H}{\partial a} + \dot{\mu} = 0 \Leftrightarrow \mu r + \dot{\mu} = 0 \tag{1.8}$$

$$\frac{\partial H}{\partial m} = 0 \Leftrightarrow e^{-\rho t} u_2(c,m) + \eta c = 0 \tag{1.9}$$

Firms produce goods with the homogenous of the degree one production function $\frac{AF(K,L)}{L} = AF(k,1) = Af(k)$, where A is a technological level parameter, sell them to individuals, hire individuals, pay them for labor, and pay rent for the capital. The representative firm maximizes profits $\max_{K(t),L(t)} \pi = F(K,L) - (r+\delta)K - wL = L[f(k) - (r+\delta) - w]$. Since the labor and capital market are assumed to be competitive, w and r are exogenous. And the firm's optimization conditions are

$$\frac{\partial \pi}{\partial K} = f'(k) - r - \delta = 0 \tag{1.10}$$

$$\frac{\partial \pi}{\partial L} = f(k) - (r+\delta) - w \tag{1.11}$$

The capital market should clear: $a = k$ (1.12)

Combining (1.2) and (1.7)-(1.12) we obtain:

$$\mu = e^{-\rho t}u_1(c,m) - \left[\frac{e^{-\rho t}u_2(c,m)}{c}\right]m - \frac{d}{dt}\left[\frac{e^{-\rho t}u_2(c,m)}{c}\right] \tag{1.13}$$

$$\frac{\dot{\mu}}{\mu} = -(Af'(k) - \delta) \tag{1.14}$$

$$\frac{\dot{c}}{c} = m \tag{1.15}$$

$$\dot{k} = Af(k) - \delta k - c \tag{1.16}$$

2.2.2. The social planner setup.

We can compare the outcome of the decentralized economy (1.1)-(1.5) and (1.10)-(1.12) to Pareto optimal by considering the social planner formulation of the problem. The benevolent policy-maker directly chooses k and c to maximize the overall utility of the representative agent (2.1) given the resource constraint (2.2). (2.5) is a transversality condition.

$$\max_{k(t),c(t)} \int_0^T e^{-\rho t} u(c,m) dt \tag{2.1}$$

subject to

$$\dot{k} = Af(k) - \delta k - c \tag{2.2}$$

$$\frac{\dot{c}}{c} = m \tag{2.3}$$

$$k(0) = k_0 \text{, given} \tag{2.4}$$

$$k(T) e^{-\bar{r}(T)T} \geq 0 \tag{2.5}$$

The Hamiltonian is:

$$H(k,c,m,\mu,\eta) = e^{-\rho t} u(c,m) + \mu[Af(k) - \delta k - c] + \eta[mc] \tag{2.6}$$

First order conditions:

$$\frac{\partial H}{\partial c} + \dot{\eta} = 0 \Leftrightarrow e^{-\rho t} u_1(c,m) - \mu + \eta m + \dot{\eta} = 0 \tag{2.7}$$

$$\frac{\partial H}{\partial k} + \dot{\mu} = 0 \Leftrightarrow \mu[Af'(k) - \delta] + \dot{\mu} = 0 \tag{2.8}$$

$$\frac{\partial H}{\partial m} = 0 \Leftrightarrow e^{-\rho t} u_2(c,m) + \eta c = 0 \tag{2.9}$$

Combining (2.2) and (2.7)-(2.9) we obtain:

$$\mu = e^{-\rho t} u_1(c,m) - \left[\frac{e^{-\rho t} u_2(c,m)}{c}\right] m - \frac{d}{dt}\left[\frac{e^{-\rho t} u_2(c,m)}{c}\right] \tag{2.10}$$

$$\frac{\dot{\mu}}{\mu} = -(Af'(k) - \delta) \tag{2.11}$$

$$\frac{\dot{c}}{c} = m \tag{2.12}$$

$$\dot{k} = Af(k) - \delta k - c \tag{2.13}$$

Since (1.13)-(1.16) are exactly the same as (2.10)-(2.13), the decentralized economy can be alternatively described as a social planner economy. Hence, the market economy in 2.2.1 gives the Pareto optimal outcomes.

2.2.3. Numeric solutions of the CGP model.

Assuming additive utility function in the form $u(c,m) = w(c) + v(m) = \log(c) + \gamma \exp(\beta m)$, $\gamma, \beta > 0$, and Cobb-Douglas production function $f(k) = k^{\alpha}$ (1.13)-(1.16) transform to

$$\mu = \frac{e^{-\rho t}}{c} - \left[\frac{\gamma\beta \exp(\beta m - \rho t)}{c}\right] m - \frac{d}{dt}\left[\frac{\gamma\beta \exp(\beta m - \rho t)}{c}\right] \tag{3.1}$$

$$\frac{\dot{\mu}}{\mu} = -\left(A\alpha k^{\alpha-1} - \delta\right) \tag{3.2}$$

$$\frac{\dot{c}}{c} = m \tag{3.3}$$

$$\dot{k} = Ak^{\alpha} - \delta k - c \tag{3.4}$$

Solving (3.1)-(3.4) would allow describing the optimal time-pass of the economy. Since the analytical solutions of the system are not feasible, we can try solving it numerically. Figures A2.1 and A2.2 shows the Matlab simulations of (3.1)-(3.4) comparing to the standard models (under $\gamma = 0$). As we can see the CGP model produces higher growth rates comparing to the standard AK production model (under $\alpha = 1$) and non-steady-state pattern for the Cobb-Douglas production function ($\alpha < 1$) in contrast to the Ramsey model. However, these patterns are not feasible because of the resource constraint which limits the long-run growth to the standard benchmark ones.

Thus, the best we can do is to analyze how the model parameters influence the main features of the business cycles. Figures A2.6-A2.8 show the numeric simulations of the cyclic components of the solution (detrended with Hondrick-

Prescott filter) for different values of the model parameters. We can summarize the results of sensitivity analysis in Table 2.1.

Table 2.1. The summary of the sensitivity analysis of the cycles in CGP model.

	γ	β	ρ	α	A	δ
Phase				+	+	+
Amplitude	+	+	–	–k	No	+k
Frequency	+	–	+	No	No	No

The weight of the consumption growth component in the utility function γ increases the amplitude and frequency of the cycle. Thus, the higher the importance of the growth of consumption the larger fluctuations the economy will exhibit. The raise of β increases the amplitude and decreases the frequency of the cycle. The raise of the discount rate, in contrast decreases the amplitude and increases the frequency of the cycle. The effect of γ, β, and ρ on the phase of the cycle is indeterminate because of the influence on frequency. In contrast, the share of capital in the economy α, technological progress A, and the discount rate δ influence the phase of the cycle. However, these parameters do not influence the amplitude and frequency of consumption and capital, except α which negatively influences the amplitude of capital cycles, and δ which influences the amplitude of capital cycles positively. Thus, there are three parameters which can be varied arbitrarily γ, β, A to match three features of cycles, which potentially gives much space to calibration of the model to the real-economy data.

2.2.4. The linearized CGP model with endogenous growth.

In order to get the optimal growth pattern we could not obtain in general case (3.1)-(3.4), we can log-linearize the CGP model under AK production function. If the CGP are small, the solutions do not differ much from the standard endogenous growth AK model without CGP ($\gamma = 0$). Assuming solution in the AK version takes form

$$c(t) = c^{AK}(t) \cdot \varepsilon(t) \tag{4.1}$$

where c^{AK} is an analytical solution to the AK model and $\varepsilon(t)$ is a perturbation due to the presence of a small consumption growth preferences (small gamma). Substituting this solution of $c(t)$ into (3.1)-(3.4) under $\alpha = 1$ (AK production) we can derive a linearized differential equation for $\varepsilon(t)$. Thus, solving the (3.1)-(3.4) for $\gamma = 0$ and $\alpha = 1$ yields

$$c^{AK}(t) = c_0 e^{(A-\delta-\rho)t} \tag{4.2}$$

$$k^{AK}(t) = \left(k_0 - \frac{c_0}{\rho}\right) e^{(A-\delta)t} + \frac{c_0}{\rho} e^{(A-\delta-\rho)t} \tag{4.3}$$

Substitution of (4.2) into (4.1) into (3.1)-(3.4) results in

$$\dot{m} = \frac{1}{\varepsilon\beta} + \frac{1}{\beta}(A-\delta) - \frac{e^{-\beta m}}{\gamma\beta^2}(c_0\mu_0\varepsilon - 1) - \frac{m}{\beta} \tag{4.4}$$

$$\dot{\varepsilon} = (m - A + \delta + \rho)\varepsilon \tag{4.5}$$

Linearizing (4.4), (4.5) around $\varepsilon_0 = 1$ and $m_0 = A - \delta - \rho$ which correspond to (4.2) we get

$$\dot{m} = \psi_1(\varepsilon - \varepsilon_0) + \psi_2(m - m_0) + m_0 \tag{4.6}$$

$$\dot{\varepsilon} = m - m_0 + \varepsilon_0 \tag{4.7}$$

Where $\psi_1 = -\frac{1}{\beta} - \frac{c_0\mu_0}{\gamma\beta^2} e^{-\beta(A-\delta-\rho)}$, $\psi_2 = \frac{e^{-\beta(A-\delta-\rho)}}{\gamma\beta}(c_0\mu_0 - 1) - \frac{1}{\beta}$.

(4.6) and (4.7) produce cycles under $\psi_2^2 + 4\psi_1 < 0$. Fluctuations are stable when $\psi_2 = 0$, dumping when $\psi_2 < 0$, and exploding when $\psi_2 > 0$

Taking the initial values at the long-run equilibrium $\varepsilon(0) = 1$, $\dot{\varepsilon}(0) = 0$ we obtain the solution of (4.6), (4.7):

$$\varepsilon(t) = e^{\frac{\psi_2}{2}t} \cos\varphi t \tag{4.8}$$

where $\varphi = -\frac{i}{2}\sqrt{\psi_2^2 + 4\psi_1}$.

Substituting (4.8) into (4.2) we get the linearized solutions for consumption:

$$c(t) = c_0 e^{\left(A-\delta-\rho+\frac{\psi_2}{2}\right)t} \varphi t \tag{4.9}$$

Solving (4.9) with (3.4) we obtain the linearized solutions for capital:

$$k(t) = \left[k_0 + \frac{c_0\left(\frac{\psi_2}{2} - \rho\right)}{\left(\frac{\psi_2^2}{2} - \rho\right)^2 + \varphi^2} \right] e^{(A-\delta)t} - \frac{c_0 e^{\left(A-\delta-\rho+\frac{\psi_2}{2}\right)t}}{\left(\frac{\psi_2^2}{2} - \rho\right)^2 + \varphi^2} \left[\left(\frac{\psi_2}{2} - \rho\right)\cos\varphi t + \varphi \sin\varphi t \right] \tag{4.10}$$

Equations (4.9) and (4.10) allow determining the behavior of linearized CGP around AK model. The Matlab simulations of the main economic variables are shown at Figure 2.2. As we can see the pattern of capital, output, interest rate, wages, saving rate is the same as in the standard AK case, while consumption, investment and utility are fluctuating along there long-run trends.

The correlation analysis (see Table A2.1) implies that wages and investment are procyclical, while consumption and capital are countercyclical and interest rate, saving rate and utility are acyclical. The analysis of second moments shows that investment and consumption are more volatile than the output, and investment is more volatile than consumption is.

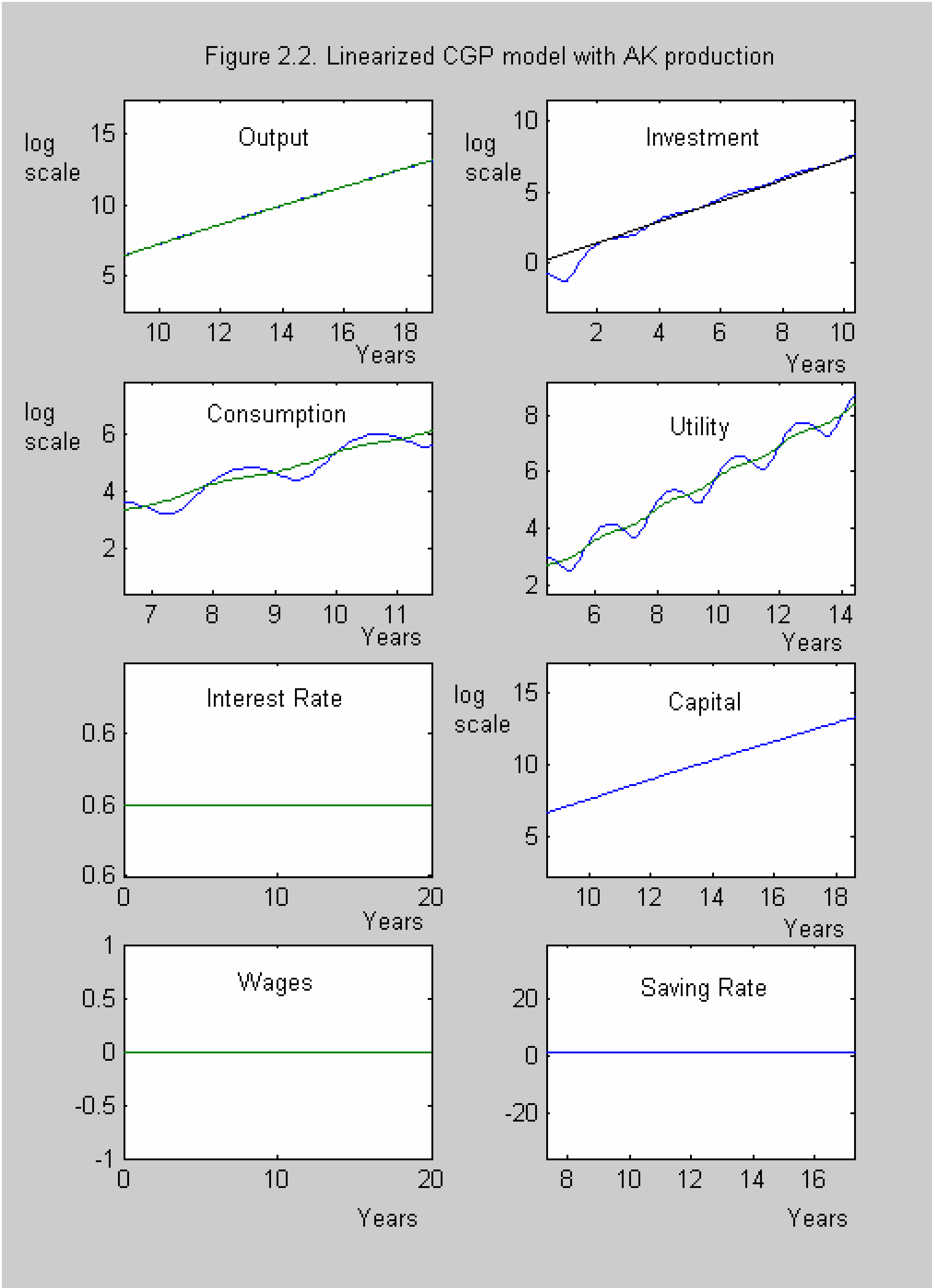
Figure 2.2. Linearized CGP model with AK production
Output
log scale
15
10
5
10 12 14 16 18
Years
Investment
log scale
10
5
0
2 4 6 8 10
Years
Consumption
log scale
6
4
2
7 8 9 10 11
Years
Utility
8
6
4
2
6 8 10 12 14
Years
Interest Rate
0.6
0.6
0.6
0 10 20
Years
Capital
log scale
15
10
5
10 12 14 16 18
Years
Wages
1
0.5
0
-0.5
-1
0 10 20
Years
Saving Rate
20
0
-20
8 10 12 14 16
Years

2.2.5. The linearized CGP model with steady state.

Now we consider the linearization of CGP model about the Ramsey model with steady state. (3.1)-(3.4). If we denote $\hat{\mu} = \mu e^{\rho t}$ (3.1)-(3.4) becomes

$$\hat{\mu} = \frac{1}{c} - \frac{\gamma\beta e^{\beta m}}{c} m - \frac{d}{dt}\left[\frac{\gamma\beta e^{\beta m}}{c}\right] \tag{5.1}$$

$$\dot{\hat{\mu}} = -\hat{\mu}\left(A\alpha k^{\alpha-1} - \delta - \rho\right) \tag{5.2}$$

$$\dot{c} = cm \tag{5.3}$$

$$\dot{k} = Ak^{\alpha} - \delta k - c \tag{5.4}$$

Solving (5.1) for $\dot{m}$:

$$\dot{m} = \frac{e^{-\beta m}}{\gamma\beta^2}\left(1 - \hat{\mu}c\right) + \frac{\rho}{\beta} \tag{5.5}$$

(5.1)-(5.4) is in the steady state when

$$\frac{\gamma\beta \exp(\beta m - \rho t)}{c} = 0, \qquad \dot{c} = 0, \qquad \dot{k} = 0, \qquad \dot{\hat{\mu}} = 0.$$

(5.6)

From (5.6) and (5.1)-(5.4) the steady state solutions are

$$m^* = 0 \tag{5.7}$$

$$k^* = \left(\frac{\delta}{A\alpha}\right)^{\frac{1}{1-\alpha}} \tag{5.8}$$

$$c^* = A\left(\frac{\delta}{A\alpha}\right)^{\frac{\alpha}{1-\alpha}} - \delta\left(\frac{\delta}{A\alpha}\right)^{\frac{1}{1-\alpha}} \tag{5.9}$$

$$\hat{\mu}^* = \frac{1}{A\left(\frac{\delta}{A\alpha}\right)^{\frac{\alpha}{1-\alpha}} - \delta\left(\frac{\delta}{A\alpha}\right)^{\frac{1}{1-\alpha}}} \tag{5.10}$$

The linearized solutions of (5.2)-(5.5) around the steady state (5.7)-(5.10) are

$$\dot{m} = -\frac{1}{\gamma\beta^2}\left(c^*\hat{\mu} + \hat{\mu}^* c - 2\right) + m^* \tag{5.11}$$

$$\dot{\hat{\mu}} = \hat{\mu}^* - \left(A\alpha\left(k^*\right)^{\alpha-1} - \delta - \rho\right)\left(\hat{\mu} - \hat{\mu}^*\right) - \hat{\mu}^* A\alpha(\alpha-1)\left(k^*\right)^{\alpha-2}\left(k - k^*\right) \tag{5.12}$$

$$\dot{c} = c^* + c^* m \tag{5.13}$$

$$\dot{k} = k^* - c + c^* + \left(A\alpha\left(k^*\right)^{\alpha-1} - \delta\right)\left(k - k^*\right) \tag{5.14}$$

The system (5.11)-(5.12) cannot be solved analytically; however, we can solve it numerically. . The Matlab simulations of the main economic variables are shown at Figure 2.3. As we can see, all the variables fluctuate on their way to the steady state. The amplitudes of fluctuations of output, wages, interest rate, and utility are dumping, while the saving rate is exploding. The analysis of cross-correlations between the main economic variables (Table A2.3) testifies to the procyclical behavior of capital, investment, interest rate, saving rate and wages, and countercyclical behavior of consumption.

2.2.6. Discussion

Under CGP, instantaneous utility is a function of both consumption and its growth rate. The resulting trade-off produces Pareto optimal cycles: high growth rate of consumption today implies high consumption level tomorrow; however, the resource constraint diminishes the capability to grow when consumption level is high. Under the long-run growth (either endogenous or transitory to the steady state), the tomorrow's growth opportunities are better than today's; thus, it is optimal to save today by reducing the consumption level.

