

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 shifts 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 (Laidler (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 than 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 et 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 through 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 Poisson model with high-frequencies endogenous cycles and growth. The minor technological progress follows significant aggregate fluctuations in this model.

## Chapter 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:

$$U_t = v(C_t - \text{Aspired}(C_t))$$

*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: 
$$U_t = v\left(\frac{C_t - \text{Aspired}(C_t)}{\text{Aspired}(C_t)}\right)$$

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

*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  $a = \frac{\text{Assets}}{L}$  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  $\rho$  is a discount rate.

Hence, the representative agent's problem is

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

subject to

$$\dot{a} = w + ra - c \quad (1.2)$$

$$\frac{\dot{c}}{c} = m \quad (1.3)$$

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

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

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:

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

The first order conditions are:

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

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

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

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

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

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

$$\text{The capital market should clear: } a = k \quad (1.12)$$

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

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

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

$$\frac{\dot{c}}{c} = m \quad (1.15)$$

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

### 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.

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

subject to

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

$$\frac{\dot{c}}{c} = m \quad (2.3)$$

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

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

The Hamiltonian is:

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

First order conditions:

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

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

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

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

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

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

$$\frac{\dot{c}}{c} = m \quad (2.12)$$

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

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

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

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

$$\frac{\dot{c}}{c} = m \quad (3.3)$$

$$\dot{k} = A k^\alpha - \delta k - c \quad (3.4)$$

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.

	$\gamma$	$\beta$	$\rho$	$\alpha$	$A$	$\delta$
Phase				+	+	+
Amplitude	+	+	-	-k	No	+k
Frequency	+	-	+	No	No	No

The weight of the consumption growth component in the utility function  $\gamma$  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  $\beta$  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  $\gamma, \beta$ , and  $\rho$  on the phase of the cycle is indeterminate because of the influence on frequency. In contrast, the share of capital in the economy  $\alpha$ , technological progress  $A$ , and the discount rate  $\delta$  influence the phase of the cycle. However, these parameters do not influence the amplitude and frequency of consumption and capital, except  $\alpha$  which negatively influences the amplitude of capital cycles, and  $\delta$  which influences the amplitude of capital cycles positively. Thus, there are three parameters which can be varied arbitrarily  $\gamma, \beta, A$  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

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

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

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

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

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

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

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

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

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

$$\dot{\varepsilon} = m - m_0 + \varepsilon_0 \quad (4.7)$$

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

(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):

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

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

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

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

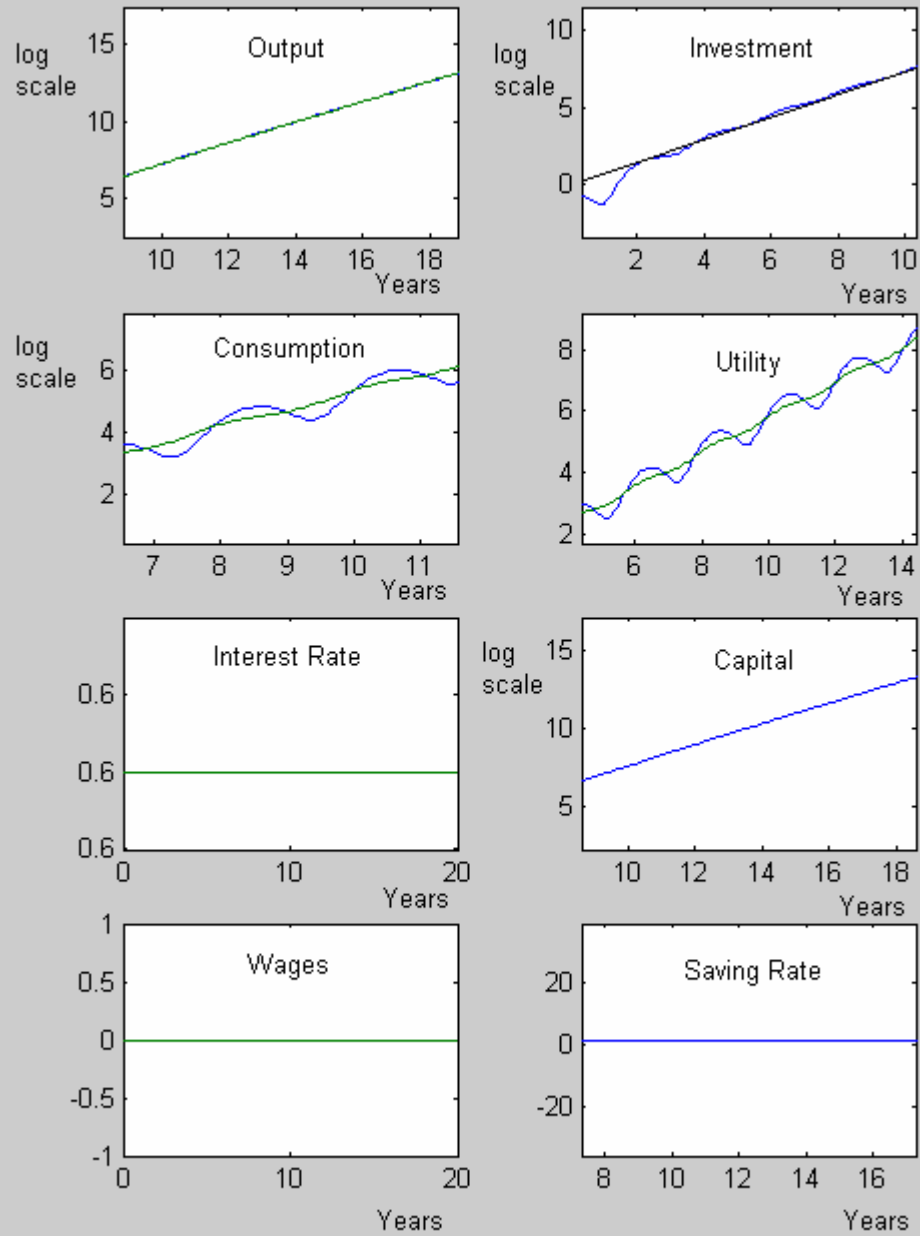
Solving (4.9) with (3.4) we obtain the linearized solutions for capital:

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

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



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

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

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

$$\dot{c} = cm \quad (5.3)$$

$$\dot{k} = Ak^{\alpha} - \delta k - c \quad (5.4)$$

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

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

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

$$\frac{\gamma\beta \exp(\beta m - \rho t)}{c} = 0, \quad \dot{c} = 0, \quad \dot{k} = 0, \quad \dot{\hat{\mu}} = 0. \quad (5.6)$$

(5.6)

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

$$m^* = 0 \quad (5.7)$$

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

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

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

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

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

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

$$\dot{c} = c^* + c^* m \quad (5.13)$$

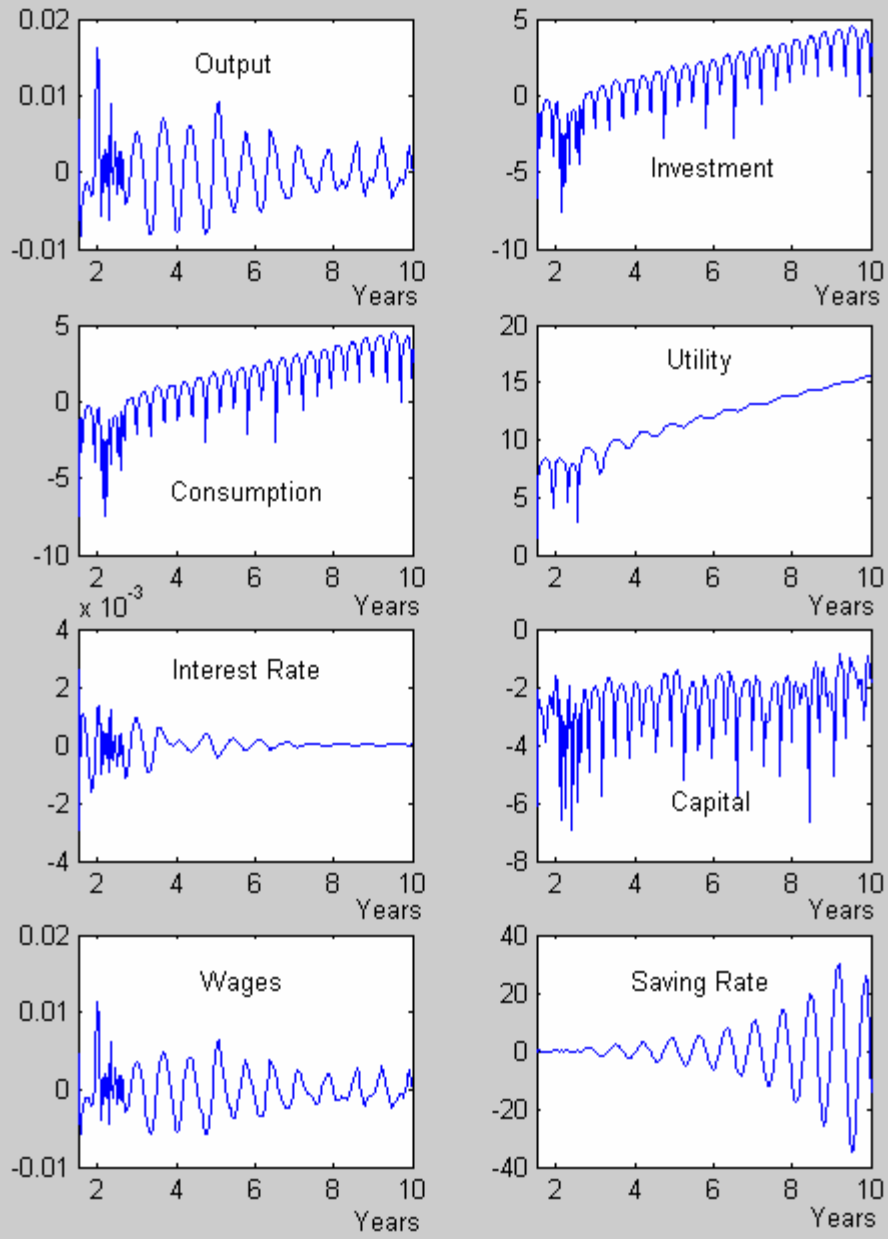
$$\dot{k} = k^* - c + c^* + \left(A\alpha(k^*)^{\alpha-1} - \delta\right)(k - k^*) \quad (5.14)$$

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



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, Switzerland, 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.  $\text{exp\_growth\_c\_cons}_{i,t}$  is its growth rate calculated as

$$\exp\left(\frac{ccons_{i,t} - ccons_{i,t-1}}{ccons_{i,t-1}}\right).$$

$\log\_consl_{i,t}$ ,  $\text{exp\_growth\_consl}_{i,t}$  and  $\log\_consch_{i,t}$ ,  $\text{exp\_growth\_consch}_{i,t}$  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.

