This book investigates the impact of the social security system on final consumption , with the overlapping generations model for Macedonia and panel of countries.A social security system covers pension insurance,health insurance,and employment contribution As hypothesis we set that social security reduces saving. Our results show that in all our models the average growth of social contributions increases final consumption,thereby reducing savings.In the models presented in this book consumption is a function of available income ,the change in disposable income,then the social security contributions per income and social wealth which is a proxy variable of gross capital formation, i.e. total human wealth.

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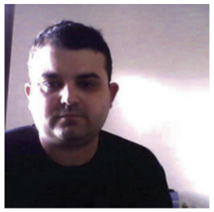
Overlapping generations models analysis for a panel of countries



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1. Introduction

In this paper we use overlapping generations model framework for analysis of social security wealth system effects on the final consumption. Social security programs were introduced partly for income distributions reasons, to ensure minimum level of income after retirement, because individuals might suffer from myopia and not provide enough for their retirement, Blanchard, Fisher (2002)[1].Economist use different types of data to investigate the effect on social security contributions per revenue on consumption(savings), Feldstein, (1979)[2]. Most common is time series approach and panel data approach. Panel data uses two dimensions cross-sectional and time series therefore it is better than time series or OLS. According to Heijdra,and Van Der Ploeg,(2002)[3], a it is expected in the following years until 2025 population to grow old. In 1950 population from 0-19 accounted for 44.1 percent, but by 2025 that percent will decrease to 32.8, while the population from 20-65,will increase from 50.8 to 57.5. And population from 65+ in 1950 accounted for 5.1 to 9.7 percent in 2025. So that age dependency ratio in OLG models[4] that was assumed to hold constant is not a realistic assumption. In the absence of immigration ageing is cause by decrease in fertility of decrease in mortality. Decrease of young which in the model are n_{t+1}, decreases the future pension[5]. So if n_{t+1}, younger population decreases, in the PAYG system (which is explained in the theoretical section) $L_{t-1}Z_t = L_tT_t \Leftrightarrow Z_t = (1+n)T_t \Rightarrow Z_{t+1} = (1+n_{t+1})T$,and saving increases at the expense of consumption. A reduction of n_{t+1} allows for higher capital to labor ratio, for a given level of savings. Permanent decrease in fertility increases the long run capital stock. This link we use in the

[1] Blanchard, O.Fischer, S(2002), ***Lectures in macroeconomics***, The MIT press, London ,England

[2] Feldstein,M,(1979), ***The effect of social security on private saving: the time series evidence,***NBER

[3] Heijdra,B.,van Der Ploeg,F.,(2002), ***The Foundations of modern macroeconomics***, Oxford University Press Inc., New York

[4] The old-age dependency ratio is $\frac{L_{t-1}}{L_t} = \frac{1}{1+n}$

[5] Savings to capital link is $S(w_t, r_{t+1}, n_{t+1}, T) = (1+n_{t+1})k_{t+1}$,where S is savings , r_{t+1}, is the future interest rate, that will hold for the young, T are the taxes imposed to the young. Here, k_{t+1} is the future capital stock.

econometric section where the final consumption is modeled as a function from social security contributions, disposable income (wages), wealth of the country (i.e. country capital stock or gross capital formation), and unemployment rate that serves as a change to marginal propensity to consume.

2. Overview of literature

Questions for the influence of the social insurance over the savings are a question from exceptional scientific interest from a lot of economists. The economist Martin Feldshein in 1974 with application of the time series from the American economy estimated that the introducing of the social system has for goal to cut down savings for 50%, Feldshein, M et al. (1974, 1979). The research that followed, in which like more prominent are the research from Alicia Munnell (1974), Robert Barro (1979), Michael Debry (1979) and others, just confirm the results gathered by Feldshesin. In fact, the negative influence of the social insurance over the savings is based on the theory of life cycle of savings. The basic assumption of this theory is that the only source for consumption after the period of retiring are the accumulated savings, so on base of that like a main motive for savings are the years after retirement. Without social insurance system, the individuals save in form of real or financial assets, where in conditions where there is a social system the saving is in a form of "social insurance wealth" – the rights of future benefits that are inherited to the individual like a retired individual.

On the other hand of the debate for the macroeconomic aspects of the social insurance with the special attention to the "pay-as-you-go" system of the savings and accumulation of capital can be elaborate through the models of overlapping generations. This models point to that because of the overlapping of the generations there is a possibility of introducing the so called "PAYG" solid system that is based on the assumption for transfer of incomes from the younger to older. The first group of economists that worked on models of overlapping are: Ramsey Frank 1928, David Cass 1956, Tjalling Koopmans 1956, Samuelson Paul 1958, and Blanchard-Jarii 1965, where the second group that worked on the improvement and expansion of the models of overlapping generations are: Feldstein, Samwick 1996-1997, Kotilkoff, Smetters and Walliser 1996. This economists have tried to improve the performances of the previous models pointing their attention towards the solving the problem, the elasticity of the work force, the tax and tax system and other aspects. However, as the biggest weakness is that in this models, after all the improvements, none of these models takes adequately the risks that are in the economy. Those risks come from the demographic changes, political instability, economic instability and changes, which have impact on the social system.