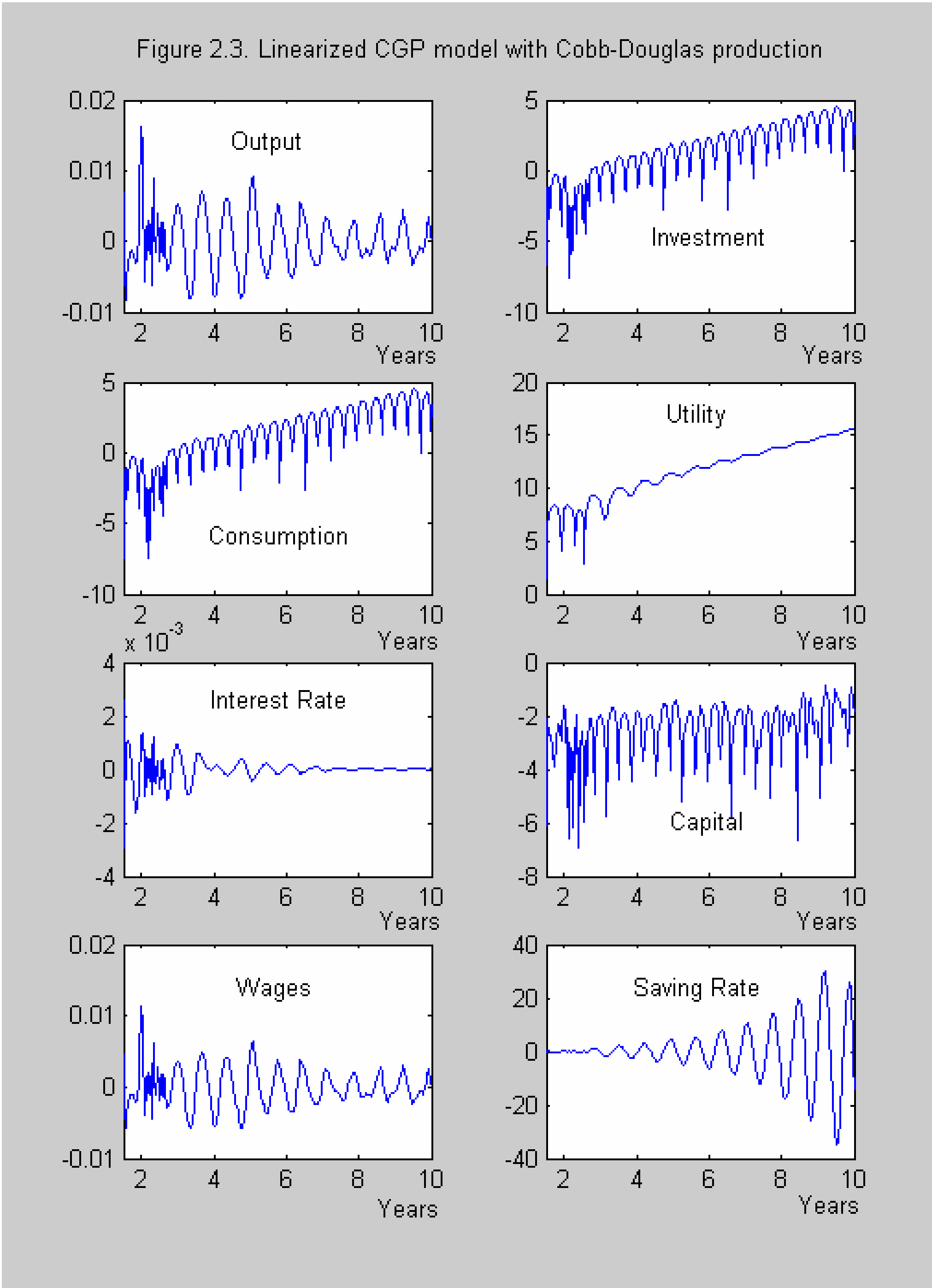
Figure 2.3. Linearized CGP model with Cobb-Douglas production
Output
Investment
Consumption
Utility
Interest Rate
Capital
Wages
Saving Rate
Years
x 10^-3

Chapter 3

TESTING THE CONSUMPTION GROWTH PREFERENCES ASSUMPTION

3.1 Data

The annual country data consists of the happiness, consumption per capita, and consumption growth rate variables. Countries include Argentina, Australia, Austria, Bangladesh, Belarus, Belgium, Brazil, Bulgaria, Canada, Chile, China, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, India, Ireland, Israel, Italy, Japan, Latvia, Lithuania, Luxembourg, Mexico, Moldova, Netherlands, Nigeria, Norway, Philippines, Poland, Portugal, Romania, Russia, Singapore, Slovakia, Slovenia, South Africa, South Korea, Spain, Sweden, Switserland, Taiwan, Turkey, the UK, Ukraine, and the USA. The countries are coded according to Table 3.3. Years range from 1950 till 2000.

The happiness variable $happiness_{i,t}$ is the average index on self-reported well-being from micro-level surveys, during which the respondent should answer the question like such as that asked in the United States General Social Survey (GSS): "Taken all together, how would you say things are these days – would you say that you are very happy, pretty happy, or not too happy?". The answers are coded and standardized in a 0-10 range. The source is the World Database of Happiness (Veenhoven (2002)).

The consumption variables data comes from Penn World Table 6.1 (PWT (2004)). $\log\_ccons_{i,t}$ – natural logarithm of the per capita consumption in current US dollars. $\exp\_growth\_c\_cons_{i,t}$ is its growth rate calculated as $\exp\left(\frac{ccons_{i,t} - ccons_{i,t-1}}{ccons_{i,t-1}}\right)$.

$\log\_consl_{i,t}$, $\exp\_growth\_consl_{i,t}$ and $\log\_consch_{i,t}$, $\exp\_growth\_consch_{i,t}$ are corresponding variables computed in constant 1996 US dollars of laspeyres and chain series.

The panel data regressions use 945 observations for 51 countries with 5-50 observations for each; the mean country number of observations is 18.53. The happiness variable ranges from 4 to 8 (the index construction allows 0-10) with the mean of 6.66 and the relatively small standard deviation of 0.8. Per capita consumption is 4271 US dollars on average; it has a wide (relative to happiness) range of 84.85 to 24313.09 dollars, and a high standard deviation of 4476.30 dollars. The annual growth rate of consumption is 6.2%; it also has a wide range (-53 to 38 percentage points), and high standard deviation (6.2 pp). The Stata commands for these and the following estimates are presented in Table A3.1.

Table 3.1. Descriptive statistics of variables output in Stata 9.2.

```
sum  happiness  ccons growth_c_cons log_ccons exp_growth_c_cons

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
   happiness |       958    6.656784    .8010736       4.01      8.065
       ccons |      1954    4271.008    4476.299    84.8477   24313.09
growth_c_c~s |      1903    .0619785    .0620541  -.5256512    .384812
   log_ccons |      1954    7.741077    1.223629   4.440858   10.09877
exp_growth~s |      1903    1.065977    .0659925   .5911703   1.469338
```

3.2 Methodology

In order to test the consumption growth preferences assumption we must estimate the parameters of the utility function $u_t = \xi \log(c_t) + \gamma \exp\left(\frac{c_t - c_{t-1}}{c_{t-1}}\right) + \varepsilon_t$. Assuming that the countries have homogenous preferences, i.e. their ξ and γ parameters in the utility function are the same for each country we can estimate the signs, scopes and significance of these parameters in the panel data regression:

$$happiness_{it} = \xi \cdot \log\_ccons_{i,t} + \gamma \cdot \exp\_growth\_c\_cons_{i,t} + \varepsilon_{i,t}$$

The panel data estimation framework allows for different specification regressions, which may include random and fixed effects, pooled regression, serially-correlated or heteroskedastic error terms. Thus, we try those specifications and make formal tests to choose among them.

The large number of individual country datasets and short time-series do not allow applying parsimonious estimation techniques for individual country. However, we can perform the eye-ball OLS regressions and see the overall statistics of the signs and significant parameters. Assuming that the countries have heterogeneous preferences, i.e. their ξ_i and γ_i parameters in the utility function are different for different countries we can estimate the signs, scopes and significance of these parameters in the regressions for individual country i:

$$happiness_{it} = \xi_i \cdot \log\_consch_{i,t} + \gamma_i \cdot \exp\_growth\_consch_{i,t} + \varepsilon_{i,t}$$

$$happiness_{it} = \xi_i \cdot \log\_ccons_{i,t} + \gamma_i \cdot \exp\_growth\_c\_cons_{i,t} + \varepsilon_{i,t}$$

$$happiness_{it} = \xi_i \cdot \log\_consl_{i,t} + \gamma_i \cdot \exp\_growth\_consl_{i,t} + \varepsilon_{i,t}$$

3.3 Panel Regression

Tables A3.2, A3.3, A3.7 and 3.2 show the different specifications regression output for equation

$$happiness_{it} = \xi \cdot \log\_ccons_{i,t} + \gamma \cdot \exp\_growth\_c\_cons_{i,t} + \varepsilon_{i,t}$$

In order to test the significance of fixed effects the F-test should be performed. The low p-value of 0.0000 implies the importance of fixed effects regression versus the pooled OLS. Table A3.2 shows the output of the test.

In order to test the significance of random effects the Lagrangian multiplier test should be performed. The low p-value of 0.0000 implies the importance of random effects regression versus the pooled OLS. Table A3.4 shows the output of the test.

In order to choose between fixed and random effects, the Hausman specification test which allows choosing the fixed effects regression if it is more efficient than the random effects regression gives p-value of 0.0192. This p-value is low at the significance level of 5%, which implies that the fixed effects estimates are more efficient. The output of the test is presented in Table A3.5.

Breusch-Pagan test for heteroskedasticity presented in Table A3.6 gives p-value of 0.0000 for the null hypothesis of the constant variance. Since p-value is low at the significance level of 5%, which implies that the variance of errors is not constant, i.e. the presence of heteroskedasticity.

In order to solve this problem feasible generalized least squares regression should be used. The results the FGLS procedure is presented in Table 3.2.

Table 3.2. Feasible generalized least squares regression output in Stata 9.2.

```
xtgls  happiness log_ccons exp_growth_c_cons

Cross-sectional time-series FGLS regression

Coefficients:  generalized least squares
Panels:        homoskedastic
Correlation:   no autocorrelation

Estimated covariances      =         1          Number of obs      =       945
Estimated autocorrelations =         0          Number of groups   =        51
Estimated coefficients     =         3          Obs per group: min =         5
                                                               avg =  18.52941
                                                               max =        50
                                                Wald chi2(2)       =     95.19
Log likelihood             = -1071.112          Prob > chi2        =    0.0000

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_ccons |   .2951435   .0305242     9.67   0.000     .2353171    .3549699
exp_growth~s |   .5809461   .3746295     1.55   0.121    -.1533141    1.315206
       _cons |   3.506137   .4838342     7.25   0.000     2.557839    4.454434
------------------------------------------------------------------------------
```

Coefficients $\xi = 0.295$ and $\gamma = 0.581$ are of expected positive signs and significant (the first one at 1, and the second one at 12.2 percent level). Thus, the main assumption of the paper about the importance of consumption growth preferences cannot be rejected on the given data sample.

Interpretation of the output is the following. Under zero growth rate of consumption the average happiness level is higher than 3.51 on the 0-10 scale. One per cent increase in per capita consumption on average leads to the 0.295 points increase in happiness when the growth rate of consumption is kept constant. And under constant per capita consumption 1 percentage point increase in growth rate of per capita consumption increases happiness by

$$\frac{1}{\log(1.065977+1)-0.0619785}\times 0.5809461 = 0.8754136$$

units, if we use the proportional transformation of coefficient from exponential to linear value in the mean point. This also implies that the 1 per cent increase in consumption is equivalent to $\frac{0.8754136}{0.2951435} = 2.9606080$ percentage point increase in the growth rate of consumption.

The error unit root coefficient is 0.8493 (Table A3.7) which might imply the presence of serial correlation. However, the absence of formal tests does not allow claiming confidently that given value is statistically significantly different from zero. Besides, the consumption growth component coefficient changes its sign and becomes insignificant, which might imply the problems with the dataset.

3.4 Individual country regressions

Assuming that the countries have heterogeneous preferences, i.e. their ξ_i and γ_i parameters in the utility function are different for different countries we can estimate the signs, scopes and significance of these parameters in the regressions for individual country i:

$$happiness_{it} = \xi_i \cdot \log\_consch_{i,t} + \gamma_i \cdot \exp\_growth\_consch_{i,t} + \varepsilon_{i,t}$$

$$happiness_{it} = \xi_i \cdot \log\_ccons_{i,t} + \gamma_i \cdot \exp\_growth\_c\_cons_{i,t} + \varepsilon_{i,t}$$

$$happiness_{it} = \xi_i \cdot \log\_consl_{i,t} + \gamma_i \cdot \exp\_growth\_consl_{i,t} + \varepsilon_{i,t}$$

While the detailed estimation output is in Table A3.8 of the appendix, Table 3.3 presents the basic ordinary least squares regressions summary for the sample countries: the country codes, the signs of coefficients if they are significant (positive are expected) or a blank cells if they are not, and the number of observations for each country regression. As we can see, Argentina, Brazil, Bulgaria, Netherlands, Nigeria, France, Germany, Greece, India, Israel, Japan, Romania, Russia, South Africa, Spain, Sweden, Taiwan, Turkey, and Ukraine, 19 countries showed both coefficients which are insignificant from zero.

Belarus, the Czech Republic, Denmark, Estonia, Lithuania, Mexico, Moldova, Poland, Singapore, the UK, 10 countries appeared with positive consumption, and negative consumption growth component coefficients. This might imply they like consumption, but dislike when it grows. Such pattern does not mean that they like negative growth since the average growth rate of consumption is positive; it rather means that their preferences are conservative.

The USA and Slovakia are definite outliers showing both significant negative coefficients. And only 7 out of 51 countries have positive significant γ_i: Austria, Belgium, Canada, Finland, Hungary, Norway, and South Korea. Thus, the consumption growth preferences assumption on the individual country level is mainly rejected on this dataset, which might be explained either with a poor data or omitted variables problem. The other reason possible reason is that the happiness variable is a weak proxy for utility, since the last one concentrates only on economic values. Besides, consumption includes only the marketed goods and services. Finally, consumption and its growth rate might have lagged effect on utility, but the short time-series do not allow for their consistent research.

The detailed Stata output of these regressions estimates are in appendix.

Table 3.3. Country summary of OLS regressions estimates

Country code	Country name	ξ_i	γ_i	Number of observations
1	Argentina			10
2	Australia	+		26
3	Austria		+	16
4	Bangladesh	+		16
5	Belarus	+	–	10
6	Belgium		+	26
7	Brazil			23
8	Bulgaria			9
9	Canada	+	+	26
10	Chile	–	–	16
11	China	–		11
12	Czech Republic	+	–	10
13	Denmark	+	–	26
14	Estonia	+	–	8
15	Finland	–	+	20
16	France			26
17	Germany			28
18	Greece			19
19	Hungary		+	18
20	Iceland	+		19
21	India			26
22	Ireland	+		26
23	Israel			19
24	Italy	+		26
25	Japan			29
26	Latvia		–	10
27	Lithuania	+	–	7
28	Luxembourg	+		26
29	Mexico	+	–	26
30	Moldova	+	–	5
31	Netherlands			27
32	Nigeria			11
33	Norway	–	+	16
34	Philippines		–	22
35	Poland	+	–	12
36	Portugal	+		16
37	Romania			8
38	Russia			9

Table 3.3 (continued). Country summury for OLS regressions estimations

39	Singapore	+	–	21
40	Slovakia	–	–	10
41	Slovenia	+		10
42	South Africa			20
43	South Korea		+	22
44	Spain			20
45	Sweden			20
46	Switzerland	+		26
47	Taiwan			13
48	Turkey			16
49	UK	+	–	30
50	Ukraine			5
51	USA	–	–	50

Table 3.4. Distribution of coefficients for 51 countries

Coefficient	ξ_i	γ_i
Positive significant	20	7
Negative significant	6	15
Insignificant	25	29

CONCLUSIONS

Models with non-standard preferences have not been previously applied in an attempt to explain long waves in economic activity. The theoretical results of the paper provide support for the hypothesis that preferences also play an important role in business cycle, and empirical results support the hypothesis of the presence of such non-standard preferences. We construct a preference-based general equilibrium model in which the short-run fluctuations arise endogenously, either along with the long-run endogenous growth or on the way to steady state. In our economy, five factors that affect the properties of the cycles are the weight of consumption growth component relative to consumption component in the individual preferences, the discount factor, the level of technology, the share of capital in the economy, and the capital depreciation rate. Even though our model cannot account for some stylized facts which can be reconciled within the advanced business cycles models, it can certainly become a simple and reliable benchmark in the future research.

The empirical part of the paper tests the business cycle generating assumption, the assumption of consumption growth preference on the panel data for 51 countries from 1950 to 2000. Different model specifications were tried. Despite the facts that the fixed effect specification won against the pooled and random effects regression and possible autocorrelation in error terms (which cannot be tested formally), the feasible generalized least squares method was used in order to account for the problem of heteroskedasticity. This allows getting unbiased, though not efficient (relative to fixed effects specification) estimates of regression parameters. The results prove the statistic and economic significances and importance of consumption growth preferences: one percent increase in consumption raises utility as much as 2.96 points increase in the consumption growth rate (expressed in percents).

At the same time the individual country ordinary least squares regressions show that the contries are not as homogeneous in their preferences as it was assumed in the panel data regressions. The consumptions growth component coefficient appears to be positive significant only for 7 individual countries, while being negatively significant for 15, and not significant for 29 out of 51 country. The possible explanations include omitted variables problem, weakness of happiness variable as a proxy for utility, lagged effect consumption and its growth rate on utility, and short-time series for some countries.

Thus, the results of panel and individual regressions assures that consumption growth preference assumption can be used in practice, though very cautiously.

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APPENDIX A2

Figure A2.1. Numeric solutions of CGP versus the Ramsey model, Matlab simulations.

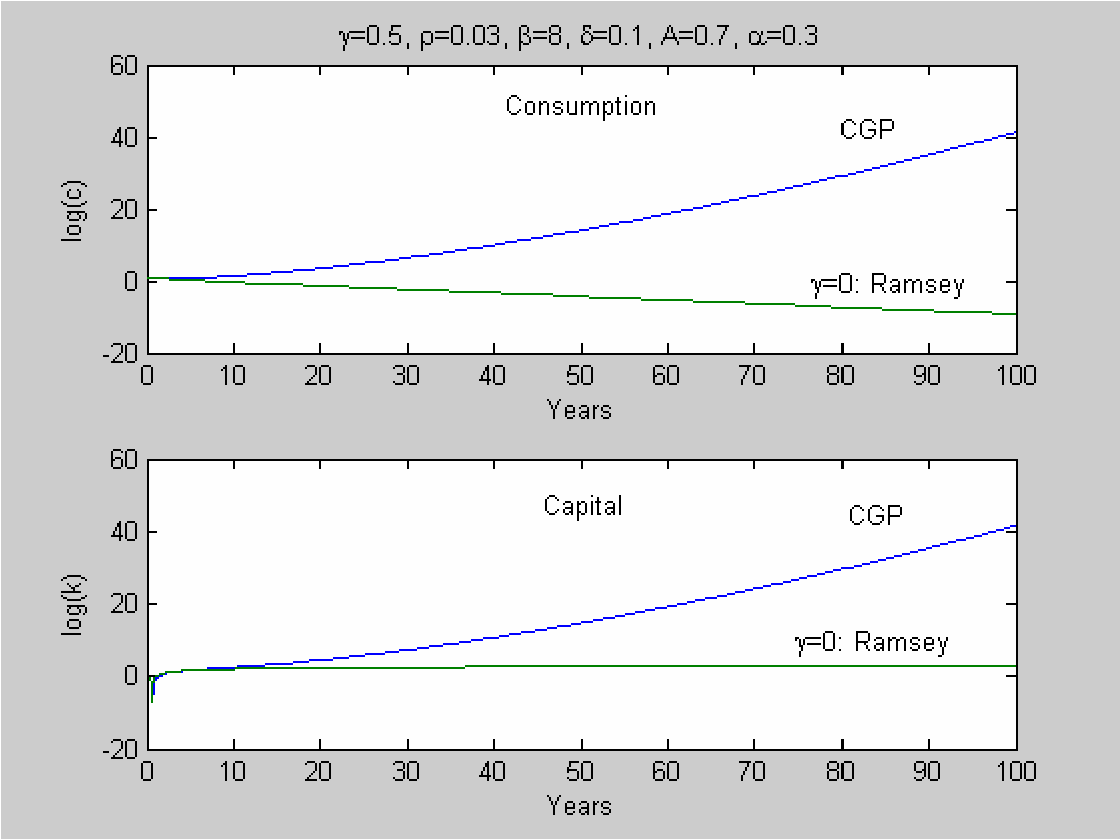

Figure A2.2. Numeric solutions of CGP versus AK model, Matlab simulations.