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  $\xi$  and  $\gamma$  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  $\xi_i$  and  $\gamma_i$  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
                                           Prob > chi2       =          0.0000

Log likelihood              = -1071.112

-----
      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  $\xi_i$  and  $\gamma_i$  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  $\gamma_i$ : 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	$\xi_i$	$\gamma_i$	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 summary 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	$\xi_i$	$\gamma_i$
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 countries are not as homogeneous in their preferences as it was assumed in the panel data regressions. The consumption 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 countries. 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 assure that consumption growth preference assumption can be used in practice, though very cautiously.

## BIBLIOGRAPHY

- Abel, Andrew B. and Blanchard, Oliver J. *The Present Value of Profits and Cyclical Movements of Investment*, NBER Working Paper no. 1122, May 1983.
- Aftalion, Albert. *Les Crises Periodiques de Surproduction*, 2 vols., Paris: Riviere, 1913.
- Benhabib, Jess and Day, Richard. *A Characterization of Erratic Dynamics in the Overlapping Generations Model*, J. Econ. Dynamics and Optimal Control, IV (1982), pp. 37-55.
- Benhabib, Jess and Farmer, Roger E.A. *Indeterminacy and Increasing Returns*, J. Econ. Theory, June 1994, 63(1), pp.19-41.
- Bental, B., Peled, D. *The accumulation of wealth and the cyclical generation of new technologies: A Search Theoretic Approach*. Int. Econ. Rev., 1996, 37, pp. 687 - 718.
- Blanchard, Oliver J. and Wyplosz, Charles. *An Empirical Structural Model of Aggregate Demand*, J. Monet. Econ., Jan. 1981, 7(1), pp. 1-28.
- Boehm, Ernst A. *Understanding Business Cycles: A Critical Review of Theory and Fact*, 11th Conference of Economists, Flinders U., Adelaide, Aug. 1982.
- Clark, John M. *Business Acceleration and the Law of Demand: A Technical Factor in Economic Cycles*, J. Polit. Econ., Mar. 1917, 25(3), pp. 217-35
- Clark, John M. *Strategic Factors in Business Cycles*, NY: NBER, 1934.
- Clark, Peter K. *Investment in the 1970s: Theory, Performance, and Prediction*, Brookings Pap. Econ. Act., 1979, 1, pp. 73-113.
- Coppock, Denis J. *The Post-War Short-Cycle in the USA*, Manchester Sch. Econ. Soc. Stud., Jan. 1965, 33(1), pp. 17-44.
- Dosi, Giovanni, G. Fagiolo and A. Roventini. *Animal Spirits, Lumpy Investment and Endogenous Business Cycles*, LEM Working Paper, Jan. 2005, <http://www.lem.sssup.it/>
- Fabricant, Solomon. *Basic Facts on Productivity Change*, NY: NBER, 1959.
- Farmer, Roger E. A. and Guo, Jang-Ting. *Real Business Cycles and Animal Spirits Hypothesis*, J. Econ. Theory, June 1994, 63(1), pp. 42-72.
- Fisher, Irving. *Booms and Depressions: Some First Principles*. NY: Adelphi Co., 1932.
- Fisher, Irving. *The Debt-Deflation Theory of Great Depressions*, Econometrica, 1933, 1, pp. 179-202.
- Foley, Dunkan K. *A Contribution to the Theory of Business Cycles*, The Quarterly J. of Econ., Aug. 1992, Vol. 180, 3, pp. 1071-1088.
- Foley, Dunkan K. *Endogenous Financial-Production Cycles*, in W. Barnett, J. Geweke, and K. Shell, eds., *Economic Complexity : Chaos, Sunspots, Bubbles and Nonlinearity*, Cambridge: Cambridge U. Press, 1988, pp. 89-99.

- Frederick, Shane and George Loewenstein. *Hedonic Adaptation*, in Kahneman, Diener, and Schwarz, op. cit., pp. 302-29, 1999.
- Friedman, Milton. *Interest Rates and the Demand for Money*, J. Law Econ., Oct. 1966, 9, pp. 71-85.
- Friedman, Milton. *The Role of Monetary Policy*, Amer. Econ. Rev., Mar. 1968, 58(1), pp. 1-17.
- Gabisch, Gunter and Lorenz, Hans-Walter, *Business Cycle Theory*, NY: Springer, 1987.
- Gali, Jordi. *Monopolistic Competition, Business Cycles, and the Composition of Aggregate Demand*, J. Econ. Theory, June 1994, 63(1), pp. 73-96.
- Goodwin, R.M., M. Kruger, and A. Vercelli, eds., *Nonlinear Models of Fluctuating Growth*, Berlin: Springer, 1984.
- Goodwin, Richard M. *The Non-linear Accelerator and the Persistence of Business Cycles*, Econometrica, Jan. 1951, 19(1), pp.1-17.
- Gordon Robert J. and Veitch John M. *Fixed Investment in the American Business Cycle 1919-83*, NBER Working Paper no. 1426, Aug. 1984.
- Grandmond, Jean-Michel, *On Endogenous Competitive Business Cycles*, *Econometrica*, LIII(5), 1985, pp. 995-1046.
- Haberler, Gottfried. *Prosperity and Depression*, First published by the League of Nations. Cambridge, MA: Harvard U. Press, [1937], 1964.
- Harrod, Roy F. *The Trade Cycle*, Oxford: Clarendon, 1936.
- Hawtrey, Ralph G. *Good and Bad Trade: An Inquiry into the Causes of Trade Fluctuations*, London: Constable and Co., 1913.
- Hayek, Friedrich A. von. *Monetary Theory and the Trade Cycle*, NY: Harcourt, Brace and Co., 1933.
- Hicks, John R. *A Contribution to the Theory of the Trade Cycle*, Oxford: Clarendon Press, 1950.
- Hillinger, Claude. *An Empirical Test of Metzler's Hypothesis Regarding the Nature of Short-Run Cyclical Fluctuations*, in *On the Stability of a Contemporary Economic Systems: Proceedings of the Third Reisenburg Symposium*. Eds.: Oldrich Kyn and Wolfram Schrettl. Goottingen: Vandenhoeck and Ruprecht, 1979, pp. 88-97.
- Inglehart, Ronald F. *Cultural Shift in Advanced Industrial Society*, Princeton: Princeton U. Press, 1990.
- Kahneman, Daniel; Ed Diener and Norbert Schwarz, eds. *Well-Being: The Foundations of Hedonic Psychology*, New York: Russell Sage Foundation, 1999.
- Kaldor, Nicholas. *A Model of the Trade Cycle*, *Econ. J.*, Mar. 1940, 50(197), pp. 78-92.
- Kalecki, Michael. *A Macroeconomic Theory of Business Cycles*, *Econometrica*, 1935, 3, pp. 327-44.
- Kalecki, Michael. *A Theory of the Business Cycle*, *Rev. Econ. Stud.*, Feb. 1937, 4, pp. 77-97.
- Keynes, John M. *The General Theory of Employment, Interest, Money*,

- London: London: Macmillan and Co., 1936.
- Laidler, David E. W. *The Demand for Money: Theories and Evidence*, Scranton, PA: International Textbook Co., 1969.
- Leijonhufvud, Axel. *On Keynesian Economics and the Economics of Keynes: A Study in Monetary Theory*, NY: Oxford U. Press, 1968.
- Lipsey Richard G. *The Relation Between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1862-1957: A Further Analysis*, *Economica* Feb. 1960, 27, pp. 1-31,
- Matsuyama, K. *Growing through Cycles in an Infinitely Lived Agent Economy*. *J. Econ. Theory*, 100, 2001, pp. 220 - 234.
- Metzler Lloyd A. *Factors Governing the Length of Inventory Cycles*, *Rev. Econ. Statist.*, Feb. 1947, 29(1), pp. 1-15.
- Metzler Lloyd A. *The Nature and Stability of Inventory Cycles*, *Rev. Econ. Statist.*, Aug. 1941, 23(3), pp. 113-29.
- Michalos, Alex C. *Global Report on Student Well-Being*. Volume 1: Life Satisfaction and Happiness, NY: Springer, 1991.
- Mitchell, Wesley C. *Business Cycles*, Berkley: U. of California Press, 1913.
- Mitchell, Wesley C. *Business Cycles: The Problem and Its Setting*, NY: NBER, 1927.
- Moore, Geoffrey H. *Productivity, Costs, and Prices: New Light from an Old Hypothesis*, *Explorations Econ. Res.*, Winter 1975, 2(1), pp. 1-17.
- Phelps, Edmund S. *Phillips Curves, Expectations of Inflation, and Optimal Unemployment Over Time*, *Economica*, N. S., Aug. 1967, 34(135), pp. 254-81.
- Phillips, A.W. *The Relation Between and the Rate of Change of Money Wage Rates in the United Kingdom, 1862-1957*, *Economica*, N.S., Nov. 1958, 25(100), pp. 283-99.
- Pigou, A.C. *Industrial Fluctuations*, London, Macmillan, 1927.
- PWT, Penn World Table 6.1, 2004, <http://www.google.com/>.
- Ramsey, Frank. *A Mathematical Theory of Saving*, *Economic Journal*, 38, December 1928, 543-559.
- Reichlin, Pietro. *Equilibrium Cycles in an Overlapping Generations Economy with Production*, *J. Econ. Theory*, XL, 1986, pp. 89-102.
- Robertson, D.H. *A Study of Industrial Fluctuations*, London: Aldwych, [1915], 1948.
- Samuelson Paul A. and Solow, Robert M. *Analytical Aspects of Anti-Inflation Policy*, *Amer. Econ. Rev.*, May 1960, 50(2), pp. 177-94.
- Samuelson Paul A. *Interaction Between the Multiplier Analysis and the Principle of Acceleration*, *Rev. Econ. Stat.*, May 1939, 21(2), pp. 75-78.
- Schmitt-Grohe, Stephanie. *Comparing Four Models of Aggregate Fluctuations Due to Self-Fulfilling Expectations*, *J. Econ. Theory*, 72(1), Jan. 1997, pp. 96-147.
- Schmitt-Grohe, Stephanie. *Endogenous Business Cycles and the Dynamics of Output, Hours, and Consumption*, *The Am. Econ. Rev.*, 90(5), Dec. 1990, pp. 1136-1159.