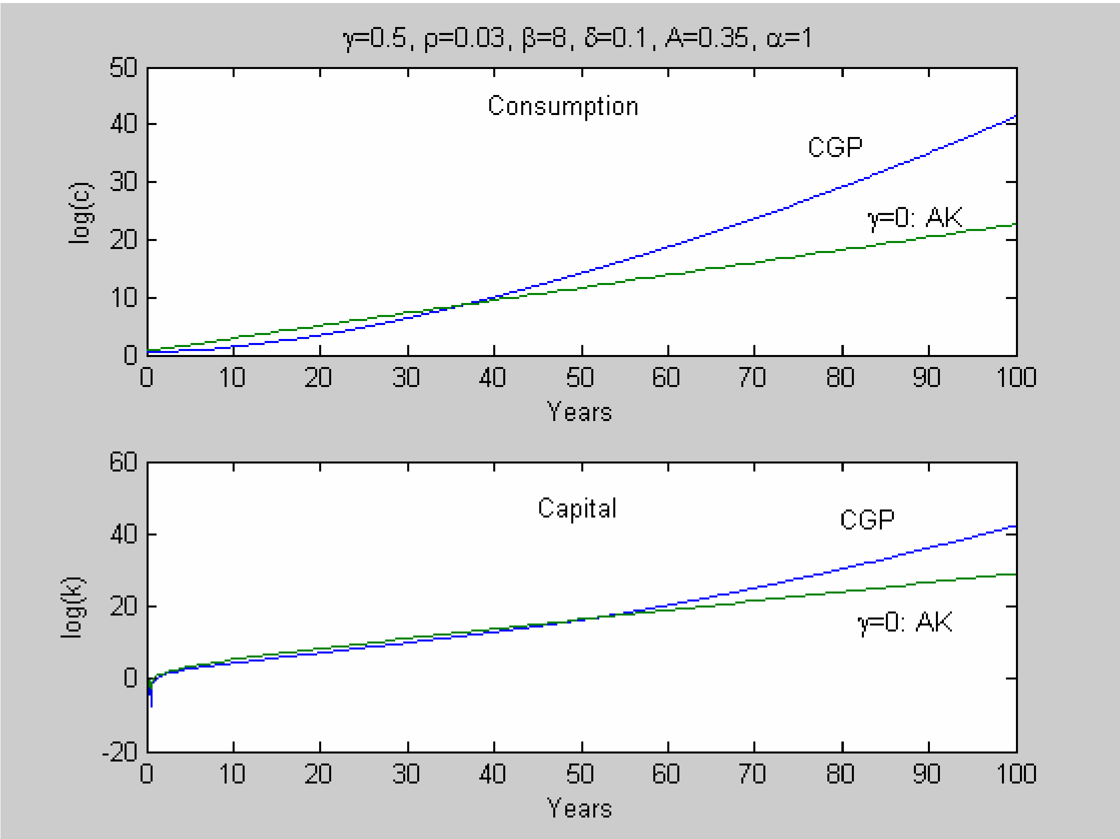

Figure A2.3. The cyclic components of CGP model. γ -sensitivity. Matlab simulations.

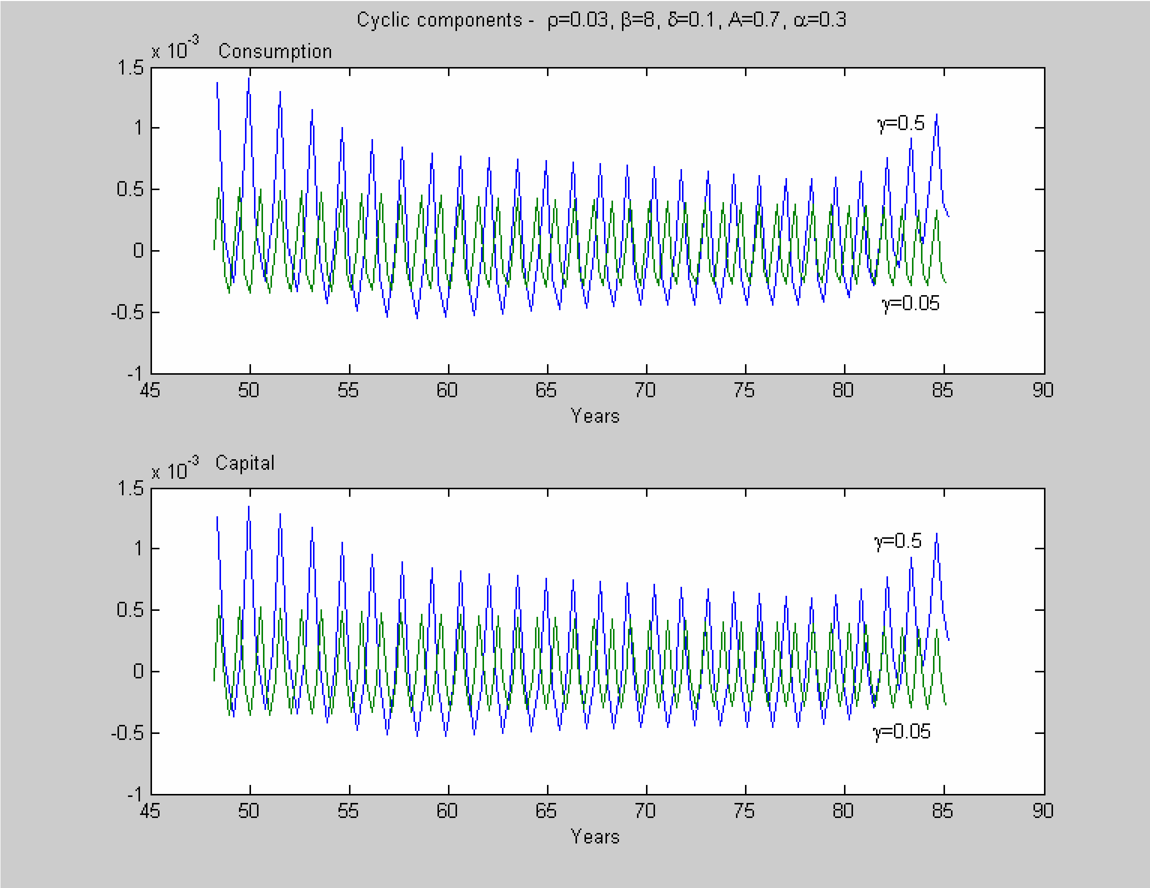

Figure A2.4. The cyclic components of CGP model. β -sensitivity. Matlab simulations.

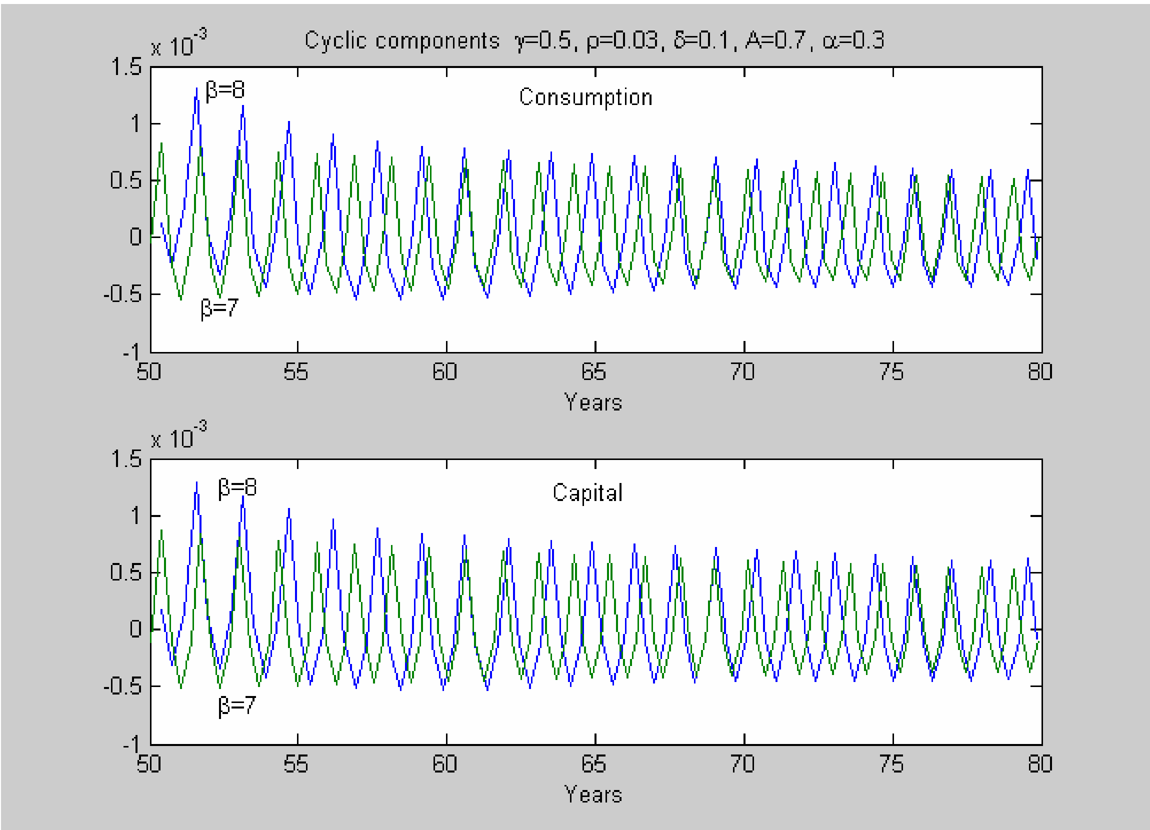

Figure A2.5. The cyclic components of CGP model. ρ -sensitivity. Matlab simulations.

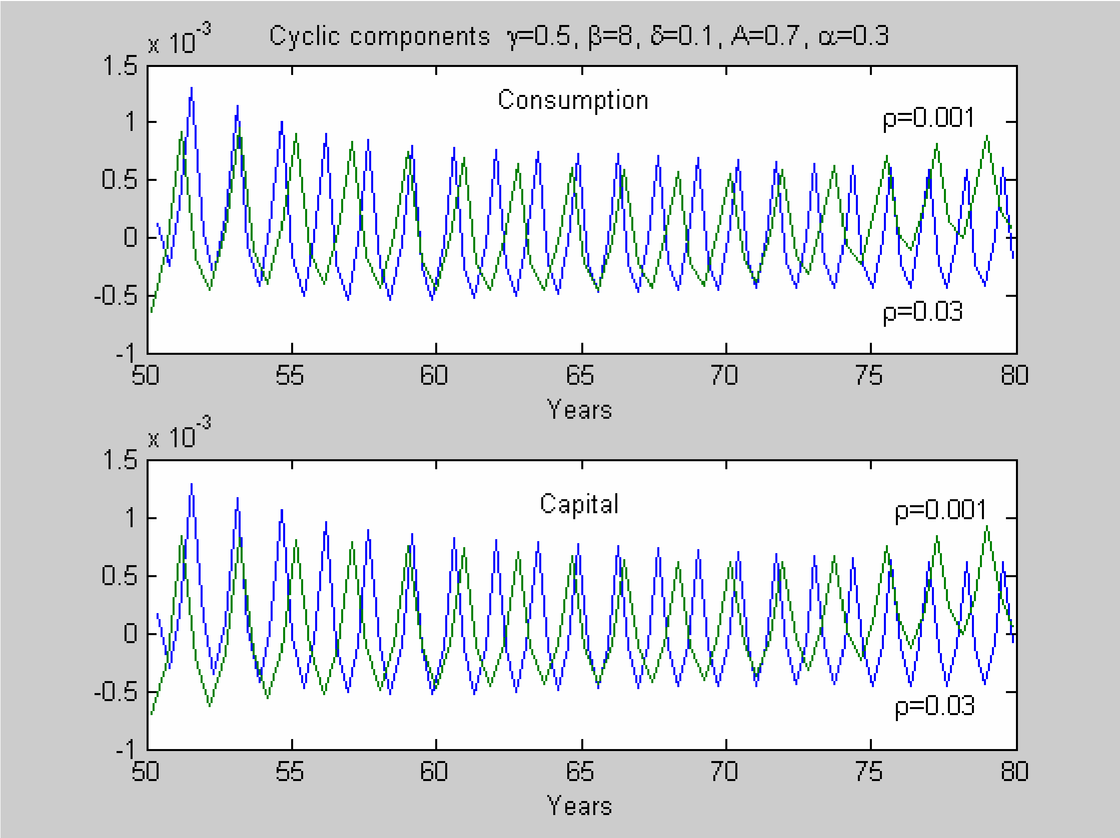

Figure A2.6. The cyclic components of CGP model. α -sensitivity. Matlab simulations.

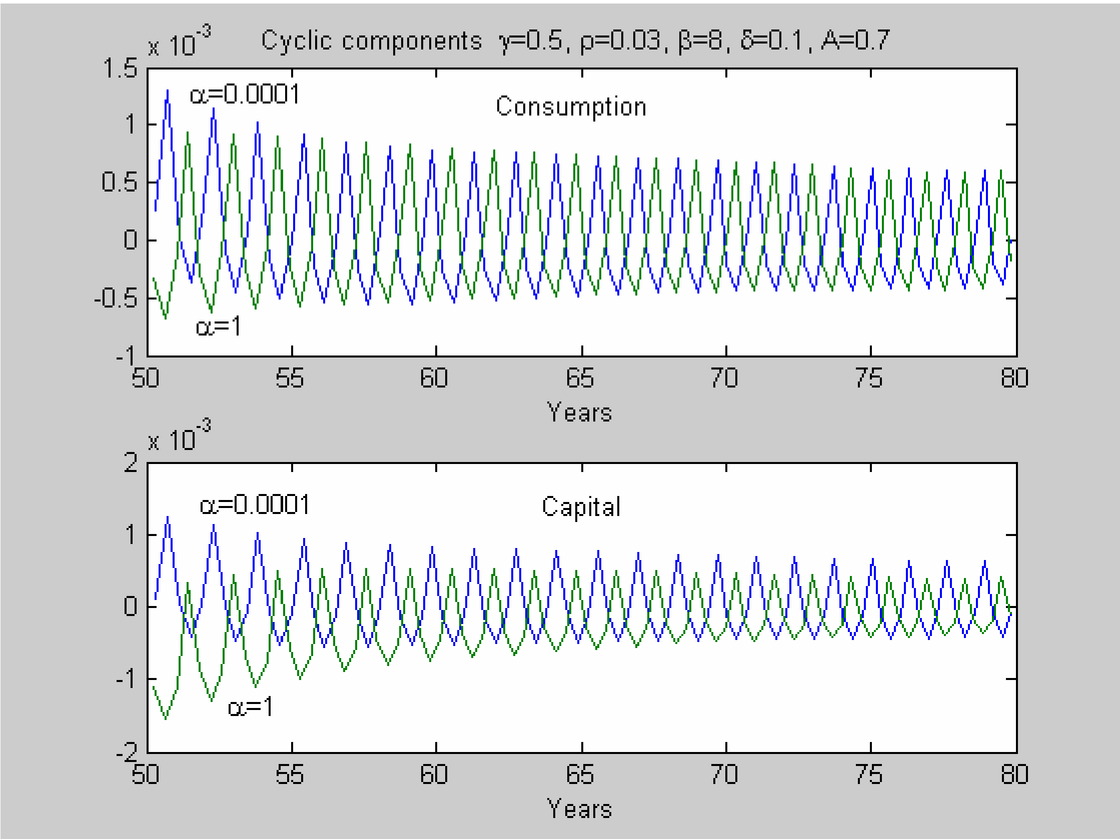

Figure A2.7. The cyclic components of CGP model. A-sensitivity. Matlab simulations.

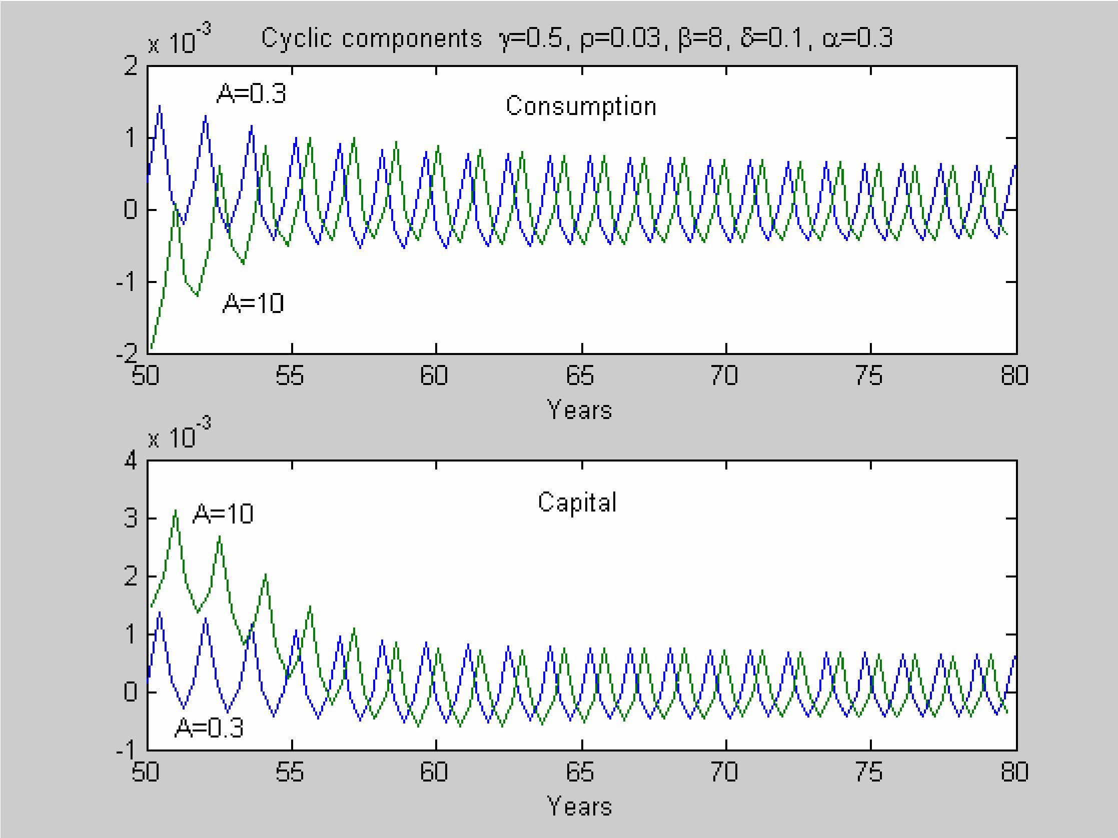

Figure A2.8. The cyclic components of CGP model. δ-sensitivity. Matlab simulations.