- Schumpeter, Joseph A. *Business Cycles: A Theoretical, Historical, and Statistical Analysis of the Capitalist Process*, 2 vols, NY: McGraw-Hill, 1939.
- Spiethoff, Arthur. *Business Cycles*, Int. Econ. Pap., 1953, 3, pp. 75-171.
- Stadler, George W. *Business Cycle Models with Endogenous Technology*, The Am. Econ. Rev., 80(4), Sep. 1990, pp. 763-778.
- Tinbergen, Jan. *Statistical Testing of Business Cycle Theories*, 2 vols. Geneva: League of Nations, 1939.
- Tobin, James. *A Dynamic Aggregative Model*, J. Polit. Econ., Apr. 1955, 63(2), pp. 103-15.
- Tobin, James. *A General Equilibrium Approach to Monetary Theory*, J. Money, Credit, Banking, Feb. 1969, 1(1), pp. 15-29. (1969)
- Tobin, James. *Keynesian Models of Recession and Depression*, Amer. Econ. Rev., May 1975, 65(2), pp. 195-202.
- Tugan-Baranovskii, Mickail I. *Les Crises Industrielles en Angleterre*, 2nd ed. Paris: Giard and Co., [1894] 1913.
- Veenhoven, Ruut. *The World Database of Happiness*. 2002, <http://www.soc.fsw.eur.nl/>.
- Wälde, Klaus. *Endogenous Business Cycles and Growth*, 2003, <http://www.waelde.com/>
- Wälde, Klaus. *The Economic Determinants of Technology Shocks in a Real Business Cycle Model*. J. Econ. Dynamics and Control, 27, 2002, pp. 1 - 28.
- Wicksell, Knut. *Interest and Prices: A Study of the Causes Regulating the Value of Money*, London: Macmillan, [1898], 1936.
- Zarnowitz, Victor. *Recent Work on Business Cycles in Historical Perspective: A Review of Theories and Evidence*, Journal of Economic Literature, Vol.23, No.2. (Jan., 1985), pp. 523-580.





APPENDIX A2

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

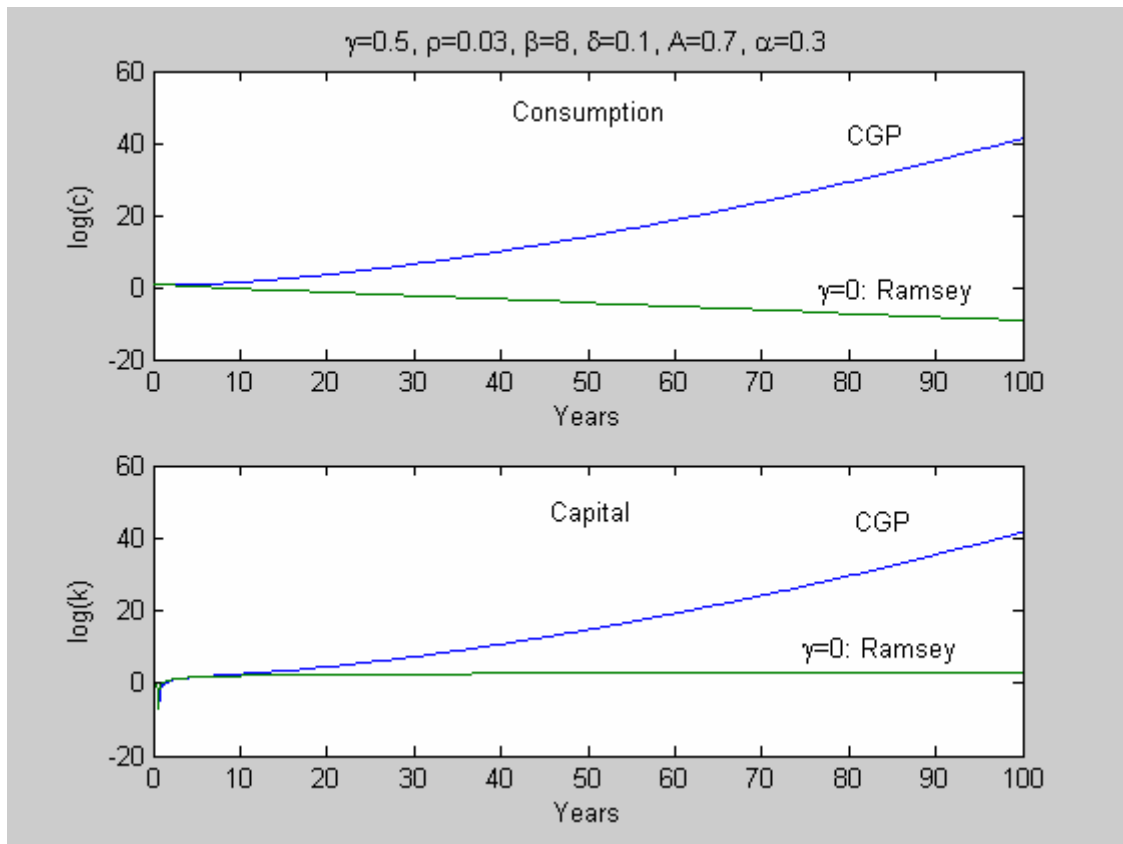


Figure A2.2. Numeric solutions of CGP versus AK model, Matlab simulations.

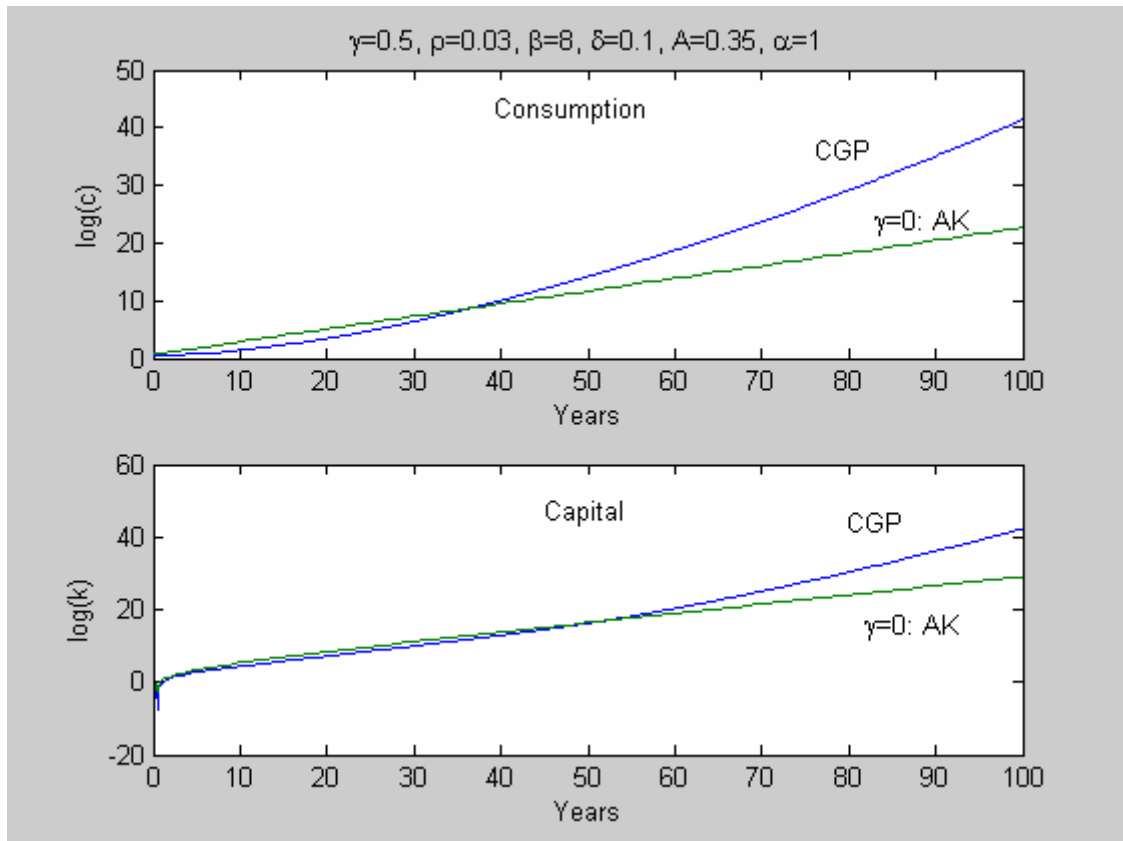


Figure A2.3. The cyclic components of CGP model.  $\gamma$ -sensitivity. Matlab simulations.