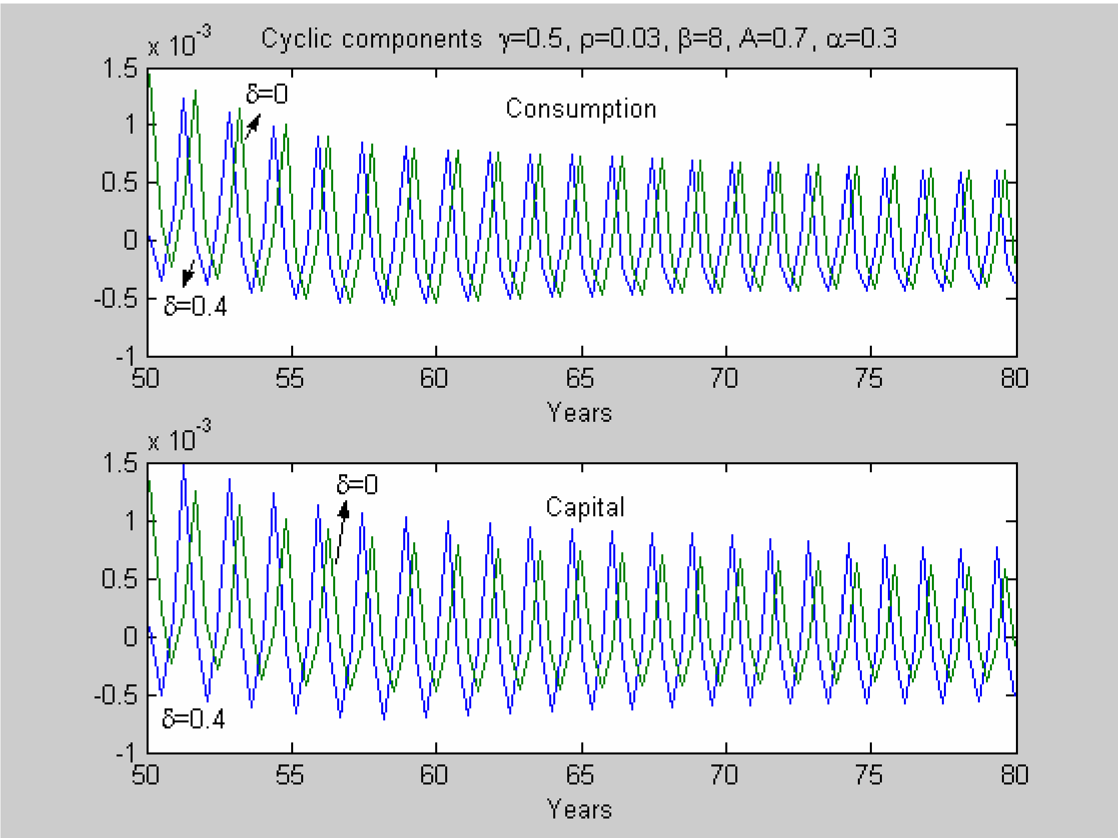

Table A2.1. Cross-correlations in the linearized CGP model with AK production

	y	i	c	k	r	w	s
y	1.0000						
i	0.2665	1.0000					
c	-0.1616	-0.9942	1.0000				
k	-0.9874	-0.2869	0.1839	1.0000			
r	0.0986	-0.0285	0.0401	-0.0940	1.0000		
w	1.0000	0.2665	-0.1616	-0.9874	0.0986	1.0000	
s	-0.0097	0.3271	-0.3360	-0.0149	0.0505	-0.0097	1.0000
u	-0.0002	-0.4046	0.4143	0.0296	-0.0284	-0.0002	-0.9730

TableA2.2. The second moments in the linearized CGP model with AK production

Variable	Obs	Mean	Std. Dev.	Min	Max
c	281	-.0006922	2269.401	-8079.7	9546.4
i	281	.0005928	2323.582	-10009	7730.5
y	281	-.000069	252.4274	-655.67	2217
k	281	.0023796	4788.229	-40162	15269
r	281	-6.45e-16	6.40e-14	-1.72e-13	1.85e-13
w	281	.0000638	72.12264	-187.33	633.44
s	281	1.61e-07	.2267169	-.42699	.39928
u	281	-1.23e-07	.2630626	-.46746	.3578
t	281	9.831026	6.000733	0	20

Table A2.3. Cross-correlations in the linearized CGP model with Cobb-Douglas production

	y	i	c	k	r	w	s
y	1.0000						
i	0.2230	1.0000					
c	-0.2228	-1.0000	1.0000				
k	0.7783	0.5612	-0.5610	1.0000			
r	0.4007	-0.0198	0.0199	0.2099	1.0000		
w	1.0000	0.2230	-0.2228	0.7783	0.4007	1.0000	
s	0.2309	0.9934	-0.9934	0.5502	-0.0190	0.2309	1.0000
u	0.0025	0.0837	-0.0837	0.0243	0.0410	0.0025	0.1048

APPENDIX A3

STATA ESTIMATIONS OUTPUT FOR PANEL DATA AND COUNTRY REGRESSIONS

Table A3.1. Stata 9.2 commands for panel data estimation.

```
sum  happiness  ccons growth_c_cons log_ccons
exp_growth_c_cons
tsset  country year
xtreg  happiness log_ccons exp_growth_c_cons, fe
estimates store fixed
xtreg  happiness log_ccons exp_growth_c_cons, re
estimates  store random
hausman  fixed random
xi: regress  happiness log_ccons exp_growth_c_cons
hettest
xtgls  happiness log_ccons exp_growth_c_cons
```

Table A3.2 Fixed effects regression output in Stata 9.2.

```
xtreg  happiness log_ccons exp_growth_c_cons, fe

Fixed-effects (within) regression               Number of obs      =       945
Group variable (i): country                     Number of groups   =        51

R-sq:  within  = 0.0177                         Obs per group: min =         5
       between = 0.1315                                        avg =      18.5
       overall = 0.0774                                        max =        50

                                                F(2,892)           =      8.04
corr(u_i, Xb)  = 0.2173                         Prob > F           =    0.0003

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_ccons |   .0774844   .0227532     3.41   0.001     .0328283    .1221404
exp_growth~s |  -.2389081   .1657841    -1.44   0.150    -.5642805    .0864642
       _cons |   6.256352    .287685    21.75   0.000     5.691734    6.820971
-------------+----------------------------------------------------------------
     sigma_u |  .84508813
     sigma_e |   .3078647
         rho |  .88283561   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(50, 892) =    94.82             Prob > F = 0.0000
```

Table A3.3. Random effects regression output in Stata 9.2.

```
xtreg  happiness log_ccons exp_growth_c_cons, re

Random-effects GLS regression                   Number of obs      =       945
Group variable (i): country                     Number of groups   =        51

R-sq:  within  = 0.0177                         Obs per group: min =         5
       between = 0.1342                                        avg =      18.5
       overall = 0.0800                                        max =        50

Random effects u_i ~ Gaussian                   Wald chi2(2)       =     18.43
corr(u_i, X)       = 0 (assumed)                Prob > chi2        =    0.0001

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_ccons |   .0853046   .0225859     3.78   0.000     .0410371    .1295721
exp_growth~s |  -.2171486   .1659731    -1.31   0.191    -.5424498    .1081527
       _cons |   5.937095   .3055958    19.43   0.000     5.338138    6.536052
-------------+----------------------------------------------------------------
     sigma_u |  .80057894
     sigma_e |   .3078647
         rho |  .87117068   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

Table A3.4. Random effects test output in Stata 9.2.

```
xttest0

Breusch and Pagan Lagrangian multiplier test for random effects:

        happiness[country,t] = Xb + u[country] + e[country,t]

        Estimated results:
                         |       Var     sd = sqrt(Var)
                ---------+-----------------------------
               happiness |   .6225457       .7890157
                       e |   .0947807       .3078647
                       u |   .6409266       .8005789

        Test:   Var(u) = 0
                              chi2(1) =  3916.33
                          Prob > chi2 =     0.0000
```

Table A3.5. Fixed versus random effects regression test output in Stata 9.2.

```
hausman fixed random

                 ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             |     fixed        random       Difference          S.E.
-------------+----------------------------------------------------------------
   log_ccons |    .0774844     .0853046       -.0078202        .0027546
exp_growth~s |   -.2389081    -.2171486       -.0217596               .
------------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from
xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from
xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(2) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =        7.90
                Prob>chi2 =      0.0192
                (V_b-V_B is not positive definite)
```

Table A3.6. Heteroskedasticity test output in Stata 9.2.

```
xi: regress  happiness log_ccons exp_growth_c_cons
hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of happiness

         chi2(1)      =    35.47
         Prob > chi2  =   0.0000
```

Table A3.7. FGLS regression with serial correlation output in Stata 9.2.

```
xtgls  happiness log_ccons exp_growth_c_cons, corr(ar1)

Cross-sectional time-series FGLS regression

Coefficients:  generalized least squares
Panels:        homoskedastic
Correlation:   common AR(1) coefficient for all panels  (0.8493)

Estimated covariances      =         1          Number of obs      =       945
Estimated autocorrelations =         1          Number of groups   =        51
Estimated coefficients     =         3          Obs per group: min =         5
                                                               avg =  18.52941
                                                               max =        50
                                                Wald chi2(2)       =     31.90
Log likelihood             =  -152.484          Prob > chi2        =    0.0000

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_ccons |   .2954518   .0524991     5.63   0.000     .1925556    .3983481
exp_growth~s |  -.0529168   .1313904    -0.40   0.687    -.3104373    .2046036
       _cons |   4.106958   .4523643     9.08   0.000      3.22034    4.993576
------------------------------------------------------------------------------
```

Table A3.8. Individual country OLS regressions output in Stata 9.2.

Argentina, 1991-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      10
-------------+------------------------------           F(  2,     7) =    2.19
       Model |  .079940661     2  .039970331           Prob > F      =  0.1822
    Residual |  .127587979     7  .018226854           R-squared     =  0.3852
-------------+------------------------------           Adj R-squared =  0.2095
       Total |   .20752864     9  .023058738           Root MSE      =  .13501

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |   .4781932   .3807863     1.26   0.249    -.4222233     1.37861
exp_growth~s |  -.5069931   .8820974    -0.57   0.583    -2.592822    1.578836
       _cons |    3.02013   4.011197     0.75   0.476    -6.464843     12.5051
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      10
-------------+------------------------------           F(  2,     7) =    1.60
       Model |  .065129086     2  .032564543           Prob > F      =  0.2676
    Residual |  .142399555     7  .020342794           R-squared     =  0.3138
-------------+------------------------------           Adj R-squared =  0.1178
       Total |   .20752864     9  .023058738           Root MSE      =  .14263

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |   .6059353   .5491315     1.10   0.306    -.6925545    1.904425
exp_growth~l |  -.8011692    .948205    -0.84   0.426    -3.043318    1.440979
       _cons |   2.172548   5.346703     0.41   0.697     -10.4704    14.81549
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      10
-------------+------------------------------           F(  2,     7) =    1.59
       Model |  .064824718     2  .032412359           Prob > F      =  0.2696
    Residual |  .142703923     7  .020386275           R-squared     =  0.3124
-------------+------------------------------           Adj R-squared =  0.1159
       Total |   .20752864     9  .023058738           Root MSE      =  .14278

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |   .6086465   .5510984     1.10   0.306    -.6944941    1.911787
exp_growth~h |  -.7791627   .9499523    -0.82   0.439    -3.025443    1.467118
       _cons |   2.125888   5.373778     0.40   0.704    -10.58108    14.83285
------------------------------------------------------------------------------
```

Australia, 1975-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      26
-------------+------------------------------           F(  2,    23) =    1.53
       Model |  .332919226     2  .166459613           Prob > F      =  0.2382
    Residual |  2.50566861    23  .108942113           R-squared     =  0.1173
-------------+------------------------------           Adj R-squared =  0.0405
       Total |  2.83858783    25  .113543513           Root MSE      =  .33006

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |   .2406805   .1395928     1.72   0.098    -.0480893    .5294503
exp_growth~s |   1.129926    1.39102     0.81   0.425    -1.747619     4.00747
       _cons |   3.863447   2.246153     1.72   0.099    -.7830751    8.509969
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      26
-------------+------------------------------           F(  2,    23) =    1.36
       Model |  .300763898     2  .150381949           Prob > F      =  0.2758
    Residual |  2.53782393    23  .110340171           R-squared     =  0.1060
-------------+------------------------------           Adj R-squared =  0.0282
       Total |  2.83858783    25  .113543513           Root MSE      =  .33217

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |   .5774082   .3637886     1.59   0.126    -.1751458    1.329962
exp_growth~l |    .123879   1.582758     0.08   0.938    -3.150305    3.398062
       _cons |    1.67688   3.457125     0.49   0.632    -5.474728    8.828488
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      26
-------------+------------------------------           F(  2,    23) =    1.36
       Model |  .300094835     2  .150047418           Prob > F      =  0.2767
    Residual |    2.538493    23  .110369261           R-squared     =  0.1057
-------------+------------------------------           Adj R-squared =  0.0280
       Total |  2.83858783    25  .113543513           Root MSE      =  .33222

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |   .5818935   .3645921     1.60   0.124    -.1723228     1.33611
exp_growth~h |   .0497063   1.562426     0.03   0.975    -3.182418    3.281831
       _cons |   1.709929   3.454016     0.50   0.625    -5.435248    8.855105
------------------------------------------------------------------------------
```

Austria, 1985-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      16
-------------+------------------------------           F(  2,    13) =    0.04
       Model |  .003517012     2  .001758506           Prob > F      =  0.9565
    Residual |  .511930848    13  .039379296           R-squared     =  0.0068
-------------+------------------------------           Adj R-squared = -0.1460
       Total |  .515447859    15  .034363191           Root MSE      =  .19844

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |   .0533618   .1825777     0.29   0.775    -.3410733    .4477969
exp_growth~s |   .0138746   .7047568     0.02   0.985     -1.50866    1.536409
       _cons |   6.444665   2.053965     3.14   0.008     2.007342    10.88199
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      16
-------------+------------------------------           F(  2,    13) =    0.01
       Model |  .000821357     2  .000410678           Prob > F      =  0.9897
    Residual |  .514626503    13  .039586654           R-squared     =  0.0016
-------------+------------------------------           Adj R-squared = -0.1520
       Total |  .515447859    15  .034363191           Root MSE      =  .19896

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |   .0414107   .3081067     0.13   0.895    -.6242135    .7070348
exp_growth~l |   .0496327   .7618337     0.07   0.949    -1.596209    1.695474
       _cons |   6.516174   3.108886     2.10   0.056    -.2001663    13.23251
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      16
-------------+------------------------------           F(  2,    13) =    0.01
       Model |  .000836236     2  .000418118           Prob > F      =  0.9895
    Residual |  .514611623    13  .039585509           R-squared     =  0.0016
-------------+------------------------------           Adj R-squared = -0.1520
       Total |  .515447859    15  .034363191           Root MSE      =  .19896

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |   .0418747   .3088764     0.14   0.894    -.6254121    .7091616
exp_growth~h |   .0506385   .7670076     0.07   0.948    -1.606381    1.707658
       _cons |   6.510718   3.118841     2.09   0.057    -.2271274    13.24856
------------------------------------------------------------------------------
```

Bangladesh, 1985-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      16
-------------+------------------------------           F(  2,    13) =   11.50
       Model |  1.28269325     2  .641346627           Prob > F      =  0.0013
    Residual |  .725146962    13  .055780536           R-squared     =  0.6388
-------------+------------------------------           Adj R-squared =  0.5833
       Total |  2.00784022    15  .133856014           Root MSE      =  .23618

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |  -1.199815   .2646727    -4.53   0.001    -1.771606   -.6280248
exp_growth~s |   2.180978   1.911871     1.14   0.275    -1.949368    6.311325
       _cons |    12.5642   2.845023     4.42   0.001     6.417906     18.7105
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      16
-------------+------------------------------           F(  2,    13) =   13.07
       Model |  1.34081596     2  .670407981           Prob > F      =  0.0008
    Residual |  .667024254    13  .051309558           R-squared     =  0.6678
-------------+------------------------------           Adj R-squared =  0.6167
       Total |  2.00784022    15  .133856014           Root MSE      =  .22652

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |  -2.905132   .5684339    -5.11   0.000    -4.133159   -1.677105
exp_growth~l |   2.644598   2.068214     1.28   0.223    -1.823507    7.112702
       _cons |   24.30843   4.083215     5.95   0.000     15.48718    33.12968
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      16
-------------+------------------------------           F(  2,    13) =   13.08
       Model |  1.34128734     2  .670643672           Prob > F      =  0.0008
    Residual |  .666552871    13  .051273298           R-squared     =  0.6680
-------------+------------------------------           Adj R-squared =  0.6170
       Total |  2.00784022    15  .133856014           Root MSE      =  .22644

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |  -2.910196   .5691736    -5.11   0.000    -4.139821   -1.680571
exp_growth~h |   2.670475   2.074467     1.29   0.220    -1.811139     7.15209
       _cons |   24.31808   4.094031     5.94   0.000     15.47346    33.16269
------------------------------------------------------------------------------
```

Belarus, 1990-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      10
-------------+------------------------------           F(  2,     7) =    1.25
       Model |  .156929355     2  .078464677           Prob > F      =  0.3441
    Residual |  .440333061     7  .062904723           R-squared     =  0.2627
-------------+------------------------------           Adj R-squared =  0.0521
       Total |  .597262415     9  .066362491           Root MSE      =  .25081

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |   .9361537   .5961218     1.57   0.160    -.4734505    2.345758
exp_growth~s |  -1.473724   1.266777    -1.16   0.283    -4.469176    1.521728
       _cons |  -1.281709   4.102358    -0.31   0.764    -10.98225    8.418827
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      10
-------------+------------------------------           F(  2,     7) =    5.84
       Model |  .373557147     2  .186778574           Prob > F      =  0.0322
    Residual |  .223705268     7  .031957895           R-squared     =  0.6254
-------------+------------------------------           Adj R-squared =  0.5184
       Total |  .597262415     9  .066362491           Root MSE      =  .17877

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |   1.788861   .5265447     3.40   0.011     .5437806    3.033941
exp_growth~l |  -2.178897   .8851026    -2.46   0.043    -4.271832   -.0859621
       _cons |  -7.563395   3.783275    -2.00   0.086    -16.50942     1.38263
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      10
-------------+------------------------------           F(  2,     7) =    6.02
       Model |  .377602545     2  .188801272           Prob > F      =  0.0302
    Residual |   .21965987     7  .031379981           R-squared     =  0.6322
-------------+------------------------------           Adj R-squared =  0.5271
       Total |  .597262415     9  .066362491           Root MSE      =  .17714

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |   1.793883   .5203331     3.45   0.011     .5634912    3.024276
exp_growth~h |  -2.171045   .8716137    -2.49   0.042    -4.232084   -.1100064
       _cons |  -7.614491   3.741831    -2.03   0.081    -16.46251    1.233532
------------------------------------------------------------------------------
```

Belgium, 1975-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      26
-------------+------------------------------           F(  2,    23) =    6.69
       Model |  .943983342     2  .471991671           Prob > F      =  0.0051
    Residual |  1.62206363    23  .070524506           R-squared     =  0.3679
-------------+------------------------------           Adj R-squared =  0.3129
       Total |  2.56604697    25  .102641879           Root MSE      =  .26556

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |   .0910199   .1832484     0.50   0.624    -.2880583    .4700981
exp_growth~s |   6.560476   2.397718     2.74   0.012     1.600419    11.52053
       _cons |  -.8064122    3.94302    -0.20   0.840     -8.96317    7.350346
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      26
-------------+------------------------------           F(  2,    23) =    1.92
       Model |  .367764591     2  .183882296           Prob > F      =  0.1688
    Residual |  2.19828238    23  .095577495           R-squared     =  0.1433
-------------+------------------------------           Adj R-squared =  0.0688
       Total |  2.56604697    25  .102641879           Root MSE      =  .30916

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |  -.6680441   .4424226    -1.51   0.145    -1.583265    .2471769
exp_growth~l |   4.568157   3.795382     1.20   0.241    -3.283188     12.4195
       _cons |   8.500104   5.713208     1.49   0.150    -3.318568    20.31878
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      26
-------------+------------------------------           F(  2,    23) =    1.69
       Model |  .329106007     2  .164553004           Prob > F      =  0.2063
    Residual |  2.23694096    23  .097258303           R-squared     =  0.1283
-------------+------------------------------           Adj R-squared =  0.0525
       Total |  2.56604697    25  .102641879           Root MSE      =  .31186

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |  -.6707586   .4466036    -1.50   0.147    -1.594629    .2531113
exp_growth~h |   3.949403   3.716471     1.06   0.299    -3.738703    11.63751
       _cons |   9.156977    5.59637     1.64   0.115    -2.419997    20.73395
------------------------------------------------------------------------------
```

Brazil, 1975-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      23
-------------+------------------------------           F(  2,    20) =    0.44
       Model |  .104698346     2  .052349173           Prob > F      =  0.6528
    Residual |  2.40315208    20  .120157604           R-squared     =  0.0417
-------------+------------------------------           Adj R-squared = -0.0541
       Total |  2.50785042    22  .113993201           Root MSE      =  .34664

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |  -.1731205   .1854884    -0.93   0.362    -.5600425    .2138015
exp_growth~s |  -.2430948   1.007372    -0.24   0.812    -2.344436    1.858247
       _cons |   8.573313   2.006546     4.27   0.000     4.387731    12.75889
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      23
-------------+------------------------------           F(  2,    20) =    0.47
       Model |  .112979114     2  .056489557           Prob > F      =  0.6307
    Residual |  2.39487131    20  .119743565           R-squared     =  0.0451
-------------+------------------------------           Adj R-squared = -0.0504
       Total |  2.50785042    22  .113993201           Root MSE      =  .34604

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |   .4533408   .5523616     0.82   0.421    -.6988654    1.605547
exp_growth~l |  -.7840882   1.112891    -0.70   0.489    -3.105537    1.537361
       _cons |   4.081677   4.357309     0.94   0.360    -5.007511    13.17086
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      23
-------------+------------------------------           F(  2,    20) =    0.51
       Model |  .121916621     2   .06095831           Prob > F      =  0.6075
    Residual |   2.3859338    20   .11929669           R-squared     =  0.0486
-------------+------------------------------           Adj R-squared = -0.0465
       Total |  2.50785042    22  .113993201           Root MSE      =  .34539

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |    .484098    .568413     0.85   0.404    -.7015909    1.669787
exp_growth~h |  -.8457894   1.132996    -0.75   0.464    -3.209177    1.517598
       _cons |   3.892711    4.46853     0.87   0.394     -5.42848     13.2139
------------------------------------------------------------------------------
```