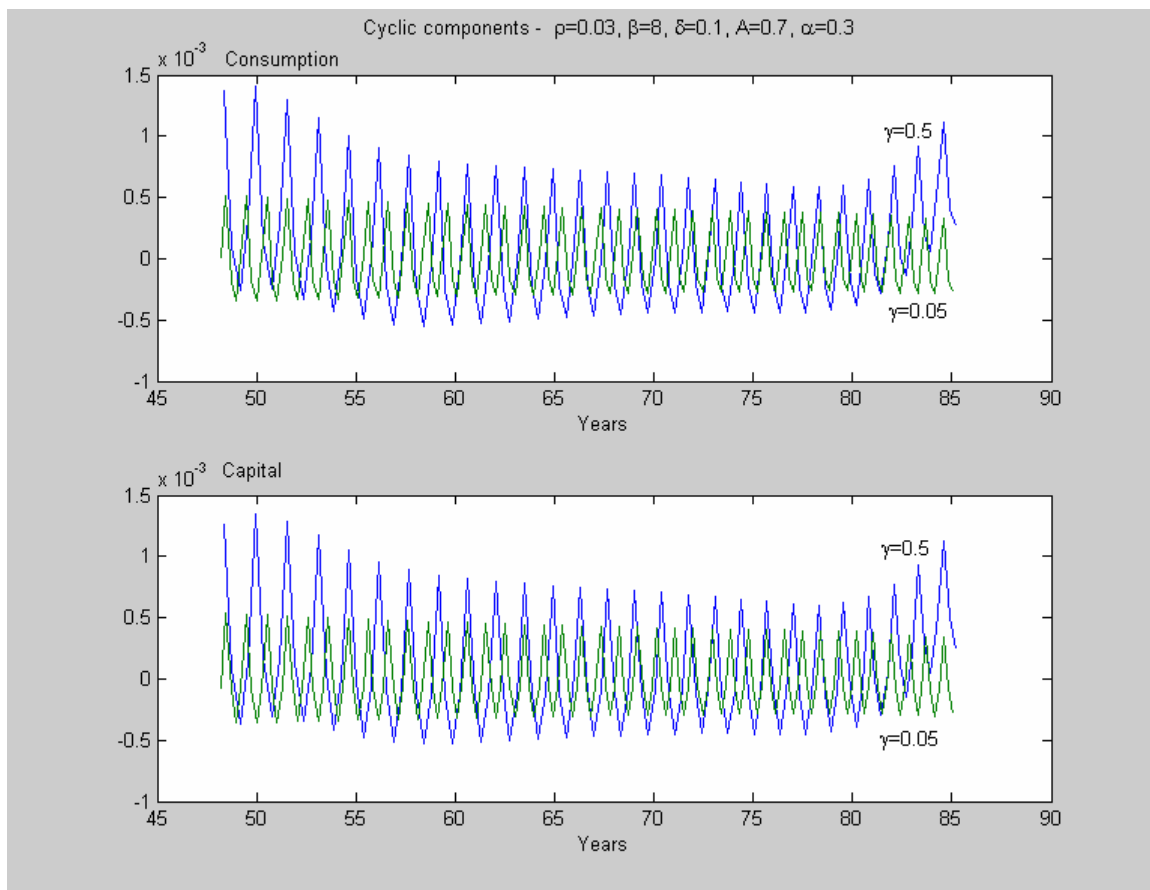


Figure A2.4. The cyclic components of CGP model.  $\beta$ -sensitivity. Matlab simulations.

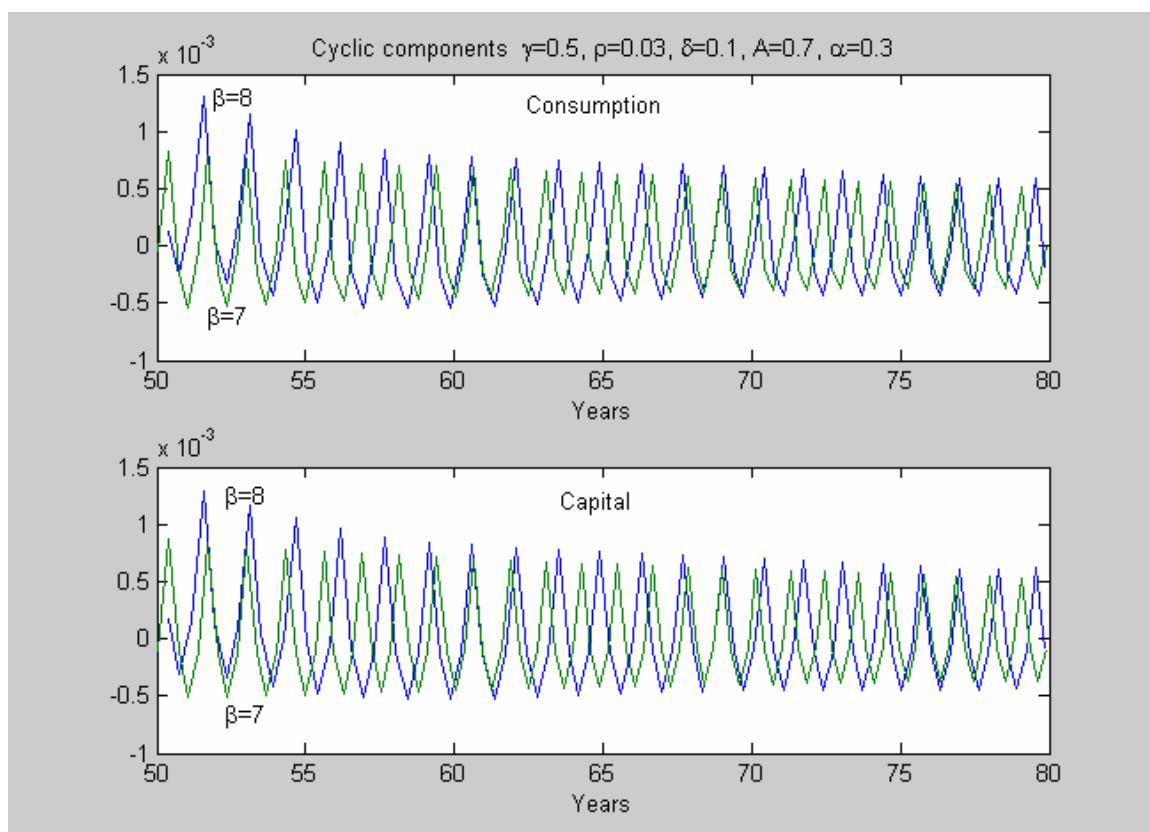


Figure A2.5. The cyclic components of CGP model.  $\rho$ -sensitivity. Matlab simulations.

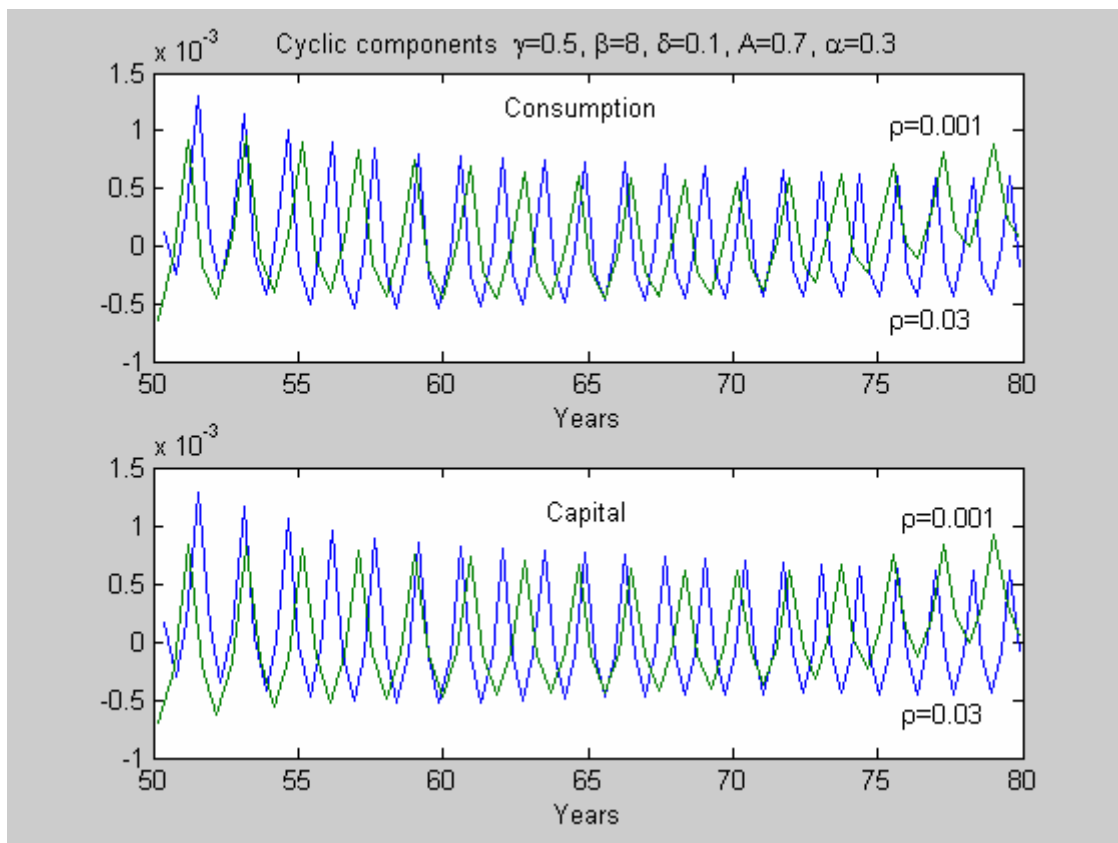


Figure A2.6. The cyclic components of CGP model.  $\alpha$ -sensitivity. Matlab simulations.

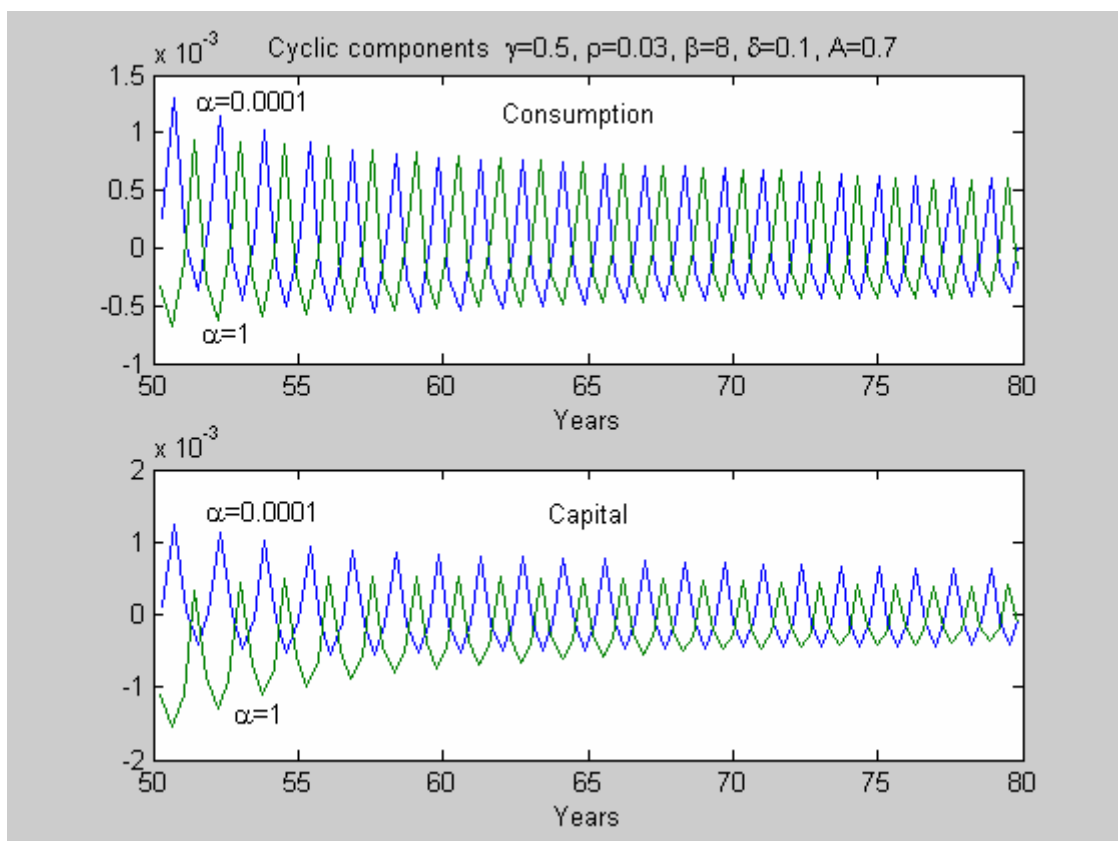


Figure A2.7. The cyclic components of CGP model.  $A$ -sensitivity. Matlab simulations.

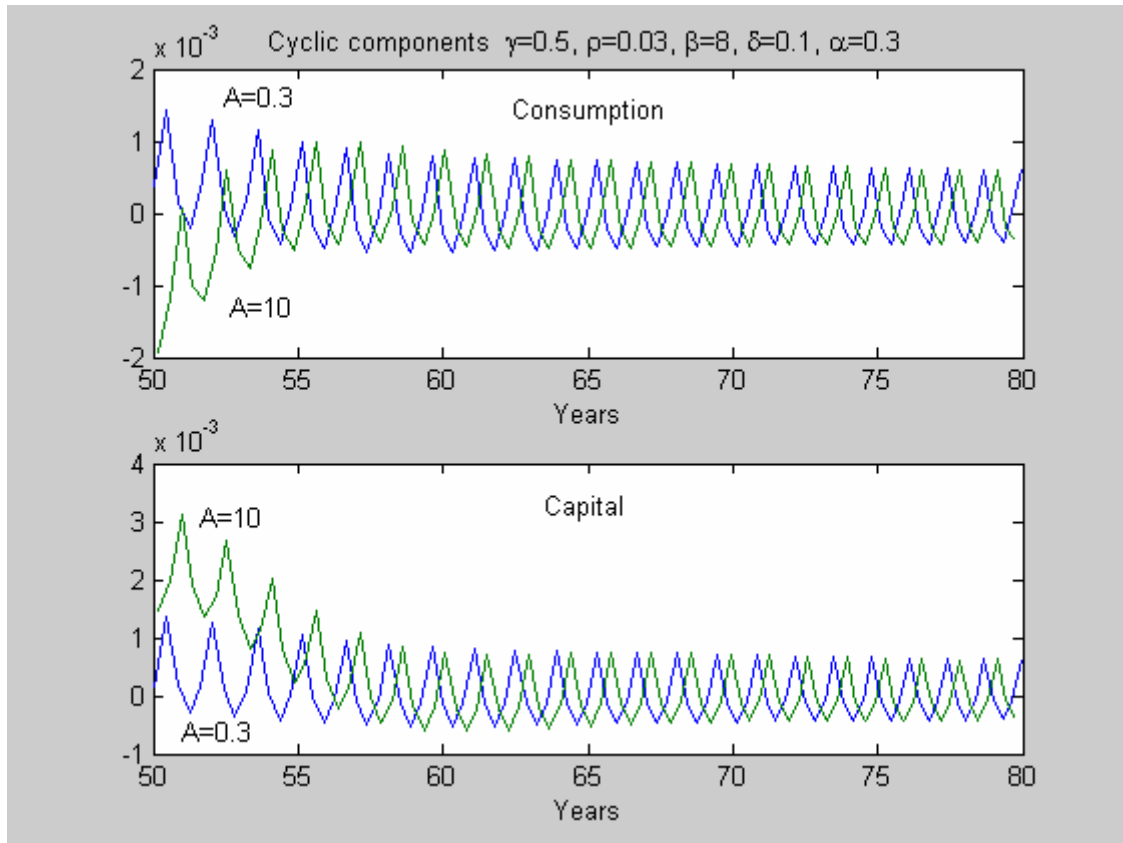


Figure A2.8. The cyclic components of CGP model.  $\delta$ -sensitivity. Matlab simulations.

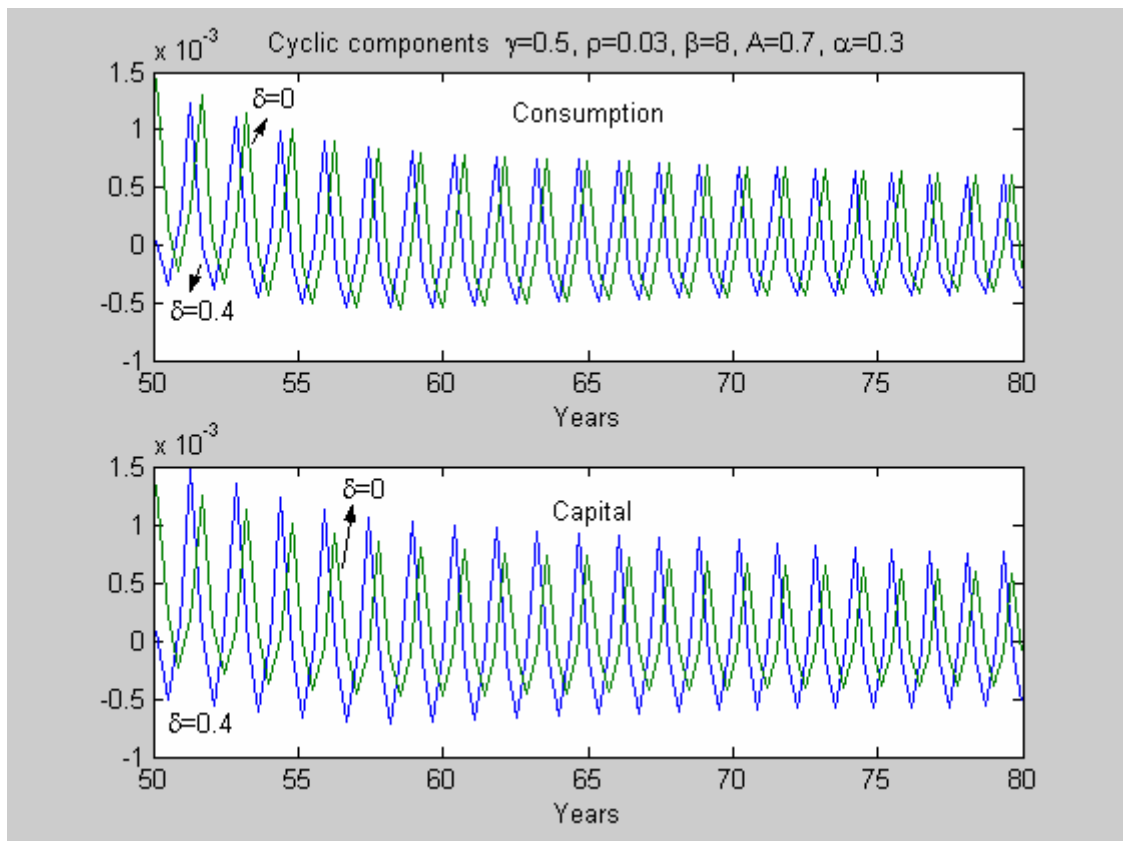


Table A2.1. Cross-correlations in the linearized CGP model with AK production

	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

Table A2.2. 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

corr(u_i, Xb) = 0.2173                        F(2,892)        =         8.04
                                                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:
-----+-----
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			
Model	.079940661	2	.039970331	Number of obs =	10	
Residual	.127587979	7	.018226854	F( 2, 7) =	2.19	
				Prob > F	= 0.1822	
				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_cons1 exp_growth_cons1
```

Source	SS	df	MS			
Model	.065129086	2	.032564543	Number of obs =	10	
Residual	.142399555	7	.020342794	F( 2, 7) =	1.60	
				Prob > F	= 0.2676	
				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_cons1	.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_cons_h exp_growth_cons_h
```

Source	SS	df	MS			
Model	.064824718	2	.032412359	Number of obs =	10	
Residual	.142703923	7	.020386275	F( 2, 7) =	1.59	
				Prob > F	= 0.2696	
				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_cons_h	.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			
Model	.332919226	2	.166459613	Number of obs =	26	
Residual	2.50566861	23	.108942113	F( 2, 23) =	1.53	
Total	2.83858783	25	.113543513	Prob > F =	0.2382	
				R-squared =	0.1173	
				Adj R-squared =	0.0405	
				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_cons1 exp_growth_cons1
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons1	.5774082	.3637886	1.59	0.126	-.1751458	1.329962
exp_growth~1	.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_cons2 exp_growth_cons2
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons2	.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			
Model	.003517012	2	.001758506	Number of obs =	16	
Residual	.511930848	13	.039379296	F( 2, 13) =	0.04	
Total	.515447859	15	.034363191	Prob > F =	0.9565	
				R-squared =	0.0068	
				Adj R-squared =	-0.1460	
				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_cons1 exp_growth_cons1
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons1	.0414107	.3081067	0.13	0.895	-.6242135	.7070348
exp_growth~1	.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_cons2 exp_growth_cons2
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons2	.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			
Model	1.28269325	2	.641346627	Number of obs =	16	
Residual	.725146962	13	.055780536	F( 2, 13) =	11.50	
Total	2.00784022	15	.133856014	Prob > F =	0.0013	
				R-squared =	0.6388	
				Adj R-squared =	0.5833	
				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_cons1 exp_growth_cons1
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons1	-2.905132	.5684339	-5.11	0.000	-4.133159	-1.677105
exp_growth~1	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_cons_h exp_growth_cons_h
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons_h	-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		
Model	.156929355	2	.078464677	F( 2, 7)	=	1.25
Residual	.440333061	7	.062904723	Prob > F	=	0.3441
				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_cons1 exp_growth_cons1
```

Source	SS	df	MS	Number of obs = 10		
Model	.373557147	2	.186778574	F( 2, 7)	=	5.84
Residual	.223705268	7	.031957895	Prob > F	=	0.0322
				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_cons1	1.788861	.5265447	3.40	0.011	.5437806	3.033941
exp_growth~1	-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_cons_h exp_growth_cons_h
```