Bulgaria, 1991-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =       9
-------------+------------------------------           F(  2,     6) =    0.22
       Model |   .03676956     2   .01838478           Prob > F      =  0.8095
    Residual |  .503719237     6  .083953206           R-squared     =  0.0680
-------------+------------------------------           Adj R-squared = -0.2426
       Total |  .540488798     8    .0675611           Root MSE      =  .28975

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |   .3610381   1.117621     0.32   0.758    -2.373682    3.095758
exp_growth~s |  -.7085396   1.093436    -0.65   0.541    -3.384081    1.967002
       _cons |   2.478026   8.977928     0.28   0.792    -19.49017    24.44622
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =       9
-------------+------------------------------           F(  2,     6) =    0.69
       Model |  .101597368     2  .050798684           Prob > F      =  0.5354
    Residual |   .43889143     6  .073148572           R-squared     =  0.1880
-------------+------------------------------           Adj R-squared = -0.0827
       Total |  .540488798     8    .0675611           Root MSE      =  .27046

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |  -1.161136   1.099321    -1.06   0.332    -3.851077    1.528805
exp_growth~l |  -.0131075   1.116225    -0.01   0.991    -2.744412    2.718197
       _cons |   14.36068   8.671876     1.66   0.149    -6.858635       35.58
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =       9
-------------+------------------------------           F(  2,     6) =    0.71
       Model |  .103490858     2  .051745429           Prob > F      =  0.5285
    Residual |   .43699794     6   .07283299           R-squared     =  0.1915
-------------+------------------------------           Adj R-squared = -0.0780
       Total |  .540488798     8    .0675611           Root MSE      =  .26988

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |  -1.170774   1.094042    -1.07   0.326    -3.847799    1.506251
exp_growth~h |  -.0086258   1.112868    -0.01   0.994    -2.731716    2.714464
       _cons |   14.43635   8.629938     1.67   0.145    -6.680345    35.55305
------------------------------------------------------------------------------
```

Canada, 1975-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      26
-------------+------------------------------           F(  2,    23) =   12.05
       Model |  .457025431     2  .228512716           Prob > F      =  0.0003
    Residual |  .436193439    23  .018964932           R-squared     =  0.5117
-------------+------------------------------           Adj R-squared =  0.4692
       Total |  .893218871    25  .035728755           Root MSE      =  .13771

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |   .4518375   .1172708     3.85   0.001     .2092443    .6944307
exp_growth~s |   2.133332   1.532161     1.39   0.177    -1.036185     5.30285
       _cons |   1.159533   2.575413     0.45   0.657    -4.168115    6.487181
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      26
-------------+------------------------------           F(  2,    23) =   21.72
       Model |  .584042805     2  .292021402           Prob > F      =  0.0000
    Residual |  .309176066    23  .013442438           R-squared     =  0.6539
-------------+------------------------------           Adj R-squared =  0.6238
       Total |  .893218871    25  .035728755           Root MSE      =  .11594

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |   1.297318   .2243601     5.78   0.000     .8331938    1.761442
exp_growth~l |   3.507335   1.266637     2.77   0.011     .8870969    6.127572
       _cons |  -8.246393   2.400779    -3.43   0.002    -13.21278   -3.280004
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      26
-------------+------------------------------           F(  2,    23) =   21.31
       Model |  .580162695     2  .290081348           Prob > F      =  0.0000
    Residual |  .313056175    23  .013611138           R-squared     =  0.6495
-------------+------------------------------           Adj R-squared =  0.6190
       Total |  .893218871    25  .035728755           Root MSE      =  .11667

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |   1.283709   .2226432     5.77   0.000     .8231364    1.744282
exp_growth~h |   3.268445   1.223898     2.67   0.014     .7366193    5.800271
       _cons |  -7.874424   2.366769    -3.33   0.003    -12.77046    -2.97839
------------------------------------------------------------------------------
```

Chile, 1985-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      16
-------------+------------------------------           F(  2,    13) =    7.10
       Model |  .157802442     2  .078901221           Prob > F      =  0.0082
    Residual |  .144467775    13  .011112906           R-squared     =  0.5221
-------------+------------------------------           Adj R-squared =  0.4485
       Total |  .302270217    15  .020151348           Root MSE      =  .10542

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |  -.1313595   .0680494    -1.93   0.076    -.2783714    .0156524
exp_growth~s |    -1.9583   .5706351    -3.43   0.004    -3.191082   -.7255178
       _cons |   10.02027   .8793119    11.40   0.000     8.120632    11.91991
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      16
-------------+------------------------------           F(  2,    13) =    5.22
       Model |  .134653007     2  .067326504           Prob > F      =  0.0217
    Residual |  .167617209    13  .012893631           R-squared     =  0.4455
-------------+------------------------------           Adj R-squared =  0.3602
       Total |  .302270217    15  .020151348           Root MSE      =  .11355

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |  -.1139751   .1064418    -1.07   0.304    -.3439286    .1159784
exp_growth~l |  -2.020515   .6800063    -2.97   0.011     -3.48958   -.5514509
       _cons |   9.895104   1.103472     8.97   0.000     7.511199    12.27901
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      16
-------------+------------------------------           F(  2,    13) =    5.22
       Model |  .134648413     2  .067324206           Prob > F      =  0.0217
    Residual |  .167621804    13  .012893985           R-squared     =  0.4455
-------------+------------------------------           Adj R-squared =  0.3601
       Total |  .302270217    15  .020151348           Root MSE      =  .11355

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |  -.1162856   .1058811    -1.10   0.292    -.3450279    .1124566
exp_growth~h |   -2.02172   .6811692    -2.97   0.011    -3.493297   -.5501434
       _cons |   9.916366   1.104443     8.98   0.000     7.530362    12.30237
------------------------------------------------------------------------------
```

China, 1990-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      11
-------------+------------------------------           F(  2,     8) =    1.97
       Model |  .187454212     2  .093727106           Prob > F      =  0.2021
    Residual |  .381440486     8  .047680061           R-squared     =  0.3295
-------------+------------------------------           Adj R-squared =  0.1619
       Total |  .568894698    10   .05688947           Root MSE      =  .21836

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |  -.6175741    .314538    -1.96   0.085      -1.3429    .1077517
exp_growth~s |  -1.675416   2.105787    -0.80   0.449    -6.531368    3.180537
       _cons |   12.35649   3.975309     3.11   0.014     3.189409    21.52356
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      11
-------------+------------------------------           F(  2,     8) =    2.17
       Model |  .200010646     2  .100005323           Prob > F      =  0.1768
    Residual |  .368884052     8  .046110507           R-squared     =  0.3516
-------------+------------------------------           Adj R-squared =  0.1895
       Total |  .568894698    10   .05688947           Root MSE      =  .21473

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |  -.7518843   .3689017    -2.04   0.076    -1.602573    .0988047
exp_growth~l |  -1.908991   2.106557    -0.91   0.391     -6.76672    2.948737
       _cons |    13.5461   3.867046     3.50   0.008     4.628676    22.46352
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      11
-------------+------------------------------           F(  2,     8) =    2.18
       Model |  .200711605     2  .100355803           Prob > F      =  0.1754
    Residual |  .368183093     8  .046022887           R-squared     =  0.3528
-------------+------------------------------           Adj R-squared =  0.1910
       Total |  .568894698    10   .05688947           Root MSE      =  .21453

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |  -.7527007   .3679259    -2.05   0.075    -1.601139     .095738
exp_growth~h |  -1.899326   2.095447    -0.91   0.391    -6.731436    2.932783
       _cons |   13.54192   3.858297     3.51   0.008     4.644676    22.43917
------------------------------------------------------------------------------
```

The Czech Republic, 1991-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      10
-------------+------------------------------           F(  2,     7) =    6.40
       Model |  .006673091     2  .003336545           Prob > F      =  0.0263
    Residual |  .003648563     7  .000521223           R-squared     =  0.6465
-------------+------------------------------           Adj R-squared =  0.5455
       Total |  .010321654     9   .00114685           Root MSE      =  .02283

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |   .1328052   .0590069     2.25   0.059    -.0067239    .2723343
exp_growth~s |  -.4188801   .1220883    -3.43   0.011     -.707573   -.1301873
       _cons |   6.007293   .4998315    12.02   0.000     4.825379    7.189207
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      10
-------------+------------------------------           F(  2,     7) =    7.65
       Model |  .007080782     2  .003540391           Prob > F      =  0.0173
    Residual |  .003240872     7  .000462982           R-squared     =  0.6860
-------------+------------------------------           Adj R-squared =  0.5963
       Total |  .010321654     9   .00114685           Root MSE      =  .02152

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |   .2533632   .0958456     2.64   0.033     .0267243     .480002
exp_growth~l |  -.4342371   .1153059    -3.77   0.007    -.7068923   -.1615819
       _cons |    4.91907   .8230417     5.98   0.001     2.972885    6.865254
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      10
-------------+------------------------------           F(  2,     7) =    7.62
       Model |  .007072079     2   .00353604           Prob > F      =  0.0175
    Residual |  .003249574     7  .000464225           R-squared     =  0.6852
-------------+------------------------------           Adj R-squared =  0.5952
       Total |  .010321654     9   .00114685           Root MSE      =  .02155

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |   .2518288   .0955221     2.64   0.034     .0259549    .4777026
exp_growth~h |  -.4332074   .1152878    -3.76   0.007    -.7058197    -.160595
       _cons |   4.932029   .8202866     6.01   0.001      2.99236    6.871699
------------------------------------------------------------------------------
```

Denmark, 1975-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      26
-------------+------------------------------           F(  2,    23) =    3.26
       Model |   .13713375     2  .068566875           Prob > F      =  0.0565
    Residual |  .483232879    23  .021010125           R-squared     =  0.2211
-------------+------------------------------           Adj R-squared =  0.1533
       Total |   .62036663    25  .024814665           Root MSE      =  .14495

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |   .0910336   .0556276     1.64   0.115    -.0240409    .2061081
exp_growth~s |  -.5545305   .3439872    -1.61   0.121    -1.266122    .1570612
       _cons |   7.469473   .6830102    10.94   0.000     6.056558    8.882387
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      26
-------------+------------------------------           F(  2,    23) =    3.46
       Model |  .143399884     2  .071699942           Prob > F      =  0.0487
    Residual |  .476966746    23  .020737685           R-squared     =  0.2312
-------------+------------------------------           Adj R-squared =  0.1643
       Total |   .62036663    25  .024814665           Root MSE      =  .14401

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |   .2639019   .1226591     2.15   0.042     .0101623    .5176415
exp_growth~l |  -.6520488    .364693    -1.79   0.087    -1.406474    .1023762
       _cons |   5.889256   1.165465     5.05   0.000     3.478309    8.300204
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      26
-------------+------------------------------           F(  2,    23) =    3.52
       Model |  .145528344     2  .072764172           Prob > F      =  0.0462
    Residual |  .474838286    23  .020645143           R-squared     =  0.2346
-------------+------------------------------           Adj R-squared =  0.1680
       Total |   .62036663    25  .024814665           Root MSE      =  .14368

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |   .2660295   .1229204     2.16   0.041     .0117493    .5203097
exp_growth~h |  -.6645159   .3648327    -1.82   0.082     -1.41923     .090198
       _cons |   5.881576   1.166768     5.04   0.000     3.467932    8.295221
------------------------------------------------------------------------------
```

Estonia, 1992-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =       8
-------------+------------------------------           F(  2,     5) =   16.40
       Model |  .297975313     2  .148987656           Prob > F      =  0.0064
    Residual |  .045424271     5  .009084854           R-squared     =  0.8677
-------------+------------------------------           Adj R-squared =  0.8148
       Total |  .343399583     7  .049057083           Root MSE      =  .09531

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |   1.132906   .2019052     5.61   0.002     .6138917     1.65192
exp_growth~s |  -1.653748   .7407694    -2.23   0.076    -3.557956    .2504603
       _cons |  -2.377516   1.739709    -1.37   0.230     -6.84958    2.094549
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl
      Source |       SS       df       MS              Number of obs =       8
-------------+------------------------------           F(  2,     5) =   20.48
       Model |  .306036242     2  .153018121           Prob > F      =  0.0039
    Residual |  .037363341     5  .007472668           R-squared     =  0.8912
-------------+------------------------------           Adj R-squared =  0.8477
       Total |  .343399583     7  .049057083           Root MSE      =  .08644

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |   1.563752   .2461501     6.35   0.001     .9310033    2.196501
exp_growth~l |  -1.893617   .7163833    -2.64   0.046    -3.735139   -.0520955
       _cons |  -5.799241   1.993178    -2.91   0.033    -10.92287   -.6756149
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =       8
-------------+------------------------------           F(  2,     5) =   20.65
       Model |  .306319107     2  .153159554           Prob > F      =  0.0038
    Residual |  .037080476     5  .007416095           R-squared     =  0.8920
-------------+------------------------------           Adj R-squared =  0.8488
       Total |  .343399583     7  .049057083           Root MSE      =  .08612

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |   1.564364   .2451744     6.38   0.001     .9341234    2.194605
exp_growth~h |  -1.899868   .7158074    -2.65   0.045    -3.739909   -.0598265
       _cons |   -5.79808   1.984875    -2.92   0.033    -10.90036    -.695798
------------------------------------------------------------------------------
```

Finland, 1981-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      20
-------------+------------------------------           F(  2,    17) =    9.39
       Model |  1.48678256     2  .743391278           Prob > F      =  0.0018
    Residual |  1.34633688    17  .079196287           R-squared     =  0.5248
-------------+------------------------------           Adj R-squared =  0.4689
       Total |  2.83311944    19  .149111549           Root MSE      =  .28142

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |  -.6096885     .28869    -2.11   0.050    -1.218771   -.0006059
exp_growth~s |   4.226662   2.088442     2.02   0.059    -.1795644    8.632889
       _cons |   8.376343   4.286418     1.95   0.067    -.6672078    17.41989
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      20
-------------+------------------------------           F(  2,    17) =    8.85
       Model |  1.44485302     2   .72242651           Prob > F      =  0.0023
    Residual |  1.38826642    17  .081662731           R-squared     =  0.5100
-------------+------------------------------           Adj R-squared =  0.4523
       Total |  2.83311944    19  .149111549           Root MSE      =  .28577

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |  -1.938157   .6417059    -3.02   0.008    -3.292038   -.5842756
exp_growth~l |   6.922792   2.253941     3.07   0.007     2.167393    11.67819
       _cons |   18.35986   6.349877     2.89   0.010     4.962788    31.75693
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      20
-------------+------------------------------           F(  2,    17) =    8.68
       Model |  1.43137616     2  .715688081           Prob > F      =  0.0025
    Residual |  1.40174328    17  .082455487           R-squared     =  0.5052
-------------+------------------------------           Adj R-squared =  0.4470
       Total |  2.83311944    19  .149111549           Root MSE      =  .28715

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |  -1.959536   .6458123    -3.03   0.007    -3.322081   -.5969916
exp_growth~h |   6.758062   2.226376     3.04   0.007      2.06082     11.4553
       _cons |   18.73209   6.350781     2.95   0.009     5.333112    32.13107
------------------------------------------------------------------------------
```

France, 1975-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      26
-------------+------------------------------           F(  2,    23) =    0.51
       Model |  .054596528     2  .027298264           Prob > F      =  0.6073
    Residual |  1.23190699    23  .053561174           R-squared     =  0.0424
-------------+------------------------------           Adj R-squared = -0.0408
       Total |  1.28650352    25  .051460141           Root MSE      =  .23143

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |   .1074443   .1215254     0.88   0.386    -.1439501    .3588387
exp_growth~s |   .0965838   .7816367     0.12   0.903    -1.520355    1.713523
       _cons |   5.141672   1.736254     2.96   0.007     1.549958    8.733386
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      26
-------------+------------------------------           F(  2,    23) =    0.57
       Model |  .060528098     2  .030264049           Prob > F      =  0.5745
    Residual |  1.22597542    23  .053303279           R-squared     =  0.0470
-------------+------------------------------           Adj R-squared = -0.0358
       Total |  1.28650352    25  .051460141           Root MSE      =  .23088

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |    .250187   .2866507     0.87   0.392     -.342795    .8431691
exp_growth~l |  -.3527616   .8822034    -0.40   0.693    -2.177738    1.472215
       _cons |   4.234888   3.027114     1.40   0.175    -2.027173    10.49695
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      26
-------------+------------------------------           F(  2,    23) =    0.58
       Model |  .061770663     2  .030885332           Prob > F      =  0.5679
    Residual |  1.22473286    23  .053249255           R-squared     =  0.0480
-------------+------------------------------           Adj R-squared = -0.0348
       Total |  1.28650352    25  .051460141           Root MSE      =  .23076

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |   .2544581   .2885824     0.88   0.387    -.3425201    .8514363
exp_growth~h |  -.3743831   .9265895    -0.40   0.690    -2.291179    1.542413
       _cons |   4.216653   3.067862     1.37   0.183    -2.129704    10.56301
------------------------------------------------------------------------------
```

Germany, 1973-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      28
-------------+------------------------------           F(  2,    25) =    1.16
       Model |  .150508248     2  .075254124           Prob > F      =  0.3303
    Residual |  1.62418189    25  .064967276           R-squared     =  0.0848
-------------+------------------------------           Adj R-squared =  0.0116
       Total |  1.77469014    27  .065729264           Root MSE      =  .25489

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |  -.1305253   .0861228    -1.52   0.142    -.3078984    .0468478
exp_growth~s |  -.4826464   .8188887    -0.59   0.561    -2.169179    1.203887
       _cons |   8.354752   1.334797     6.26   0.000     5.605687    11.10382
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      28
-------------+------------------------------           F(  2,    25) =    1.91
       Model |  .234856447     2  .117428223           Prob > F      =  0.1696
    Residual |  1.53983369    25  .061593348           R-squared     =  0.1323
-------------+------------------------------           Adj R-squared =  0.0629
       Total |  1.77469014    27  .065729264           Root MSE      =  .24818

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |  -.3092114     .19159    -1.61   0.119    -.7037984    .0853757
exp_growth~l |  -.8839476   .9623569    -0.92   0.367    -2.865959    1.098064
       _cons |   10.44992   1.940783     5.38   0.000     6.452806    14.44704
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      28
-------------+------------------------------           F(  2,    25) =    1.95
       Model |  .239329164     2  .119664582           Prob > F      =  0.1635
    Residual |  1.53536097    25  .061414439           R-squared     =  0.1349
-------------+------------------------------           Adj R-squared =  0.0656
       Total |  1.77469014    27  .065729264           Root MSE      =  .24782

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |  -.3106663   .1931487    -1.61   0.120    -.7084635     .087131
exp_growth~h |  -.9435028   .9829484    -0.96   0.346    -2.967923    1.080917
       _cons |   10.52532    1.96006     5.37   0.000       6.4885    14.56214
------------------------------------------------------------------------------
```

Greece, 1982-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      19
-------------+------------------------------           F(  2,    16) =    0.03
       Model |  .007337501     2  .003668751           Prob > F      =  0.9690
    Residual |  1.85877949    16  .116173718           R-squared     =  0.0039
-------------+------------------------------           Adj R-squared = -0.1206
       Total |  1.86611699    18  .103673166           Root MSE      =  .34084

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |   .0101857   .2705649     0.04   0.970    -.5633863    .5837577
exp_growth~s |  -.5970694   2.459001    -0.24   0.811    -5.809919     4.61578
       _cons |   6.111446   3.739895     1.63   0.122    -1.816778    14.03967
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      19
-------------+------------------------------           F(  2,    16) =    0.14
       Model |  .031264208     2  .015632104           Prob > F      =  0.8736
    Residual |  1.83485278    16  .114678299           R-squared     =  0.0168
-------------+------------------------------           Adj R-squared = -0.1062
       Total |  1.86611699    18  .103673166           Root MSE      =  .33864

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |   .2892626   .5903199     0.49   0.631    -.9621597    1.540685
exp_growth~l |  -.9481594    2.95731    -0.32   0.753    -7.217377    5.321059
       _cons |   3.915073   5.298626     0.74   0.471    -7.317512    15.14766
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      19
-------------+------------------------------           F(  2,    16) =    0.14
       Model |  .031090547     2  .015545273           Prob > F      =  0.8742
    Residual |  1.83502645    16  .114689153           R-squared     =  0.0167
-------------+------------------------------           Adj R-squared = -0.1063
       Total |  1.86611699    18  .103673166           Root MSE      =  .33866

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |   .2951286   .5959736     0.50   0.627    -.9682789    1.558536
exp_growth~h |  -.9104582   2.969752    -0.31   0.763    -7.206051    5.385135
       _cons |   3.822584   5.324567     0.72   0.483    -7.464994    15.11016
------------------------------------------------------------------------------
```

Hungary, 1982-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      18
-------------+------------------------------           F(  2,    15) =    3.49
       Model |  1.84741005     2  .923705027           Prob > F      =  0.0569
    Residual |   3.9691712    15  .264611414           R-squared     =  0.3176
-------------+------------------------------           Adj R-squared =  0.2266
       Total |  5.81658126    17  .342151839           Root MSE      =   .5144

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |  -1.501856   .8978994    -1.67   0.115    -3.415683    .4119715
exp_growth~s |   4.532904    3.21783     1.41   0.179    -2.325738    11.39155
       _cons |   14.44905   9.319814     1.55   0.142    -5.415666    34.31376
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      18
-------------+------------------------------           F(  2,    15) =    2.38
       Model |  1.39945108     2  .699725538           Prob > F      =  0.1269
    Residual |  4.41713018    15  .294475346           R-squared     =  0.2406
-------------+------------------------------           Adj R-squared =  0.1393
       Total |  5.81658126    17  .342151839           Root MSE      =  .54266

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |  -2.627744    2.71853    -0.97   0.349    -8.422153    3.166666
exp_growth~l |   8.086772   3.741417     2.16   0.047     .1121314    16.06141
       _cons |   21.09035   22.81419     0.92   0.370    -27.53695    69.71765
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      18
-------------+------------------------------           F(  2,    15) =    2.29
       Model |  1.35920926     2   .67960463           Prob > F      =  0.1359
    Residual |    4.457372    15  .297158133           R-squared     =  0.2337
-------------+------------------------------           Adj R-squared =  0.1315
       Total |  5.81658126    17  .342151839           Root MSE      =  .54512

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |   -2.59773   2.723822    -0.95   0.355    -8.403419    3.207959
exp_growth~h |   8.001863    3.77252     2.12   0.051    -.0390721     16.0428
       _cons |    20.9166    22.8368     0.92   0.374    -27.75888    69.59207
------------------------------------------------------------------------------
```

Iceland, 1981-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      19
-------------+------------------------------           F(  2,    16) =   10.94
       Model |  .031238632     2  .015619316           Prob > F      =  0.0010
    Residual |  .022834067    16  .001427129           R-squared     =  0.5777
-------------+------------------------------           Adj R-squared =  0.5249
       Total |  .054072699    18  .003004039           Root MSE      =  .03778

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |   .1301588   .0283962     4.58   0.000     .0699616     .190356
exp_growth~s |  -.0884931   .1106473    -0.80   0.436    -.3230548    .1460687
       _cons |   6.680836   .2932128    22.78   0.000     6.059252    7.302419
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      19
-------------+------------------------------           F(  2,    16) =   11.86
       Model |  .032291523     2  .016145761           Prob > F      =  0.0007
    Residual |  .021781176    16  .001361324           R-squared     =  0.5972
-------------+------------------------------           Adj R-squared =  0.5468
       Total |  .054072699    18  .003004039           Root MSE      =   .0369

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |   .2983497   .0612691     4.87   0.000      .168465    .4282345
exp_growth~l |  -.2029153   .1294835    -1.57   0.137     -.477408    .0715774
       _cons |   5.176295   .5558643     9.31   0.000     3.997915    6.354674
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      19
-------------+------------------------------           F(  2,    16) =   11.93
       Model |  .032368561     2  .016184281           Prob > F      =  0.0007
    Residual |  .021704138    16  .001356509           R-squared     =  0.5986
-------------+------------------------------           Adj R-squared =  0.5484
       Total |  .054072699    18  .003004039           Root MSE      =  .03683

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |   .3044731   .0623375     4.88   0.000     .1723236    .4366226
exp_growth~h |  -.2072232   .1296626    -1.60   0.130    -.4820956    .0676492
       _cons |   5.121721   .5646062     9.07   0.000      3.92481    6.318633
------------------------------------------------------------------------------
```

India, 1975-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      26
-------------+------------------------------           F(  2,    23) =    1.36
       Model |  1.23030191     2  .615150953           Prob > F      =  0.2753
    Residual |    10.36531    23  .450665651           R-squared     =  0.1061
-------------+------------------------------           Adj R-squared =  0.0284
       Total |  11.5956119    25  .463824475           Root MSE      =  .67132

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |   .4456334   .2888138     1.54   0.136    -.1518234     1.04309
exp_growth~s |   .2329017   2.487773     0.09   0.926    -4.913448    5.379251
       _cons |   2.930351   3.863521     0.76   0.456    -5.061951    10.92265
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      26
-------------+------------------------------           F(  2,    23) =    0.38
       Model |  .368085445     2  .184042722           Prob > F      =  0.6901
    Residual |  11.2275264    23  .488153323           R-squared     =  0.0317
-------------+------------------------------           Adj R-squared = -0.0525
       Total |  11.5956119    25  .463824475           Root MSE      =  .69868

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |   .5831775   .6758301     0.86   0.397    -.8148836    1.981239
exp_growth~l |   .1418778   3.171421     0.04   0.965    -6.418706    6.702462
       _cons |    1.95279   5.515679     0.35   0.727    -9.457261    13.36284
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      26
-------------+------------------------------           F(  2,    23) =    0.38
       Model |  .368619571     2  .184309786           Prob > F      =  0.6897
    Residual |  11.2269923    23    .4881301           R-squared     =  0.0318
-------------+------------------------------           Adj R-squared = -0.0524
       Total |  11.5956119    25  .463824475           Root MSE      =  .69866

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |   .5817224   .6739402     0.86   0.397    -.8124292    1.975874
exp_growth~h |   .1595622    3.21726     0.05   0.961    -6.495847    6.814971
       _cons |   1.945193   5.534894     0.35   0.728    -9.504608    13.39499
------------------------------------------------------------------------------
```

Ireland, 1975-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      26
-------------+------------------------------           F(  2,    23) =    1.77
       Model |  .302206945     2  .151103473           Prob > F      =  0.1935
    Residual |  1.96867521    23  .085594575           R-squared     =  0.1331
-------------+------------------------------           Adj R-squared =  0.0577
       Total |  2.27088216    25  .090835286           Root MSE      =  .29257

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |   .1608946   .1013881     1.59   0.126    -.0488427    .3706318
exp_growth~s |    1.16905   1.110652     1.05   0.303    -1.128508    3.466608
       _cons |   4.415091   1.519267     2.91   0.008     1.272247    7.557935
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      26
-------------+------------------------------           F(  2,    23) =    3.22
       Model |  .496581313     2  .248290656           Prob > F      =  0.0586
    Residual |  1.77430085    23  .077143515           R-squared     =  0.2187
-------------+------------------------------           Adj R-squared =  0.1507
       Total |  2.27088216    25  .090835286           Root MSE      =  .27775

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |    .497822   .2126737     2.34   0.028      .057873     .937771
exp_growth~l |  -.1717302   1.204305    -0.14   0.888    -2.663024    2.319564
       _cons |   2.764045   1.780554     1.55   0.134    -.9193113    6.447401
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      26
-------------+------------------------------           F(  2,    23) =    3.20
       Model |  .494042412     2  .247021206           Prob > F      =  0.0595
    Residual |  1.77683975    23  .077253902           R-squared     =  0.2176
-------------+------------------------------           Adj R-squared =  0.1495
       Total |  2.27088216    25  .090835286           Root MSE      =  .27795

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |   .4948817   .2125421     2.33   0.029     .0552049    .9345586
exp_growth~h |  -.1492752   1.204276    -0.12   0.902    -2.640509    2.341959
       _cons |   2.767211   1.782587     1.55   0.134    -.9203515    6.454774
------------------------------------------------------------------------------
```

Israel, 1982-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      19
-------------+------------------------------           F(  2,    16) =    0.82
       Model |  .123978618     2  .061989309           Prob > F      =  0.4569
    Residual |  1.20536893    16  .075335558           R-squared     =  0.0933
-------------+------------------------------           Adj R-squared = -0.0201
       Total |  1.32934755    18  .073852642           Root MSE      =  .27447

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |   .1589984   .1871893     0.85   0.408    -.2378251     .555822
exp_growth~s |   1.433146   1.213332     1.18   0.255    -1.139003    4.005294
       _cons |   3.876933   2.405119     1.61   0.127    -1.221691    8.975557
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      19
-------------+------------------------------           F(  2,    16) =    0.73
       Model |  .110790684     2  .055395342           Prob > F      =  0.4985
    Residual |  1.21855687    16  .076159804           R-squared     =  0.0833
-------------+------------------------------           Adj R-squared = -0.0312
       Total |  1.32934755    18  .073852642           Root MSE      =  .27597

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |   .1295969   .3159464     0.41   0.687    -.5401795    .7993732
exp_growth~l |   1.524989   1.322351     1.15   0.266     -1.27827    4.328248
       _cons |     4.0693   3.209565     1.27   0.223    -2.734673    10.87327
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      19
-------------+------------------------------           F(  2,    16) =    0.71
       Model |  .108794904     2  .054397452           Prob > F      =  0.5051
    Residual |  1.22055265    16  .076284541           R-squared     =  0.0818
-------------+------------------------------           Adj R-squared = -0.0329
       Total |  1.32934755    18  .073852642           Root MSE      =   .2762

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |   .1228253   .3154553     0.39   0.702       -.54591    .7915605
exp_growth~h |   1.523817   1.329958     1.15   0.269    -1.295567    4.343202
       _cons |   4.131249    3.20479     1.29   0.216    -2.662602     10.9251
------------------------------------------------------------------------------
```

Italy, 1975-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      26
-------------+------------------------------           F(  2,    23) =   12.09
       Model |  1.35386712     2  .676933559           Prob > F      =  0.0003
    Residual |  1.28800821    23  .056000357           R-squared     =  0.5125
-------------+------------------------------           Adj R-squared =  0.4701
       Total |  2.64187533    25  .105675013           Root MSE      =  .23664

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |   .4425033   .0918707     4.82   0.000     .2524542    .6325524
exp_growth~s |   .6621305   .6625679     1.00   0.328    -.7084956    2.032757
       _cons |   1.318639   1.288781     1.02   0.317    -1.347407    3.984684
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      26
-------------+------------------------------           F(  2,    23) =   13.67
       Model |    1.434854     2     .717427           Prob > F      =  0.0001
    Residual |  1.20702133    23  .052479188           R-squared     =  0.5431
-------------+------------------------------           Adj R-squared =  0.5034
       Total |  2.64187533    25  .105675013           Root MSE      =  .22908

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |   .9271876   .1775012     5.22   0.000     .5599984    1.294377
exp_growth~l |   .0109501   .7186313     0.02   0.988    -1.475652    1.497552
       _cons |  -2.628579   1.843037    -1.43   0.167    -6.441193    1.184034
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      26
-------------+------------------------------           F(  2,    23) =   13.72
       Model |  1.43721672     2  .718608359           Prob > F      =  0.0001
    Residual |  1.20465861    23  .052376461           R-squared     =  0.5440
-------------+------------------------------           Adj R-squared =  0.5044
       Total |  2.64187533    25  .105675013           Root MSE      =  .22886

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |   .9342801   .1785068     5.23   0.000     .5650106     1.30355
exp_growth~h |    .000067   .7188936     0.00   1.000    -1.487078    1.487212
       _cons |  -2.684917   1.847354    -1.45   0.160     -6.50646    1.136626
------------------------------------------------------------------------------
```

Japan, 1972-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      29
-------------+------------------------------           F(  2,    26) =    0.89
       Model |  .184619121     2   .09230956           Prob > F      =  0.4224
    Residual |  2.69349451    26  .103595943           R-squared     =  0.0641
-------------+------------------------------           Adj R-squared = -0.0078
       Total |  2.87811363    28  .102789773           Root MSE      =  .32186

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |    .152117   .1159757     1.31   0.201    -.0862746    .3905085
exp_growth~s |   .8032578   1.399572     0.57   0.571    -2.073604     3.68012
       _cons |   3.835588   2.280884     1.68   0.105    -.8528365    8.524013
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      29
-------------+------------------------------           F(  2,    26) =    1.24
       Model |  .250158853     2  .125079426           Prob > F      =  0.3066
    Residual |  2.62795478    26  .101075184           R-squared     =  0.0869
-------------+------------------------------           Adj R-squared =  0.0167
       Total |  2.87811363    28  .102789773           Root MSE      =  .31792

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |   .3317287   .2356145     1.41   0.171    -.1525838    .8160413
exp_growth~l |   2.391295   2.117991     1.13   0.269    -1.962298    6.744887
       _cons |   .5099223   3.568942     0.14   0.887    -6.826142    7.845987
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      29
-------------+------------------------------           F(  2,    26) =    1.27
       Model |  .255905099     2   .12795255           Prob > F      =  0.2980
    Residual |  2.62220853    26  .100854174           R-squared     =  0.0889
-------------+------------------------------           Adj R-squared =  0.0188
       Total |  2.87811363    28  .102789773           Root MSE      =  .31758

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |   .3314958   .2358442     1.41   0.172    -.1532889    .8162806
exp_growth~h |   2.482131   2.127364     1.17   0.254    -1.890729    6.854991
       _cons |   .4186484    3.57087     0.12   0.908     -6.92138    7.758677
------------------------------------------------------------------------------
```

Latvia, 1990-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      10
-------------+------------------------------           F(  2,     7) =   10.78
       Model |  .057319257     2  .028659629           Prob > F      =  0.0073
    Residual |  .018609109     7  .002658444           R-squared     =  0.7549
-------------+------------------------------           Adj R-squared =  0.6849
       Total |  .075928366     9  .008436485           Root MSE      =  .05156

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |   .0528764   .0876604     0.60   0.565    -.1544075    .2601604
exp_growth~s |  -.5805606   .1250863    -4.64   0.002    -.8763427   -.2847784
       _cons |   5.467813   .7313218     7.48   0.000     3.738512    7.197115
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      10
-------------+------------------------------           F(  2,     7) =   13.78
       Model |  .060547237     2  .030273619           Prob > F      =  0.0037
    Residual |  .015381129     7  .002197304           R-squared     =  0.7974
-------------+------------------------------           Adj R-squared =  0.7395
       Total |  .075928366     9  .008436485           Root MSE      =  .04688

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |   .0789582   .0802825     0.98   0.358    -.1108798    .2687962
exp_growth~l |  -.5694666   .1154824    -4.93   0.002     -.842539   -.2963941
       _cons |   5.226526   .6995277     7.47   0.000     3.572406    6.880646
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      10
-------------+------------------------------           F(  2,     7) =   13.80
       Model |  .060569783     2  .030284892           Prob > F      =  0.0037
    Residual |  .015358583     7  .002194083           R-squared     =  0.7977
-------------+------------------------------           Adj R-squared =  0.7399
       Total |  .075928366     9  .008436485           Root MSE      =  .04684

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |   .0792682   .0799175     0.99   0.354    -.1097067    .2682432
exp_growth~h |  -.5685193   .1152452    -4.93   0.002    -.8410308   -.2960078
       _cons |   5.222956   .6964645     7.50   0.000     3.576079    6.869833
------------------------------------------------------------------------------
```

Lithuania, 1993-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =       7
-------------+------------------------------           F(  2,     4) =   24.61
       Model |  .311224123     2  .155612061           Prob > F      =  0.0057
    Residual |   .02529723     4  .006324308           R-squared     =  0.9248
-------------+------------------------------           Adj R-squared =  0.8872
       Total |  .336521353     6  .056086892           Root MSE      =  .07953

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |   2.177519   .3137468     6.94   0.002     1.306418     3.04862
exp_growth~s |  -1.222678   .4225834    -2.89   0.044    -2.395958   -.0493989
       _cons |   -11.8604   2.449187    -4.84   0.008    -18.66043   -5.060368
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =       7
-------------+------------------------------           F(  2,     4) =    5.85
       Model |  .250764204     2  .125382102           Prob > F      =  0.0649
    Residual |  .085757149     4  .021439287           R-squared     =  0.7452
-------------+------------------------------           Adj R-squared =  0.6177
       Total |  .336521353     6  .056086892           Root MSE      =  .14642

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |   2.508681   .7521174     3.34   0.029     .4204688    4.596894
exp_growth~l |  -.9329344   .8050327    -1.16   0.311    -3.168063    1.302195
       _cons |  -14.94262   5.958881    -2.51   0.066    -31.48713    1.601887
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =       7
-------------+------------------------------           F(  2,     4) =    5.97
       Model |  .252041368     2  .126020684           Prob > F      =  0.0630
    Residual |  .084479985     4  .021119996           R-squared     =  0.7490
-------------+------------------------------           Adj R-squared =  0.6234
       Total |  .336521353     6  .056086892           Root MSE      =  .14533

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |    2.50721   .7453383     3.36   0.028     .4378189    4.576601
exp_growth~h |  -.9235154   .8010047    -1.15   0.313    -3.147461     1.30043
       _cons |  -14.94034   5.902868    -2.53   0.065    -31.32933     1.44865
------------------------------------------------------------------------------
```

Luxembourg, 1975-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      26
-------------+------------------------------           F(  2,    23) =   25.03
       Model |  .854614136     2  .427307068           Prob > F      =  0.0000
    Residual |  .392708159    23  .017074268           R-squared     =  0.6852
-------------+------------------------------           Adj R-squared =  0.6578
       Total |   1.2473223    25  .049892892           Root MSE      =  .13067

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |   .3549709   .0507646     6.99   0.000     .2499563    .4599854
exp_growth~s |   .5174433   .5006504     1.03   0.312    -.5182309    1.553118
       _cons |   3.419658    .817007     4.19   0.000      1.72955    5.109765
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      26
-------------+------------------------------           F(  2,    23) =   15.92
       Model |  .724164027     2  .362082013           Prob > F      =  0.0000
    Residual |  .523158268    23  .022746012           R-squared     =  0.5806
-------------+------------------------------           Adj R-squared =  0.5441
       Total |   1.2473223    25  .049892892           Root MSE      =  .15082

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |   .6951767   .1276988     5.44   0.000     .4310116    .9593417
exp_growth~l |   .1997937   .6550333     0.31   0.763    -1.155246    1.554833
       _cons |   .3904533   1.272276     0.31   0.762    -2.241449    3.022356
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      26
-------------+------------------------------           F(  2,    23) =   15.94
       Model |  .724519166     2  .362259583           Prob > F      =  0.0000
    Residual |  .522803129    23  .022730571           R-squared     =  0.5809
-------------+------------------------------           Adj R-squared =  0.5444
       Total |   1.2473223    25  .049892892           Root MSE      =  .15077