Source	SS	df	MS	Number of obs = 10		
Model	.377602545	2	.188801272	F( 2, 7)	=	6.02
Residual	.21965987	7	.031379981	Prob > F	=	0.0302
				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_cons_h	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		
Model	.943983342	2	.471991671	F( 2, 23)	=	6.69
Residual	1.62206363	23	.070524506	Prob > F	=	0.0051
-----				R-squared	=	0.3679
Total	2.56604697	25	.102641879	Adj R-squared	=	0.3129
-----				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_cons1 exp_growth_cons1
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons1	-.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_consSch exp_growth_consSch
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_consSch	-.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			
Model	.104698346	2	.052349173	Number of obs =	23	
Residual	2.40315208	20	.120157604	F( 2, 20) =	0.44	
Total	2.50785042	22	.113993201	Prob > F =	0.6528	
				R-squared =	0.0417	
				Adj R-squared =	-0.0541	
				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_cons1 exp_growth_cons1
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons1	.4533408	.5523616	0.82	0.421	-.6988654	1.605547
exp_growth~1	-.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_cons2 exp_growth_cons2
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons2	.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		
Model	.03676956	2	.01838478	F( 2, 6)	=	0.22
Residual	.503719237	6	.083953206	Prob > F	=	0.8095
-----				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_cons1 exp_growth_cons1
```

Source	SS	df	MS	Number of obs = 9		
Model	.101597368	2	.050798684	F( 2, 6)	=	0.69
Residual	.43889143	6	.073148572	Prob > F	=	0.5354
-----				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_cons1	-1.161136	1.099321	-1.06	0.332	-3.851077	1.528805
exp_growth~1	-.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_cons2 exp_growth_cons2
```

Source	SS	df	MS	Number of obs = 9		
Model	.103490858	2	.051745429	F( 2, 6)	=	0.71
Residual	.43699794	6	.07283299	Prob > F	=	0.5285
-----				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_cons2	-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			
Model	.457025431	2	.228512716	Number of obs =	26	
Residual	.436193439	23	.018964932	F( 2, 23) =	12.05	
Total	.893218871	25	.035728755	Prob > F =	0.0003	
				R-squared =	0.5117	
				Adj R-squared =	0.4692	
				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_cons1 exp_growth_cons1
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons1	1.297318	.2243601	5.78	0.000	.8331938	1.761442
exp_growth~1	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_cons2 exp_growth_cons2
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons2	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			
Model	.157802442	2	.078901221	Number of obs =	16	
Residual	.144467775	13	.011112906	F( 2, 13) =	7.10	
Total	.302270217	15	.020151348	Prob > F =	0.0082	
				R-squared =	0.5221	
				Adj R-squared =	0.4485	
				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_cons1 exp_growth_cons1
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons1	-.1139751	.1064418	-1.07	0.304	-.3439286	.1159784
exp_growth~1	-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_cons_h exp_growth_cons_h
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons_h	-.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		
Model	.187454212	2	.093727106	F( 2, 8)	=	1.97
Residual	.381440486	8	.047680061	Prob > F	=	0.2021
				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_cons1 exp_growth_cons1
```

Source	SS	df	MS	Number of obs = 11		
Model	.200010646	2	.100005323	F( 2, 8)	=	2.17
Residual	.368884052	8	.046110507	Prob > F	=	0.1768
				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_cons1	-.7518843	.3689017	-2.04	0.076	-1.602573	.0988047
exp_growth~1	-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_conschr exp_growth_consch
```

Source	SS	df	MS	Number of obs = 11		
Model	.200711605	2	.100355803	F( 2, 8)	=	2.18
Residual	.368183093	8	.046022887	Prob > F	=	0.1754
				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		
Model	.006673091	2	.003336545	F( 2, 7)	=	6.40
Residual	.003648563	7	.000521223	Prob > F	=	0.0263
-----				R-squared	=	0.6465
Total	.010321654	9	.00114685	Adj R-squared	=	0.5455
-----				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_cons1 exp_growth_cons1
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons1	.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_cons_h exp_growth_cons_h
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons_h	.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			
Model	.13713375	2	.068566875	Number of obs =	26	
Residual	.483232879	23	.021010125	F( 2, 23) =	3.26	
Total	.62036663	25	.024814665	Prob > F =	0.0565	
				R-squared =	0.2211	
				Adj R-squared =	0.1533	
				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_cons1 exp_growth_cons1
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons1	.2639019	.1226591	2.15	0.042	.0101623	.5176415
exp_growth~1	-.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_cons_h exp_growth_cons_h
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons_h	.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		
Model	.297975313	2	.148987656	F( 2, 5) =	16.40	
Residual	.045424271	5	.009084854	Prob > F =	0.0064	
Total	.343399583	7	.049057083	R-squared =	0.8677	
				Adj R-squared =	0.8148	
				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_cons1 exp_growth_cons1
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons1	1.563752	.2461501	6.35	0.001	.9310033	2.196501
exp_growth~1	-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_consSch exp_growth_consSch
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_consSch	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			
Model	1.48678256	2	.743391278	Number of obs =	20	
Residual	1.34633688	17	.079196287	F( 2, 17) =	9.39	
Total	2.83311944	19	.149111549	Prob > F =	0.0018	
				R-squared =	0.5248	
				Adj R-squared =	0.4689	
				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_cons1 exp_growth_cons1
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons1	-1.938157	.6417059	-3.02	0.008	-3.292038	-.5842756
exp_growth~1	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			
Model	1.43137616	2	.715688081	Number of obs =	20	
Residual	1.40174328	17	.082455487	F( 2, 17) =	8.68	
Total	2.83311944	19	.149111549	Prob > F =	0.0025	
				R-squared =	0.5052	
				Adj R-squared =	0.4470	
				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			
Model	.054596528	2	.027298264	Number of obs =	26	
Residual	1.23190699	23	.053561174	F( 2, 23) =	0.51	
Total	1.28650352	25	.051460141	Prob > F =	0.6073	
				R-squared =	0.0424	
				Adj R-squared =	-0.0408	
				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_cons1 exp_growth_cons1
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons1	.250187	.2866507	0.87	0.392	-.342795	.8431691
exp_growth~1	-.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_cons2 exp_growth_cons2
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons2	.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		
Model	.150508248	2	.075254124	F( 2, 25) =	1.16	
Residual	1.62418189	25	.064967276	Prob > F =	0.3303	
-----				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_cons1 exp_growth_cons1
```

Source	SS	df	MS	Number of obs = 28		
Model	.234856447	2	.117428223	F( 2, 25) =	1.91	
Residual	1.53983369	25	.061593348	Prob > F =	0.1696	
-----				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_cons1	-.3092114	.19159	-1.61	0.119	-.7037984	.0853757
exp_growth~1	-.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		
Model	.239329164	2	.119664582	F( 2, 25) =	1.95	
Residual	1.53536097	25	.061414439	Prob > F =	0.1635	
-----				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			
Model	.007337501	2	.003668751	Number of obs =	19	
Residual	1.85877949	16	.116173718	F( 2, 16) =	0.03	
Total	1.86611699	18	.103673166	Prob > F =	0.9690	
				R-squared =	0.0039	
				Adj R-squared =	-0.1206	
				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_cons1 exp_growth_cons1
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons1	.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_consche exp_growth_consch
```

Source	SS	df	MS			
Model	.031090547	2	.015545273	Number of obs =	19	
Residual	1.83502645	16	.114689153	F( 2, 16) =	0.14	
Total	1.86611699	18	.103673166	Prob > F =	0.8742	
				R-squared =	0.0167	
				Adj R-squared =	-0.1063	
				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			
Model	1.84741005	2	.923705027	Number of obs =	18	
Residual	3.9691712	15	.264611414	F( 2, 15) =	3.49	
Total	5.81658126	17	.342151839	Prob > F =	0.0569	
				R-squared =	0.3176	
				Adj R-squared =	0.2266	
				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_cons1 exp_growth_cons1
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons1	-2.627744	2.71853	-0.97	0.349	-8.422153	3.166666
exp_growth~1	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_cons_h exp_growth_cons_h
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons_h	-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		
Model	.031238632	2	.015619316	F( 2, 16)	=	10.94
Residual	.022834067	16	.001427129	Prob > F	=	0.0010
-----				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_cons1 exp_growth_cons1
```

Source	SS	df	MS	Number of obs = 19		
Model	.032291523	2	.016145761	F( 2, 16)	=	11.86
Residual	.021781176	16	.001361324	Prob > F	=	0.0007
-----				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_cons1	.2983497	.0612691	4.87	0.000	.168465	.4282345
exp_growth~1	-.2029153	.1294835	-1.57	0.137	-.477408	.0715774
_cons	5.176295	.5558643	9.31	0.000	3.997915	6.354674

```
reg happiness log_cons2 exp_growth_cons2
```

Source	SS	df	MS	Number of obs = 19		
Model	.032368561	2	.016184281	F( 2, 16)	=	11.93
Residual	.021704138	16	.001356509	Prob > F	=	0.0007
-----				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_cons2	.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		
Model	1.23030191	2	.615150953	F( 2, 23)	=	1.36
Residual	10.36531	23	.450665651	Prob > F	=	0.2753
-----				R-squared	=	0.1061
Total	11.5956119	25	.463824475	Adj R-squared	=	0.0284
-----				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_cons1 exp_growth_cons1
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons1	.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_conschr exp_growth_consch
```

Source	SS	df	MS	Number of obs = 26		
Model	.368619571	2	.184309786	F( 2, 23)	=	0.38
Residual	11.2269923	23	.4881301	Prob > F	=	0.6897
-----				R-squared	=	0.0318
Total	11.5956119	25	.463824475	Adj R-squared	=	-0.0524
-----				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			
Model	.302206945	2	.151103473	Number of obs =	26	
Residual	1.96867521	23	.085594575	F( 2, 23) =	1.77	
Total	2.27088216	25	.090835286	Prob > F =	0.1935	
				R-squared =	0.1331	
				Adj R-squared =	0.0577	
				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_cons1 exp_growth_cons1
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons1	.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_consche exp_growth_consch
```

Source	SS	df	MS			
Model	.494042412	2	.247021206	Number of obs =	26	
Residual	1.77683975	23	.077253902	F( 2, 23) =	3.20	
Total	2.27088216	25	.090835286	Prob > F =	0.0595	
				R-squared =	0.2176	
				Adj R-squared =	0.1495	
				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			
Model	.123978618	2	.061989309	Number of obs =	19	
Residual	1.20536893	16	.075335558	F( 2, 16) =	0.82	
Total	1.32934755	18	.073852642	Prob > F =	0.4569	
				R-squared =	0.0933	
				Adj R-squared =	-0.0201	
				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_cons1 exp_growth_cons1
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons1	.1295969	.3159464	0.41	0.687	-.5401795	.7993732
exp_growth~1	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_cons_h exp_growth_cons_h
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons_h	.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		
Model	1.35386712	2	.676933559	F( 2, 23)	=	12.09
Residual	1.28800821	23	.056000357	Prob > F	=	0.0003
				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_cons1 exp_growth_cons1
```