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |   .6922462   .1271083     5.45   0.000     .4293027    .9551897
exp_growth~h |   .1723778   .6546984     0.26   0.795    -1.181969    1.526725
       _cons |   .4481674    1.26194     0.36   0.726    -2.162355     3.05869
------------------------------------------------------------------------------
```

Mexico, 1975-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      26
-------------+------------------------------           F(  2,    23) =    5.28
       Model |  1.04976621     2  .524883107           Prob > F      =  0.0130
    Residual |  2.28771478    23   .09946586           R-squared     =  0.3145
-------------+------------------------------           Adj R-squared =  0.2549
       Total |  3.33748099    25   .13349924           Root MSE      =  .31538

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |   .3322172    .182921     1.82   0.082    -.0461838    .7106182
exp_growth~s |  -2.007689   1.155553    -1.74   0.096    -4.398132    .3827546
       _cons |   6.509414   2.300297     2.83   0.009     1.750886    11.26794
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      26
-------------+------------------------------           F(  2,    23) =    2.44
       Model |  .583795258     2  .291897629           Prob > F      =  0.1096
    Residual |  2.75368574    23  .119725467           R-squared     =  0.1749
-------------+------------------------------           Adj R-squared =  0.1032
       Total |  3.33748099    25   .13349924           Root MSE      =  .34601

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |   1.403723   .8553861     1.64   0.114    -.3657782    3.173224
exp_growth~l |  -3.028898    1.68747    -1.79   0.086    -6.519696    .4618992
       _cons |  -1.858407   7.182367    -0.26   0.798    -16.71626    12.99945
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      26
-------------+------------------------------           F(  2,    23) =    2.33
       Model |  .562361225     2  .281180613           Prob > F      =  0.1198
    Residual |  2.77511977    23  .120657381           R-squared     =  0.1685
-------------+------------------------------           Adj R-squared =  0.0962
       Total |  3.33748099    25   .13349924           Root MSE      =  .34736

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |   1.363263   .8558848     1.59   0.125    -.4072695    3.133796
exp_growth~h |  -2.932753   1.648337    -1.78   0.088    -6.342598    .4770925
       _cons |  -1.608598   7.166734    -0.22   0.824    -16.43412    13.21692
------------------------------------------------------------------------------
```

Moldova, 1995-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =       5
-------------+------------------------------           F(  2,     2) =   18.85
       Model |   .27802813     2  .139014065           Prob > F      =  0.0504
    Residual |  .014751797     2  .007375899           R-squared     =  0.9496
-------------+------------------------------           Adj R-squared =  0.8992
       Total |  .292779927     4  .073194982           Root MSE      =  .08588

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |   4.930419   .8369926     5.89   0.028     1.329131    8.531708
exp_growth~s |  -2.482275   .5672245    -4.38   0.048    -4.922845   -.0417048
       _cons |  -29.64323   5.721253    -5.18   0.035     -54.2598   -5.026666
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =       5
-------------+------------------------------           F(  2,     2) =    2.91
       Model |  .217914397     2  .108957198           Prob > F      =  0.2557
    Residual |   .07486553     2  .037432765           R-squared     =  0.7443
-------------+------------------------------           Adj R-squared =  0.4886
       Total |  .292779927     4  .073194982           Root MSE      =  .19348

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |   6.825128   3.011935     2.27   0.152    -6.134183    19.78444
exp_growth~l |  -3.314985   1.786372    -1.86   0.205    -11.00112    4.371155
       _cons |  -42.73086   20.62648    -2.07   0.174    -131.4794     46.0177
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =       5
-------------+------------------------------           F(  2,     2) =    3.03
       Model |  .220190894     2  .110095447           Prob > F      =  0.2479
    Residual |  .072589033     2  .036294517           R-squared     =  0.7521
-------------+------------------------------           Adj R-squared =  0.5041
       Total |  .292779927     4  .073194982           Root MSE      =  .19051

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |   6.846828    2.95927     2.31   0.147    -5.885883    19.57954
exp_growth~h |  -3.333585   1.757455    -1.90   0.198     -10.8953    4.228133
       _cons |  -42.87457   20.26359    -2.12   0.169    -130.0617     44.3126
------------------------------------------------------------------------------
```

Netherlands, 1974-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      27
-------------+------------------------------           F(  2,    24) =    0.26
       Model |  .017496518     2  .008748259           Prob > F      =  0.7708
    Residual |    .7979031    24  .033245962           R-squared     =  0.0215
-------------+------------------------------           Adj R-squared = -0.0601
       Total |  .815399618    26  .031361524           Root MSE      =  .18233

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |    .012995    .070592     0.18   0.855    -.1326997    .1586898
exp_growth~s |  -.3449884   .5655862    -0.61   0.548    -1.512301    .8223242
       _cons |   7.793951   1.005193     7.75   0.000     5.719335    9.868567
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      27
-------------+------------------------------           F(  2,    24) =    0.62
       Model |  .040308166     2  .020154083           Prob > F      =  0.5442
    Residual |  .775091451    24  .032295477           R-squared     =  0.0494
-------------+------------------------------           Adj R-squared = -0.0298
       Total |  .815399618    26  .031361524           Root MSE      =  .17971

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |   .1318632   .1668401     0.79   0.437    -.2124777    .4762042
exp_growth~l |   -.534538   .6021098    -0.89   0.383    -1.777231    .7081554
       _cons |   6.864296    1.59037     4.32   0.000     3.581934    10.14666
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      27
-------------+------------------------------           F(  2,    24) =    0.61
       Model |  .039593827     2  .019796914           Prob > F      =  0.5503
    Residual |   .77580579    24  .032325241           R-squared     =  0.0486
-------------+------------------------------           Adj R-squared = -0.0307
       Total |  .815399618    26  .031361524           Root MSE      =  .17979

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |   .1358873   .1685395     0.81   0.428    -.2119612    .4837357
exp_growth~h |  -.5325445   .6170424    -0.86   0.397    -1.806057    .7409685
       _cons |   6.824401   1.605318     4.25   0.000     3.511187    10.13762
------------------------------------------------------------------------------
```

Nigeria, 1990-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      11
-------------+------------------------------           F(  2,     8) =    2.57
       Model |  .442548672     2  .221274336           Prob > F      =  0.1377
    Residual |  .689754289     8  .086219286           R-squared     =  0.3908
-------------+------------------------------           Adj R-squared =  0.2385
       Total |  1.13230296    10  .113230296           Root MSE      =  .29363

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |  -.4265705   .5531074    -0.77   0.463    -1.702038    .8488974
exp_growth~s |  -.5945867   .8821887    -0.67   0.519    -2.628917    1.439744
       _cons |   10.02487   2.880837     3.48   0.008     3.381651    16.66809
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      11
-------------+------------------------------           F(  2,     8) =    3.72
       Model |  .545727959     2  .272863979           Prob > F      =  0.0720
    Residual |  .586575002     8  .073321875           R-squared     =  0.4820
-------------+------------------------------           Adj R-squared =  0.3525
       Total |  1.13230296    10  .113230296           Root MSE      =  .27078

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |  -.6226107   .3986133    -1.56   0.157    -1.541815    .2965932
exp_growth~l |  -.2796955   .7642664    -0.37   0.724    -2.042097    1.482706
       _cons |   10.97645   2.070853     5.30   0.001     6.201055    15.75184
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      11
-------------+------------------------------           F(  2,     8) =    3.75
       Model |  .547991832     2  .273995916           Prob > F      =  0.0709
    Residual |  .584311129     8  .073038891           R-squared     =  0.4840
-------------+------------------------------           Adj R-squared =  0.3550
       Total |  1.13230296    10  .113230296           Root MSE      =  .27026

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |  -.6190985   .3968991    -1.56   0.157    -1.534349    .2961524
exp_growth~h |  -.2805182    .764201    -0.37   0.723    -2.042769    1.481733
       _cons |   10.95407   2.057612     5.32   0.001     6.209209    15.69893
------------------------------------------------------------------------------
```

Norway, 1981-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      16
-------------+------------------------------           F(  2,    13) =    6.37
       Model |  .191188342     2  .095594171           Prob > F      =  0.0118
    Residual |  .195085105    13  .015006547           R-squared     =  0.4950
-------------+------------------------------           Adj R-squared =  0.4173
       Total |  .386273447    15  .025751563           Root MSE      =   .1225

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |   -.357424   .1472509    -2.43   0.030    -.6755403   -.0393077
exp_growth~s |   1.661565   1.281288     1.30   0.217     -1.10649    4.429621
       _cons |   8.907513   2.301565     3.87   0.002     3.935283    13.87974
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      16
-------------+------------------------------           F(  2,    13) =    5.54
       Model |  .177782166     2  .088891083           Prob > F      =  0.0182
    Residual |  .208491281    13  .016037791           R-squared     =  0.4602
-------------+------------------------------           Adj R-squared =  0.3772
       Total |  .386273447    15  .025751563           Root MSE      =  .12664

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |  -1.210932   .3950493    -3.07   0.009    -2.064384   -.3574794
exp_growth~l |   2.957776   1.432904     2.06   0.060    -.1378258    6.053378
       _cons |   15.78596    3.62806     4.35   0.001     7.948012    23.62391
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      16
-------------+------------------------------           F(  2,    13) =    5.39
       Model |  .175043793     2  .087521896           Prob > F      =  0.0198
    Residual |  .211229655    13  .016248435           R-squared     =  0.4532
-------------+------------------------------           Adj R-squared =  0.3690
       Total |  .386273447    15  .025751563           Root MSE      =  .12747

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |  -1.211012   .4015093    -3.02   0.010     -2.07842   -.3436044
exp_growth~h |   2.927339   1.430995     2.05   0.062    -.1641374    6.018816
       _cons |   15.82011   3.684902     4.29   0.001     7.859361    23.78085
------------------------------------------------------------------------------
```

Philippines, 1979-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      22
-------------+------------------------------           F(  2,    19) =    6.95
       Model |  .737183794     2  .368591897           Prob > F      =  0.0054
    Residual |  1.00789807    19  .053047267           R-squared     =  0.4224
-------------+------------------------------           Adj R-squared =  0.3616
       Total |  1.74508186    21  .083099136           Root MSE      =  .23032

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |   .2603088   .1960626     1.33   0.200     -.150055    .6706725
exp_growth~s |  -3.264348   1.120823    -2.91   0.009    -5.610257   -.9184382
       _cons |   8.570092   2.146092     3.99   0.001      4.07827    13.06191
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      22
-------------+------------------------------           F(  2,    19) =    0.84
       Model |  .141606212     2  .070803106           Prob > F      =  0.4476
    Residual |  1.60347565    19  .084393455           R-squared     =  0.0811
-------------+------------------------------           Adj R-squared = -0.0156
       Total |  1.74508186    21  .083099136           Root MSE      =  .29051

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |  -.6796232   .8481282    -0.80   0.433    -2.454776    1.095529
exp_growth~l |  -1.294487   2.013091    -0.64   0.528    -5.507934     2.91896
       _cons |   13.62613    6.06561     2.25   0.037     .9306617    26.32159
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      22
-------------+------------------------------           F(  2,    19) =    0.99
       Model |  .164052284     2  .082026142           Prob > F      =  0.3915
    Residual |  1.58102958    19  .083212083           R-squared     =  0.0940
-------------+------------------------------           Adj R-squared = -0.0014
       Total |  1.74508186    21  .083099136           Root MSE      =  .28847

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |  -.7691122   .8379318    -0.92   0.370    -2.522924    .9846993
exp_growth~h |  -1.254825   1.965475    -0.64   0.531    -5.368611    2.858961
       _cons |   14.27519   5.991189     2.38   0.028     1.735483    26.81489
------------------------------------------------------------------------------
```

Poland, 1989-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      12
-------------+------------------------------           F(  2,     9) =    1.64
       Model |  .339663955     2  .169831978           Prob > F      =  0.2462
    Residual |   .92934439     9  .103260488           R-squared     =  0.2677
-------------+------------------------------           Adj R-squared =  0.1049
       Total |  1.26900835    11  .115364395           Root MSE      =  .32134

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |   .7858495   .4653719     1.69   0.126    -.2668949    1.838594
exp_growth~s |  -1.464957   1.537059    -0.95   0.365    -4.942027    2.012113
       _cons |   .8490349   4.018661     0.21   0.837    -8.241808    9.939878
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      12
-------------+------------------------------           F(  2,     9) =    3.23
       Model |  .529999184     2  .264999592           Prob > F      =  0.0878
    Residual |  .739009162     9  .082112129           R-squared     =  0.4176
-------------+------------------------------           Adj R-squared =  0.2882
       Total |  1.26900835    11  .115364395           Root MSE      =  .28655

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |   1.653479   .6614355     2.50   0.034     .1572075     3.14975
exp_growth~l |  -1.771489   1.467674    -1.21   0.258      -5.0916    1.548621
       _cons |  -6.365491   5.411704    -1.18   0.270    -18.60762    5.876634
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      12
-------------+------------------------------           F(  2,     9) =    3.22
       Model |   .52962424     2   .26481212           Prob > F      =  0.0880
    Residual |  .739384105     9  .082153789           R-squared     =  0.4174
-------------+------------------------------           Adj R-squared =  0.2879
       Total |  1.26900835    11  .115364395           Root MSE      =  .28662

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |   1.663734   .6642292     2.50   0.034     .1611429    3.166325
exp_growth~h |  -1.727536   1.470965    -1.17   0.270    -5.055091    1.600019
       _cons |  -6.499065   5.433874    -1.20   0.262    -18.79134    5.793212
------------------------------------------------------------------------------
```

Portugal, 1985-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      16
-------------+------------------------------           F(  2,    13) =    2.07
       Model |  .304133067     2  .152066534           Prob > F      =  0.1664
    Residual |   .95724014    13  .073633857           R-squared     =  0.2411
-------------+------------------------------           Adj R-squared =  0.1244
       Total |  1.26137321    15  .084091547           Root MSE      =  .27136

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |   .3839004   .2159602     1.78   0.099    -.0826532    .8504541
exp_growth~s |   -.651034    1.17457    -0.55   0.589    -3.188538     1.88647
       _cons |   3.115539   2.521057     1.24   0.238    -2.330873    8.561951
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      16
-------------+------------------------------           F(  2,    13) =    2.56
       Model |  .356788861     2   .17839443           Prob > F      =  0.1152
    Residual |  .904584346    13  .069583411           R-squared     =  0.2829
-------------+------------------------------           Adj R-squared =  0.1725
       Total |  1.26137321    15  .084091547           Root MSE      =  .26379

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |   .6727396   .3294155     2.04   0.062    -.0389193    1.384399
exp_growth~l |   -1.07042   1.224377    -0.87   0.398    -3.715527    1.574686
       _cons |   .9005594   3.279225     0.27   0.788    -6.183777    7.984895
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      16
-------------+------------------------------           F(  2,    13) =    2.57
       Model |  .357584639     2   .17879232           Prob > F      =  0.1145
    Residual |  .903788568    13  .069522198           R-squared     =  0.2835
-------------+------------------------------           Adj R-squared =  0.1733
       Total |  1.26137321    15  .084091547           Root MSE      =  .26367

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |   .6674189   .3283133     2.03   0.063    -.0418589    1.376697
exp_growth~h |  -1.083675   1.217935    -0.89   0.390    -3.714864    1.547515
       _cons |   .9627892    3.27373     0.29   0.773    -6.109675    8.035254
------------------------------------------------------------------------------
```

Romania, 1991-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =       8
-------------+------------------------------           F(  2,     5) =    1.08
       Model |  .065854352     2  .032927176           Prob > F      =  0.4079
    Residual |  .152642421     5  .030528484           R-squared     =  0.3014
-------------+------------------------------           Adj R-squared =  0.0220
       Total |  .218496772     7  .031213825           Root MSE      =  .17472

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |  -.6964234   .4761814    -1.46   0.203    -1.920487    .5276399
exp_growth~s |   .1010519   .8484507     0.12   0.910     -2.07996    2.282064
       _cons |   10.50248      3.844     2.73   0.041     .6211621     20.3838
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =       8
-------------+------------------------------           F(  2,     5) =    1.19
       Model |  .070281726     2  .035140863           Prob > F      =  0.3790
    Residual |  .148215046     5  .029643009           R-squared     =  0.3217
-------------+------------------------------           Adj R-squared =  0.0503
       Total |  .218496772     7  .031213825           Root MSE      =  .17217

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |   -1.04922   .6848718    -1.53   0.186    -2.809739    .7112987
exp_growth~l |   .3227988   .9070819     0.36   0.736     -2.00893    2.654527
       _cons |   13.17717   5.380014     2.45   0.058    -.6525958    27.00694
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =       8
-------------+------------------------------           F(  2,     5) =    1.19
       Model |  .070292003     2  .035146002           Prob > F      =  0.3789
    Residual |  .148204769     5  .029640954           R-squared     =  0.3217
-------------+------------------------------           Adj R-squared =  0.0504
       Total |  .218496772     7  .031213825           Root MSE      =  .17217

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |  -1.056339   .6893519    -1.53   0.186    -2.828374    .7156967
exp_growth~h |   .3298336   .9095448     0.36   0.732    -2.008226    2.667893
       _cons |   13.22897    5.41332     2.44   0.058    -.6864079    27.14435
------------------------------------------------------------------------------
```

Russia 1991-2000

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =       9
-------------+------------------------------           F(  2,     6) =    0.39
       Model |  .170797827     2  .085398914           Prob > F      =  0.6945
    Residual |  1.32170017     6  .220283362           R-squared     =  0.1144
-------------+------------------------------           Adj R-squared = -0.1807
       Total |    1.492498     8   .18656225           Root MSE      =  .46934

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |   .5647325   1.080508     0.52   0.620    -2.079174    3.208639
exp_growth~s |   .6618138   1.852308     0.36   0.733     -3.87062    5.194248
       _cons |  -.5979455   8.245914    -0.07   0.945    -20.77497    19.57908
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =       9
-------------+------------------------------           F(  2,     6) =    0.54
       Model |  .227986808     2  .113993404           Prob > F      =  0.6082
    Residual |  1.26451119     6  .210751866           R-squared     =  0.1528
-------------+------------------------------           Adj R-squared = -0.1297
       Total |    1.492498     8   .18656225           Root MSE      =  .45908

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |   1.125601   1.506493     0.75   0.483    -2.560656    4.811857
exp_growth~l |   .3362216   1.902341     0.18   0.866    -4.318639    4.991083
       _cons |  -4.941479   11.60744    -0.43   0.685    -33.34386     23.4609
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =       9
-------------+------------------------------           F(  2,     6) =    0.56
       Model |   .23304809     2  .116524045           Prob > F      =  0.6009
    Residual |  1.25944991     6  .209908319           R-squared     =  0.1561
-------------+------------------------------           Adj R-squared = -0.1251
       Total |    1.492498     8   .18656225           Root MSE      =  .45816

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |   1.129838   1.517334     0.74   0.485    -2.582945    4.842622
exp_growth~h |   .3767093   1.921049     0.20   0.851    -4.323929    5.077347
       _cons |  -5.019515   11.68936    -0.43   0.683    -33.62235    23.58332
------------------------------------------------------------------------------
```

South Korea, 1979-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      22
-------------+------------------------------           F(  2,    19) =    0.96
       Model |  .392242645     2  .196121322           Prob > F      =  0.4011
    Residual |  3.88598772    19   .20452567           R-squared     =  0.0917
-------------+------------------------------           Adj R-squared = -0.0039
       Total |  4.27823037    21  .203725256           Root MSE      =  .45225

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |    .252976   .1984649     1.27   0.218    -.1624158    .6683679
exp_growth~s |   2.337738   2.113966     1.11   0.283    -2.086843    6.762319
       _cons |   1.345617   3.454015     0.39   0.701    -5.883719    8.574953
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      22
-------------+------------------------------           F(  2,    19) =    1.91
       Model |  .717038024     2  .358519012           Prob > F      =  0.1750
    Residual |  3.56119235    19  .187431176           R-squared     =  0.1676
-------------+------------------------------           Adj R-squared =  0.0800
       Total |  4.27823037    21  .203725256           Root MSE      =  .43293

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |   .2335581   .2622353     0.89   0.384    -.3153067    .7824229
exp_growth~l |   3.731828   2.079089     1.79   0.089    -.6197559    8.083411
       _cons |   .0965458   3.231523     0.03   0.976    -6.667109      6.8602
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      22
-------------+------------------------------           F(  2,    19) =    1.91
       Model |  .715535838     2  .357767919           Prob > F      =  0.1757
    Residual |  3.56269453    19  .187510238           R-squared     =  0.1673
-------------+------------------------------           Adj R-squared =  0.0796
       Total |  4.27823037    21  .203725256           Root MSE      =  .43302

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |    .233764   .2604556     0.90   0.381    -.3113759    .7789039
exp_growth~h |   3.678708   2.056051     1.79   0.090    -.6246556    7.982072
       _cons |   .1501183   3.203056     0.05   0.963    -6.553955    6.854192
------------------------------------------------------------------------------
```

Singapore, 1979-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      21
-------------+------------------------------           F(  2,    18) =    6.80
       Model |  .044585672     2  .022292836           Prob > F      =  0.0063
    Residual |   .05897289    18  .003276272           R-squared     =  0.4305
-------------+------------------------------           Adj R-squared =  0.3673
       Total |  .103558562    20  .005177928           Root MSE      =  .05724

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |   .0649193   .0330312     1.97   0.065    -.0044766    .1343153
exp_growth~s |   -.555646   .2981946    -1.86   0.079     -1.18213    .0708377
       _cons |   7.161388   .5188678    13.80   0.000     6.071287    8.251489
------------------------------------------------------------------------------
```

Slovakia, 1990-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      10
-------------+------------------------------           F(  2,     7) =   14.98
       Model |  .296231648     2  .148115824           Prob > F      =  0.0030
    Residual |  .069235088     7  .009890727           R-squared     =  0.8106
-------------+------------------------------           Adj R-squared =  0.7564
       Total |  .365466736     9  .040607415           Root MSE      =  .09945

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |   -1.59995   .4279008    -3.74   0.007    -2.611775   -.5881252
exp_growth~s |  -.7437233   .3744185    -1.99   0.087    -1.629083    .1416358
       _cons |   20.66225   3.608808     5.73   0.001     12.12878    29.19573
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      10
-------------+------------------------------           F(  2,     7) =    4.46
       Model |  .204778558     2  .102389279           Prob > F      =  0.0564
    Residual |  .160688177     7  .022955454           R-squared     =  0.5603
-------------+------------------------------           Adj R-squared =  0.4347
       Total |  .365466736     9  .040607415           Root MSE      =  .15151

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |  -1.081488   .8583896    -1.26   0.248    -3.111256    .9482811
exp_growth~l |   -1.25482   .5286557    -2.37   0.049    -2.504892   -.0047477
       _cons |   16.61073   7.448185     2.23   0.061    -1.001426    34.22289
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      10
-------------+------------------------------           F(  2,     7) =    4.44
       Model |  .204313154     2  .102156577           Prob > F      =  0.0569
    Residual |  .161153582     7   .02302194           R-squared     =  0.5590
-------------+------------------------------           Adj R-squared =  0.4331
       Total |  .365466736     9  .040607415           Root MSE      =  .15173

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |  -1.064779   .8536029    -1.25   0.252    -3.083229    .9536708
exp_growth~h |  -1.256079   .5287885    -2.38   0.049    -2.506465   -.0056926
       _cons |   16.46465    7.40628     2.22   0.062    -1.048416    33.97772
------------------------------------------------------------------------------
```

Slovenia, 1991-1999.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =       8
-------------+------------------------------           F(  2,     5) =   18.56
       Model |  .188140575     2  .094070288           Prob > F      =  0.0049
    Residual |  .025339545     5  .005067909           R-squared     =  0.8813
-------------+------------------------------           Adj R-squared =  0.8338
       Total |   .21348012     7   .03049716           Root MSE      =  .07119

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |   .9376455   .1538905     6.09   0.002     .5420573    1.333234
exp_growth~s |  -.2307982   .4363125    -0.53   0.619    -1.352375    .8907787
       _cons |   -1.61442   1.398114    -1.15   0.300    -5.208388    1.979548
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =       8
-------------+------------------------------           F(  2,     5) =   19.51
       Model |  .189231733     2  .094615866           Prob > F      =  0.0043
    Residual |  .024248388     5  .004849678           R-squared     =  0.8864
-------------+------------------------------           Adj R-squared =  0.8410
       Total |   .21348012     7   .03049716           Root MSE      =  .06964

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |   1.288556    .206485     6.24   0.002      .757769    1.819342
exp_growth~l |  -.3918198   .4423502    -0.89   0.416    -1.528917    .7452776
       _cons |  -4.562495   1.798029    -2.54   0.052    -9.184475    .0594848
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =       8
-------------+------------------------------           F(  2,     5) =   19.38
       Model |  .189086614     2  .094543307           Prob > F      =  0.0044
    Residual |  .024393506     5  .004878701           R-squared     =  0.8857
-------------+------------------------------           Adj R-squared =  0.8400
       Total |   .21348012     7   .03049716           Root MSE      =  .06985

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |   1.285916   .2067155     6.22   0.002     .7545368    1.817295
exp_growth~h |  -.3920702   .4435072    -0.88   0.417    -1.532142    .7480014
       _cons |  -4.538452   1.802154    -2.52   0.053    -9.171037    .0941323
------------------------------------------------------------------------------
```

South Africa, 1981-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      20
-------------+------------------------------           F(  2,    17) =    0.07
       Model |  .010518951     2  .005259475           Prob > F      =  0.9342
    Residual |  1.30815701    17  .076950412           R-squared     =  0.0080
-------------+------------------------------           Adj R-squared = -0.1087
       Total |  1.31867596    19  .069403998           Root MSE      =   .2774

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |  -.1431482   .4002438    -0.36   0.725    -.9875889    .7012924
exp_growth~s |  -.4402858   1.884614    -0.23   0.818    -4.416474    3.535902
       _cons |   7.917261   4.500906     1.76   0.097    -1.578819    17.41334
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      20
-------------+------------------------------           F(  2,    17) =    0.22
       Model |  .033054535     2  .016527267           Prob > F      =  0.8059
    Residual |  1.28562143    17   .07562479           R-squared     =  0.0251
-------------+------------------------------           Adj R-squared = -0.0896
       Total |  1.31867596    19  .069403998           Root MSE      =    .275

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |   1.281529   2.380697     0.54   0.597    -3.741303    6.304361
exp_growth~l |   -1.66074   2.848187    -0.58   0.567     -7.66989    4.348411
       _cons |  -2.910237   19.05603    -0.15   0.880    -43.11496    37.29448
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      20
-------------+------------------------------           F(  2,    17) =    0.17
       Model |   .02583387     2  .012916935           Prob > F      =  0.8452
    Residual |  1.29284209    17  .076049535           R-squared     =  0.0196
-------------+------------------------------           Adj R-squared = -0.0958
       Total |  1.31867596    19  .069403998           Root MSE      =  .27577

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |   1.258592    2.32142     0.54   0.595    -3.639175     6.15636
exp_growth~h |  -1.207885   2.784802    -0.43   0.670    -7.083304    4.667533
       _cons |  -3.172501   18.57468    -0.17   0.866    -42.36165    36.01665
------------------------------------------------------------------------------
```

Spain, 1981-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      20
-------------+------------------------------           F(  2,    17) =    1.36
       Model |  .118131416     2  .059065708           Prob > F      =  0.2827
    Residual |  .737089526    17  .043358207           R-squared     =  0.1381
-------------+------------------------------           Adj R-squared =  0.0367
       Total |  .855220942    19  .045011629           Root MSE      =  .20823

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |   .2381789   .1472964     1.62   0.124    -.0725894    .5489473
exp_growth~s |    .269383   .8016737     0.34   0.741    -1.422001    1.960767
       _cons |   4.004263   1.579961     2.53   0.021     .6708357    7.337689
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      20
-------------+------------------------------           F(  2,    17) =    1.44
       Model |  .123799928     2  .061899964           Prob > F      =  0.2647
    Residual |  .731421014    17  .043024766           R-squared     =  0.1448
-------------+------------------------------           Adj R-squared =  0.0441
       Total |  .855220942    19  .045011629           Root MSE      =  .20742

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |   .4947655   .3295071     1.50   0.152    -.2004336    1.189965
exp_growth~l |   .2198617   .8709014     0.25   0.804     -1.61758    2.057303
       _cons |   1.667759   2.862119     0.58   0.568    -4.370784    7.706302
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      20
-------------+------------------------------           F(  2,    17) =    1.43
       Model |  .123370913     2  .061685456           Prob > F      =  0.2660
    Residual |  .731850029    17  .043050002           R-squared     =  0.1443
-------------+------------------------------           Adj R-squared =  0.0436
       Total |  .855220942    19  .045011629           Root MSE      =  .20748

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |   .4926871   .3279261     1.50   0.151    -.1991766    1.184551
exp_growth~h |    .215652   .8715391     0.25   0.808    -1.623135    2.054439
       _cons |   1.691543   2.850059     0.59   0.561    -4.321556    7.704642
------------------------------------------------------------------------------
```

Sweden, 1981-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      20
-------------+------------------------------           F(  2,    17) =    0.26
       Model |  .054317029     2  .027158514           Prob > F      =  0.7725
    Residual |  1.76165293    17  .103626643           R-squared     =  0.0299
-------------+------------------------------           Adj R-squared = -0.0842
       Total |  1.81596996    19  .095577367           Root MSE      =  .32191

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |   .1111176   .2120891     0.52   0.607    -.3363512    .5585864
exp_growth~s |   .3464762   .6745945     0.51   0.614    -1.076794    1.769746
       _cons |   6.026736   2.090971     2.88   0.010     1.615172     10.4383
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      20
-------------+------------------------------           F(  2,    17) =    0.26
       Model |  .054414166     2  .027207083           Prob > F      =  0.7721
    Residual |   1.7615558    17  .103620929           R-squared     =  0.0300
-------------+------------------------------           Adj R-squared = -0.0842
       Total |  1.81596996    19  .095577367           Root MSE      =   .3219

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |     .10161   .4125802     0.25   0.808    -.7688581    .9720781
exp_growth~l |    .441733   .7285923     0.61   0.552    -1.095462    1.978928
       _cons |   6.012316   3.751673     1.60   0.127    -1.903022    13.92765
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      20
-------------+------------------------------           F(  2,    17) =    0.26
       Model |  .054327675     2  .027163838           Prob > F      =  0.7725
    Residual |  1.76164229    17  .103626017           R-squared     =  0.0299
-------------+------------------------------           Adj R-squared = -0.0842
       Total |  1.81596996    19  .095577367           Root MSE      =  .32191

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |   .1066545   .4111708     0.26   0.798      -.76084    .9741491
exp_growth~h |   .4357327   .7285442     0.60   0.558    -1.101361    1.972827
       _cons |   5.971409   3.738871     1.60   0.129    -1.916919    13.85974
------------------------------------------------------------------------------
```

Switzerland 1975-2000

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      26
-------------+------------------------------           F(  2,    23) =   19.15
       Model |  .786563529     2  .393281764           Prob > F      =  0.0000
    Residual |  .472361706    23  .020537465           R-squared     =  0.6248
-------------+------------------------------           Adj R-squared =  0.5922
       Total |  1.25892524    25  .050357009           Root MSE      =  .14331

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |   .3515847   .1303745     2.70   0.013     .0818844    .6212849
exp_growth~s |  -1.744754    1.57763    -1.11   0.280    -5.008331    1.518823
       _cons |    6.14231   2.729517     2.25   0.034     .4958739    11.78875
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      26
-------------+------------------------------           F(  2,    23) =   15.81
       Model |  .728846339     2  .364423169           Prob > F      =  0.0000
    Residual |  .530078897    23  .023046909           R-squared     =  0.5789
-------------+------------------------------           Adj R-squared =  0.5423
       Total |  1.25892524    25  .050357009           Root MSE      =  .15181

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |   2.593671   .4615711     5.62   0.000     1.638838    3.548503
exp_growth~l |     .73827   2.381298     0.31   0.759    -4.187821    5.664361
       _cons |  -17.94132   5.050315    -3.55   0.002     -28.3887    -7.49395
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      26
-------------+------------------------------           F(  2,    23) =   15.65
       Model |  .725604501     2  .362802251           Prob > F      =  0.0001
    Residual |  .533320734    23  .023187858           R-squared     =  0.5764
-------------+------------------------------           Adj R-squared =  0.5395
       Total |  1.25892524    25  .050357009           Root MSE      =  .15228

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |   2.529453   .4539677     5.57   0.000     1.590349    3.468557
exp_growth~h |   .5487055   2.231254     0.25   0.808    -4.066995    5.164407
       _cons |  -17.13475   4.790576    -3.58   0.002    -27.04481    -7.22469
------------------------------------------------------------------------------
```

Taiwan, 1985-1998.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      13
-------------+------------------------------           F(  2,    10) =    0.56
       Model |  .021611624     2  .010805812           Prob > F      =  0.5904
    Residual |  .194437658    10  .019443766           R-squared     =  0.1000
-------------+------------------------------           Adj R-squared = -0.0800
       Total |  .216049282    12  .018004107           Root MSE      =  .13944

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |   .0219138    .148931     0.15   0.886    -.3099251    .3537527
exp_growth~s |  -1.097728   1.771764    -0.62   0.549    -5.045464    2.850007
       _cons |   7.651505    3.05257     2.51   0.031     .8499549    14.45305
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      13
-------------+------------------------------           F(  2,    10) =    0.75
       Model |  .028185271     2  .014092635           Prob > F      =  0.4971
    Residual |  .187864011    10  .018786401           R-squared     =  0.1305
-------------+------------------------------           Adj R-squared = -0.0435
       Total |  .216049282    12  .018004107           Root MSE      =  .13706

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |   .0281642   .1790034     0.16   0.878    -.3706803    .4270087
exp_growth~l |  -1.750458    2.02005    -0.87   0.407     -6.25141    2.750494
       _cons |   8.260829   3.396231     2.43   0.035     .6935538     15.8281
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      13
-------------+------------------------------           F(  2,    10) =    0.74
       Model |   .02799829     2  .013999145           Prob > F      =  0.4996
    Residual |  .188050992    10  .018805099           R-squared     =  0.1296
-------------+------------------------------           Adj R-squared = -0.0445
       Total |  .216049282    12  .018004107           Root MSE      =  .13713

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |   .0275673   .1789093     0.15   0.881    -.3710674    .4262021
exp_growth~h |  -1.731435   2.005334    -0.86   0.408    -6.199598    2.736727
       _cons |    8.24606   3.382725     2.44   0.035     .7088779    15.78324
------------------------------------------------------------------------------
```

Turkey, 1985-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      16
-------------+------------------------------           F(  2,    13) =    0.86
       Model |  .074919987     2  .037459994           Prob > F      =  0.4456
    Residual |  .565696482    13  .043515114           R-squared     =  0.1169
-------------+------------------------------           Adj R-squared = -0.0189
       Total |  .640616469    15  .042707765           Root MSE      =   .2086

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |  -.3322091   .2566532    -1.29   0.218    -.8866747    .2222565
exp_growth~s |  -.0642741   1.023104    -0.06   0.951    -2.274555    2.146007
       _cons |   9.125386   2.258465     4.04   0.001     4.246269     14.0045
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      16
-------------+------------------------------           F(  2,    13) =    0.94
       Model |  .081009424     2  .040504712           Prob > F      =  0.4153
    Residual |  .559607046    13  .043046696           R-squared     =  0.1265
-------------+------------------------------           Adj R-squared = -0.0079
       Total |  .640616469    15  .042707765           Root MSE      =  .20748

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |   -.837084   .6494454    -1.29   0.220    -2.240126    .5659575
exp_growth~l |    .059466   1.172589     0.05   0.960    -2.473758     2.59269
       _cons |    13.2481   5.096936     2.60   0.022     2.236834    24.25936
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      16
-------------+------------------------------           F(  2,    13) =    0.95
       Model |  .081826195     2  .040913098           Prob > F      =  0.4114
    Residual |  .558790274    13  .042983867           R-squared     =  0.1277
-------------+------------------------------           Adj R-squared = -0.0065
       Total |  .640616469    15  .042707765           Root MSE      =  .20733

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |  -.8310125   .6370549    -1.30   0.215    -2.207286    .5452609
exp_growth~h |   .0663082   1.170545     0.06   0.956    -2.462501    2.595118
       _cons |   13.18945   5.011321     2.63   0.021     2.363149    24.01575
------------------------------------------------------------------------------
```

The United Kingdom, 1971-2000

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =      30
-------------+------------------------------           F(  2,    27) =    9.53
       Model |  2.53213432     2  1.26606716           Prob > F      =  0.0007
    Residual |  3.58880731    27  .132918789           R-squared     =  0.4137
-------------+------------------------------           Adj R-squared =  0.3703
       Total |  6.12094164    29  .211066953           Root MSE      =  .36458

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |   .5957051   .1456137     4.09   0.000     .2969304    .8944798
exp_growth~s |   4.324167   3.097392     1.40   0.174    -2.031156    10.67949
       _cons |  -3.198853   4.268329    -0.75   0.460    -11.95674    5.559035
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =      30
-------------+------------------------------           F(  2,    27) =    8.40
       Model |  2.34763476     2  1.17381738           Prob > F      =  0.0015
    Residual |  3.77330688    27  .139752107           R-squared     =  0.3835
-------------+------------------------------           Adj R-squared =  0.3379
       Total |  6.12094164    29  .211066953           Root MSE      =  .37383

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |   1.219774   .3417975     3.57   0.001     .5184636    1.921085
exp_growth~l |  -8.163941   3.399781    -2.40   0.023    -15.13971   -1.188166
       _cons |    3.70268   4.467023     0.83   0.414    -5.462894    12.86825
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =      30
-------------+------------------------------           F(  2,    27) =    8.23
       Model |  2.31884479     2   1.1594224           Prob > F      =  0.0016
    Residual |  3.80209684    27  .140818402           R-squared     =  0.3788
-------------+------------------------------           Adj R-squared =  0.3328
       Total |  6.12094164    29  .211066953           Root MSE      =  .37526

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |   1.222928   .3442247     3.55   0.001     .5166371    1.929219
exp_growth~h |  -7.992724   3.356165    -2.38   0.025    -14.87901   -1.106441
       _cons |   3.496034   4.422685     0.79   0.436    -5.578567    12.57063
------------------------------------------------------------------------------
```

Ukraine, 1996-2000.

```
reg happiness log_cons exp_growth_cons

      Source |       SS       df       MS              Number of obs =       5
-------------+------------------------------           F(  2,     2) =    0.97
       Model |  .479727411     2  .239863706           Prob > F      =  0.5079
    Residual |  .495152761     2   .24757638           R-squared     =  0.4921
-------------+------------------------------           Adj R-squared = -0.0158
       Total |  .974880172     4  .243720043           Root MSE      =  .49757

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    log_cons |   4.663093   10.15512     0.46   0.691    -39.03087    48.35706
exp_growth~s |   3.042398   9.930297     0.31   0.788    -39.68422    45.76902
       _cons |  -34.78586   71.52903    -0.49   0.675    -342.5505    272.9787
------------------------------------------------------------------------------
```

```
reg happiness log_consl exp_growth_consl

      Source |       SS       df       MS              Number of obs =       5
-------------+------------------------------           F(  2,     2) =    1.04
       Model |  .498119851     2  .249059925           Prob > F      =  0.4890
    Residual |  .476760321     2  .238380161           R-squared     =  0.5110
-------------+------------------------------           Adj R-squared =  0.0219
       Total |  .974880172     4  .243720043           Root MSE      =  .48824

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_consl |  -7.856737     14.378    -0.55   0.640    -69.72027     54.0068
exp_growth~l |   9.595642   7.497921     1.28   0.329    -22.66531    41.85659
       _cons |   56.92804   106.9796     0.53   0.648    -403.3682    517.2243
------------------------------------------------------------------------------
```

```
reg happiness log_consch exp_growth_consch

      Source |       SS       df       MS              Number of obs =       5
-------------+------------------------------           F(  2,     2) =    1.04
       Model |  .498025413     2  .249012706           Prob > F      =  0.4891
    Residual |  .476854759     2   .23842738           R-squared     =  0.5109
-------------+------------------------------           Adj R-squared =  0.0217
       Total |  .974880172     4  .243720043           Root MSE      =  .48829

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  log_consch |  -7.789215   14.41998    -0.54   0.643    -69.83339    54.25497
exp_growth~h |   9.587911   7.503879     1.28   0.330    -22.69868     41.8745
       _cons |   56.40733   107.3134     0.53   0.652    -405.3251    518.1398
------------------------------------------------------------------------------
```

The United States of America, 1950-2000.

```
reg  happiness log_ccons exp_growth_c_cons

      Source |       SS       df       MS              Number of obs =      50
-------------+------------------------------           F(  2,    47) =   12.53
       Model |  1.88835837     2  .944179183           Prob > F      =  0.0000
    Residual |    3.541962    47  .075360894           R-squared     =  0.3477
-------------+------------------------------           Adj R-squared =  0.3200
       Total |  5.43032037    49  .110822865           Root MSE      =  .27452

------------------------------------------------------------------------------
   happiness |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   log_ccons |  -.0847468    .042136    -2.01   0.050    -.1695135      .00002
exp_growth~s |   -6.41307   1.540492    -4.16   0.000     -9.51214   -3.313999
       _cons |   14.67078   1.613349     9.09   0.000     11.42514    17.91642
------------------------------------------------------------------------------
```