Source	SS	df	MS	Number of obs = 26		
Model	1.434854	2	.717427	F( 2, 23)	=	13.67
Residual	1.20702133	23	.052479188	Prob > F	=	0.0001
				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_cons1	.9271876	.1775012	5.22	0.000	.5599984	1.294377
exp_growth~1	.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_cons2 exp_growth_cons2
```

Source	SS	df	MS	Number of obs = 26		
Model	1.43721672	2	.718608359	F( 2, 23)	=	13.72
Residual	1.20465861	23	.052376461	Prob > F	=	0.0001
				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_cons2	.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		
Model	.184619121	2	.09230956	F( 2, 26)	=	0.89
Residual	2.69349451	26	.103595943	Prob > F	=	0.4224
				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_cons1 exp_growth_cons1
```

Source	SS	df	MS	Number of obs = 29		
Model	.250158853	2	.125079426	F( 2, 26)	=	1.24
Residual	2.62795478	26	.101075184	Prob > F	=	0.3066
				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_cons1	.3317287	.2356145	1.41	0.171	-.1525838	.8160413
exp_growth~1	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_cons_h exp_growth_cons_h
```

Source	SS	df	MS	Number of obs = 29		
Model	.255905099	2	.12795255	F( 2, 26)	=	1.27
Residual	2.62220853	26	.100854174	Prob > F	=	0.2980
				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_cons_h	.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		
Model	.057319257	2	.028659629	F( 2, 7)	=	10.78
Residual	.018609109	7	.002658444	Prob > F	=	0.0073
-----				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_cons1 exp_growth_cons1
```

Source	SS	df	MS	Number of obs = 10		
Model	.060547237	2	.030273619	F( 2, 7)	=	13.78
Residual	.015381129	7	.002197304	Prob > F	=	0.0037
-----				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_cons1	.0789582	.0802825	0.98	0.358	-.1108798	.2687962
exp_growth~1	-.5694666	.1154824	-4.93	0.002	-.842539	-.2963941
_cons	5.226526	.6995277	7.47	0.000	3.572406	6.880646

```
reg happiness log_conschr exp_growth_consch
```

Source	SS	df	MS	Number of obs = 10		
Model	.060569783	2	.030284892	F( 2, 7)	=	13.80
Residual	.015358583	7	.002194083	Prob > F	=	0.0037
-----				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		
Model	.311224123	2	.155612061	F( 2, 4)	=	24.61
Residual	.02529723	4	.006324308	Prob > F	=	0.0057
				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_cons1 exp_growth_cons1
```

Source	SS	df	MS	Number of obs = 7		
Model	.250764204	2	.125382102	F( 2, 4)	=	5.85
Residual	.085757149	4	.021439287	Prob > F	=	0.0649
				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_cons1	2.508681	.7521174	3.34	0.029	.4204688	4.596894
exp_growth~1	-.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_cons_h exp_growth_cons_h
```

Source	SS	df	MS	Number of obs = 7		
Model	.252041368	2	.126020684	F( 2, 4)	=	5.97
Residual	.084479985	4	.021119996	Prob > F	=	0.0630
				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_cons_h	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		
Model	.854614136	2	.427307068	F( 2, 23)	=	25.03
Residual	.392708159	23	.017074268	Prob > F	=	0.0000
-----				R-squared	=	0.6852
Total	1.2473223	25	.049892892	Adj R-squared	=	0.6578
-----				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_cons1 exp_growth_cons1
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons1	.6951767	.1276988	5.44	0.000	.4310116	.9593417
exp_growth~1	.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		
Model	.724519166	2	.362259583	F( 2, 23)	=	15.94
Residual	.522803129	23	.022730571	Prob > F	=	0.0000
-----				R-squared	=	0.5809
Total	1.2473223	25	.049892892	Adj R-squared	=	0.5444
-----				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			
Model	1.04976621	2	.524883107	Number of obs =	26	
Residual	2.28771478	23	.09946586	F( 2, 23) =	5.28	
Total	3.33748099	25	.13349924	Prob > F =	0.0130	
				R-squared =	0.3145	
				Adj R-squared =	0.2549	
				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_cons1 exp_growth_cons1
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons1	1.403723	.8553861	1.64	0.114	-.3657782	3.173224
exp_growth~1	-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_cons2 exp_growth_cons2
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons2	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		
Model	.27802813	2	.139014065	F( 2, 2)	=	18.85
Residual	.014751797	2	.007375899	Prob > F	=	0.0504
-----				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_cons1 exp_growth_cons1
```

Source	SS	df	MS	Number of obs = 5		
Model	.217914397	2	.108957198	F( 2, 2)	=	2.91
Residual	.07486553	2	.037432765	Prob > F	=	0.2557
-----				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_cons1	6.825128	3.011935	2.27	0.152	-6.134183	19.78444
exp_growth~1	-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_cons_h exp_growth_cons_h
```

Source	SS	df	MS	Number of obs = 5		
Model	.220190894	2	.110095447	F( 2, 2)	=	3.03
Residual	.072589033	2	.036294517	Prob > F	=	0.2479
-----				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_cons_h	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			
Model	.017496518	2	.008748259	Number of obs =	27	
Residual	.7979031	24	.033245962	F( 2, 24) =	0.26	
Total	.815399618	26	.031361524	Prob > F =	0.7708	
				R-squared =	0.0215	
				Adj R-squared =	-0.0601	
				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_cons1 exp_growth_cons1
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons1	.1318632	.1668401	0.79	0.437	-.2124777	.4762042
exp_growth~1	-.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			
Model	.039593827	2	.019796914	Number of obs =	27	
Residual	.77580579	24	.032325241	F( 2, 24) =	0.61	
Total	.815399618	26	.031361524	Prob > F =	0.5503	
				R-squared =	0.0486	
				Adj R-squared =	-0.0307	
				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		
Model	.442548672	2	.221274336	F( 2, 8)	=	2.57
Residual	.689754289	8	.086219286	Prob > F	=	0.1377
-----				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_cons1 exp_growth_cons1
```

Source	SS	df	MS	Number of obs = 11		
Model	.545727959	2	.272863979	F( 2, 8)	=	3.72
Residual	.586575002	8	.073321875	Prob > F	=	0.0720
-----				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_cons1	-.6226107	.3986133	-1.56	0.157	-1.541815	.2965932
exp_growth~1	-.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_cons_h exp_growth_cons_h
```

Source	SS	df	MS	Number of obs = 11		
Model	.547991832	2	.273995916	F( 2, 8)	=	3.75
Residual	.584311129	8	.073038891	Prob > F	=	0.0709
-----				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_cons_h	-.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		
Model	.191188342	2	.095594171	F( 2, 13)	=	6.37
Residual	.195085105	13	.015006547	Prob > F	=	0.0118
				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_cons1 exp_growth_cons1
```

Source	SS	df	MS	Number of obs = 16		
Model	.177782166	2	.088891083	F( 2, 13)	=	5.54
Residual	.208491281	13	.016037791	Prob > F	=	0.0182
				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_cons1	-1.210932	.3950493	-3.07	0.009	-2.064384	-.3574794
exp_growth~1	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_cons_h exp_growth_cons_h
```

Source	SS	df	MS	Number of obs = 16		
Model	.175043793	2	.087521896	F( 2, 13)	=	5.39
Residual	.211229655	13	.016248435	Prob > F	=	0.0198
				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_cons_h	-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			
Model	.737183794	2	.368591897	Number of obs =	22	
Residual	1.00789807	19	.053047267	F( 2, 19) =	6.95	
Total	1.74508186	21	.083099136	Prob > F =	0.0054	
				R-squared =	0.4224	
				Adj R-squared =	0.3616	
				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_cons1 exp_growth_cons1
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons1	-.6796232	.8481282	-0.80	0.433	-2.454776	1.095529
exp_growth~1	-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_cons_h exp_growth_cons_h
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons_h	-.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			
Model	.339663955	2	.169831978	Number of obs =	12	
Residual	.92934439	9	.103260488	F( 2, 9) =	1.64	
				Prob > F =	0.2462	
				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_cons1 exp_growth_cons1
```

Source	SS	df	MS			
Model	.529999184	2	.264999592	Number of obs =	12	
Residual	.739009162	9	.082112129	F( 2, 9) =	3.23	
				Prob > F =	0.0878	
				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_cons1	1.653479	.6614355	2.50	0.034	.1572075	3.14975
exp_growth~1	-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_cons2 exp_growth_cons2
```

Source	SS	df	MS			
Model	.52962424	2	.26481212	Number of obs =	12	
Residual	.739384105	9	.082153789	F( 2, 9) =	3.22	
				Prob > F =	0.0880	
				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_cons2	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			
Model	.304133067	2	.152066534	Number of obs =	16	
Residual	.95724014	13	.073633857	F( 2, 13) =	2.07	
Total	1.26137321	15	.084091547	Prob > F =	0.1664	
				R-squared =	0.2411	
				Adj R-squared =	0.1244	
				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_cons1 exp_growth_cons1
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons1	.6727396	.3294155	2.04	0.062	-.0389193	1.384399
exp_growth~1	-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_cons_h exp_growth_cons_h
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons_h	.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		
Model	.065854352	2	.032927176	F( 2, 5) =	1.08	
Residual	.152642421	5	.030528484	Prob > F =	0.4079	
				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_cons1 exp_growth_cons1
```

Source	SS	df	MS	Number of obs = 8		
Model	.070281726	2	.035140863	F( 2, 5) =	1.19	
Residual	.148215046	5	.029643009	Prob > F =	0.3790	
				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_cons1	-1.04922	.6848718	-1.53	0.186	-2.809739	.7112987
exp_growth~1	.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_cons_h exp_growth_cons_h
```

Source	SS	df	MS	Number of obs = 8		
Model	.070292003	2	.035146002	F( 2, 5) =	1.19	
Residual	.148204769	5	.029640954	Prob > F =	0.3789	
				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_cons_h	-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		
Model	.170797827	2	.085398914	F( 2, 6)	=	0.39
Residual	1.32170017	6	.220283362	Prob > F	=	0.6945
-----				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_cons1 exp_growth_cons1
```

Source	SS	df	MS	Number of obs = 9		
Model	.227986808	2	.113993404	F( 2, 6)	=	0.54
Residual	1.26451119	6	.210751866	Prob > F	=	0.6082
-----				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_cons1	1.125601	1.506493	0.75	0.483	-2.560656	4.811857
exp_growth~1	.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_cons_h exp_growth_cons_h
```

Source	SS	df	MS	Number of obs = 9		
Model	.23304809	2	.116524045	F( 2, 6)	=	0.56
Residual	1.25944991	6	.209908319	Prob > F	=	0.6009
-----				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_cons_h	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		
Model	.392242645	2	.196121322	F( 2, 19)	=	0.96
Residual	3.88598772	19	.20452567	Prob > F	=	0.4011
-----				R-squared	=	0.0917
Total	4.27823037	21	.203725256	Adj R-squared	=	-0.0039
-----				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_cons1 exp_growth_cons1
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons1	.2335581	.2622353	0.89	0.384	-.3153067	.7824229
exp_growth~1	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_cons_h exp_growth_cons_h
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons_h	.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			
Model	.044585672	2	.022292836	Number of obs =	21	
Residual	.05897289	18	.003276272	F( 2, 18) =	6.80	
				Prob > F =	0.0063	
				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		
Model	.296231648	2	.148115824	F( 2, 7)	=	14.98
Residual	.069235088	7	.009890727	Prob > F	=	0.0030
-----				R-squared	=	0.8106
Total	.365466736	9	.040607415	Adj R-squared	=	0.7564
-----				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_cons1 exp_growth_cons1
```

Source	SS	df	MS	Number of obs = 10		
Model	.204778558	2	.102389279	F( 2, 7)	=	4.46
Residual	.160688177	7	.022955454	Prob > F	=	0.0564
-----				R-squared	=	0.5603
Total	.365466736	9	.040607415	Adj R-squared	=	0.4347
-----				Root MSE	=	.15151
-----						
happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons1	-1.081488	.8583896	-1.26	0.248	-3.111256	.9482811
exp_growth~1	-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_consche exp_growth_consch
```

Source	SS	df	MS	Number of obs = 10		
Model	.204313154	2	.102156577	F( 2, 7)	=	4.44
Residual	.161153582	7	.02302194	Prob > F	=	0.0569
-----				R-squared	=	0.5590
Total	.365466736	9	.040607415	Adj R-squared	=	0.4331
-----				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		
Model	.188140575	2	.094070288	F( 2, 5) =	18.56	
Residual	.025339545	5	.005067909	Prob > F =	0.0049	
-----				R-squared =	0.8813	
Total	.21348012	7	.03049716	Adj R-squared =	0.8338	
-----				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_cons1 exp_growth_cons1
```

Source	SS	df	MS	Number of obs = 8		
Model	.189231733	2	.094615866	F( 2, 5) =	19.51	
Residual	.024248388	5	.004849678	Prob > F =	0.0043	
-----				R-squared =	0.8864	
Total	.21348012	7	.03049716	Adj R-squared =	0.8410	
-----				Root MSE =	.06964	
happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons1	1.288556	.206485	6.24	0.002	.757769	1.819342
exp_growth~1	-.3918198	.4423502	-0.89	0.416	-1.528917	.7452776
_cons	-4.562495	1.798029	-2.54	0.052	-9.184475	.0594848

```
reg happiness log_cons_h exp_growth_cons_h
```

Source	SS	df	MS	Number of obs = 8		
Model	.189086614	2	.094543307	F( 2, 5) =	19.38	
Residual	.024393506	5	.004878701	Prob > F =	0.0044	
-----				R-squared =	0.8857	
Total	.21348012	7	.03049716	Adj R-squared =	0.8400	
-----				Root MSE =	.06985	
happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons_h	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		
Model	.010518951	2	.005259475	F( 2, 17)	=	0.07
Residual	1.30815701	17	.076950412	Prob > F	=	0.9342
				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_cons1 exp_growth_cons1
```

Source	SS	df	MS	Number of obs = 20		
Model	.033054535	2	.016527267	F( 2, 17)	=	0.22
Residual	1.28562143	17	.07562479	Prob > F	=	0.8059
				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_cons1	1.281529	2.380697	0.54	0.597	-3.741303	6.304361
exp_growth~1	-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_cons_h exp_growth_cons_h
```

Source	SS	df	MS	Number of obs = 20		
Model	.02583387	2	.012916935	F( 2, 17)	=	0.17
Residual	1.29284209	17	.076049535	Prob > F	=	0.8452
				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_cons_h	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		
Model	.118131416	2	.059065708	F( 2, 17)	=	1.36
Residual	.737089526	17	.043358207	Prob > F	=	0.2827
				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_cons1 exp_growth_cons1
```

Source	SS	df	MS	Number of obs = 20		
Model	.123799928	2	.061899964	F( 2, 17)	=	1.44
Residual	.731421014	17	.043024766	Prob > F	=	0.2647
				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_cons1	.4947655	.3295071	1.50	0.152	-.2004336	1.189965
exp_growth~1	.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_cons_h exp_growth_cons_h
```

Source	SS	df	MS	Number of obs = 20		
Model	.123370913	2	.061685456	F( 2, 17)	=	1.43
Residual	.731850029	17	.043050002	Prob > F	=	0.2660
				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_cons_h	.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			
Model	.054317029	2	.027158514	Number of obs =	20	
Residual	1.76165293	17	.103626643	F( 2, 17) =	0.26	
Total	1.81596996	19	.095577367	Prob > F =	0.7725	
				R-squared =	0.0299	
				Adj R-squared =	-0.0842	
				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_cons1 exp_growth_cons1
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons1	.10161	.4125802	0.25	0.808	-.7688581	.9720781
exp_growth~1	.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_cons_h exp_growth_cons_h
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons_h	.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		
Model	.786563529	2	.393281764	F( 2, 23)	=	19.15
Residual	.472361706	23	.020537465	Prob > F	=	0.0000
-----				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_cons1 exp_growth_cons1
```

Source	SS	df	MS	Number of obs = 26		
Model	.728846339	2	.364423169	F( 2, 23)	=	15.81
Residual	.530078897	23	.023046909	Prob > F	=	0.0000
-----				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_cons1	2.593671	.4615711	5.62	0.000	1.638838	3.548503
exp_growth~1	.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_cons_h exp_growth_cons_h
```

Source	SS	df	MS	Number of obs = 26		
Model	.725604501	2	.362802251	F( 2, 23)	=	15.65
Residual	.533320734	23	.023187858	Prob > F	=	0.0001
-----				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_cons_h	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			
Model	.021611624	2	.010805812	Number of obs =	13	
Residual	.194437658	10	.019443766	F( 2, 10) =	0.56	
Total	.216049282	12	.018004107	Prob > F =	0.5904	
				R-squared =	0.1000	
				Adj R-squared =	-0.0800	
				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_cons1 exp_growth_cons1
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons1	.0281642	.1790034	0.16	0.878	-.3706803	.4270087
exp_growth~1	-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_cons_h exp_growth_cons_h
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons_h	.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		
Model	.074919987	2	.037459994	F( 2, 13)	=	0.86
Residual	.565696482	13	.043515114	Prob > F	=	0.4456
-----				R-squared	=	0.1169
Total	.640616469	15	.042707765	Adj R-squared	=	-0.0189
-----				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_cons1 exp_growth_cons1
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons1	-.837084	.6494454	-1.29	0.220	-2.240126	.5659575
exp_growth~1	.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_conscha exp_growth_conscha
```

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

happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_conscha	-.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		
Model	2.53213432	2	1.26606716	F( 2, 27)	=	9.53
Residual	3.58880731	27	.132918789	Prob > F	=	0.0007
-----				R-squared	=	0.4137
Total	6.12094164	29	.211066953	Adj R-squared	=	0.3703
-----				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_cons1 exp_growth_cons1
```

Source	SS	df	MS	Number of obs = 30		
Model	2.34763476	2	1.17381738	F( 2, 27)	=	8.40
Residual	3.77330688	27	.139752107	Prob > F	=	0.0015
-----				R-squared	=	0.3835
Total	6.12094164	29	.211066953	Adj R-squared	=	0.3379
-----				Root MSE	=	.37383
-----						
happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons1	1.219774	.3417975	3.57	0.001	.5184636	1.921085
exp_growth~1	-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_cons_h exp_growth_cons_h
```

Source	SS	df	MS	Number of obs = 30		
Model	2.31884479	2	1.1594224	F( 2, 27)	=	8.23
Residual	3.80209684	27	.140818402	Prob > F	=	0.0016
-----				R-squared	=	0.3788
Total	6.12094164	29	.211066953	Adj R-squared	=	0.3328
-----				Root MSE	=	.37526
-----						
happiness	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
log_cons_h	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		
Model	.479727411	2	.239863706	F( 2, 2)	=	0.97
Residual	.495152761	2	.24757638	Prob > F	=	0.5079
				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_cons1 exp_growth_cons1
```

Source	SS	df	MS	Number of obs = 5		
Model	.498119851	2	.249059925	F( 2, 2)	=	1.04
Residual	.476760321	2	.238380161	Prob > F	=	0.4890
				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_cons1	-7.856737	14.378	-0.55	0.640	-69.72027	54.0068
exp_growth~1	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_cons2 exp_growth_cons2
```

Source	SS	df	MS	Number of obs = 5		
Model	.498025413	2	.249012706	F( 2, 2)	=	1.04
Residual	.476854759	2	.23842738	Prob > F	=	0.4891
				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_cons2	-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

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```
reg happiness log_ccons exp_growth_c_cons
```

Source	SS	df	MS	Number of obs = 50		
Model	1.88835837	2	.944179183	F( 2, 47) =	12.53	
Residual	3.541962	47	.075360894	Prob > F	= 0.0000	
				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