Like it was mentioned before, the base assumption on which is based the research of Feldshein (social insurance increases the final private consumption, or decreases the private savings) is the assumption of the simple model of life cycle. Namely, the social insurance is financed on the base of pay-as-you-go system. That means that the benefits every year are paid from the current contributions. Because there is no accumulation of real assets in the economy because the savings of the individuals are in a form of accumulated benefits, the real private savings in the economy are decreasing (individuals spend more knowing that after the working period they have a right of benefits in form of pensions and similar compensations). In fact, the explanation of the negative correlation between the social insurance and the private savings can be explained across the effect of substituting of assets.

However, this explanation is relatively simple and we need to be very careful. First, as Feldshein states, the social insurance can influence the decision of retirement. Some individual without social insurance can decide not to work past his 64th year, but the social insurance makes him to retire earlier. In a way, the social insurance shortens the life span of working period, and increases the period of retirement. This can be easily a motivation for the individuals to increase their savings in the working period. In fact, this effect is of "retirement" influences badly from the effect of substitution of assets on which is based the model of Feldshein. Second, the model of life cycle assumes that the only source of finance to the spending in time of the retirement period is the accumulated savings. The Economist Robert Barro (1974, 1979) says that that between the introductions of the social insurance, there was only the system of private integration transfers. In many families, the younger members that are working and make income provide for their retired parents. Barro states that the introduction of the social system just institutionalizes this system of integration transfers. In fact, this system implies that in place of direct transfer to the parents, the transfer is made indirectly by paying taxes to the country. To which level the social system is substituted with the private integration transfers, the decrease of private savings that comes out of the model "life cycle" is controversial. Third, the simple model of "life cycle" assumes that the only reason for savings is to secure equally distributed consumption between the working and the retirement period. Anyway, Derby 1979 stated that there are other motives for savings, as saving for rainy days, and insecurity for the future or for leaving heritage. Derby estimates that just 20-30% of the private savings can be explained by the model of life cycle. Kotlikoff and Summers 1980 have similar conclusions.

3. Analyze of the social system of Republic of Macedonia

The deterioration of the financial condition of the social and retirement system of Republic of Macedonia in the 1990 as a result of the drastically falling income because of the decrease of the number of employees in the country has imposed the idea from implementing reforms in the social and retirement system, which started with the introduction of second capital financed charge column in the so called pay-as-you-go (PSYG) pension system. These reforms are introduced with the goal of improving and sustain the mandatory pension system.

The overview of the social and retirement fund of Republic of Macedonia will start with the analysis of the income of the Fund for retirement and disability insurance and afterwards the dynamic of the income will be analyzed in regards of the final consumption and national savings, which in essence is the main part of this analysis in frames of this research.

The total amount of income in the Fund in 2012 is 46.370,63 million denars, made from the following sources of income: **Source Income** (contribution of payment, beneficial experience, income from physical persons making activity and employees, income from individual farmers and agency for employment) are 27.744,05 million denars. 851,03 million denars from **Excise**, 17.503,34 million denars from **The Budget of the Republic**, 122,56 million denars from **dividend and sales of shares**, and 149,65 million denars from

other incomes (assets from other funds for paying the pensions, rent, compensation for damage, from passed period, interest, and etc.). **The assets from the contribution** that are calculated from the gross pay of the employed, in 2012 are 26.587,97 million denars or 57,3% of the total amount of the Fund. **The assets from the Budget of the Republic** are 17.503,34 million denars and the same are for paying the legal obligations, for transitioning expenses and for covering the current deficit. **The assets from the contribution of income**, are 346,21 million denars. **The contributions from physical people** that have an individual activity and their employees are made in 651,03 million denars. **The contributions from individual farmers** are 74,59 million denars. **The contributions from the Excise** that are calculated in rate of 9,18% of the oil derivatives, are 851,03 million denars or 1,8% of the total contributions. **From the agency of employment** for the people that are taking compensations, in 2012 are 84,25 million denars. **From the dividend and selling stock share** in 2012 are made 122,56 million denars (3,44 from dividend and 119,12 from selling stock share). **Other contributions** in 2012 are made in 149,65 million denars.

We can conclude that without the role of the country of 1/3 it is not possible to pay the pensions, which only confirms the need for sustaining the Fund in the future is needed to be takes some adequate measures that in a long run will increase the income of the Fund. Namely, the actions for decreasing the rate of income and decreasing the smallest base from which is needed to calculate and pay the contribution are in opposite direction and the same are decreased, instead of the need for increasing the income of the Fund with his long term financial sustainability.

In continuation, we will try to interpret the basic data and indicators that are about the incomes and expenditure by social insurance, with the ratio between the insured and retired, the ratio between pensions and payments and the ratio of unemployment in the timeframe between 1993 and 2011.

Table1. Significant parameters for the condition of the social and retirement system from 1992-2011

Year	Revenue	Expenditures	Ratio insured - retired	Ratio pensions - pay	Rate of unemployment (%)
1993	6960	9412	2.4	77.5	30
1994	17494	18445	2.2	68.9	35.6
1995	18011	18296	2	64.3	38.8
1996	18327	18925	1.8	64.5	31.9
1997	20674	20054	1.7	63.6	36
1998	20521	20533	1.6	59.3	34.5
1999	21031	20681	1.6	64	32.4
2000	22896	22941	1.5	62.7	32.2
2001	24289	24696	1.4	61.7	30.5
2002	25809	25880	1.3	60.2	31.9
2003	27728	27764	1.3	62.1	36.7
2004	29028	29117	1.3	59.3	37.2
2005	28911	29028	1.3	56.8	36.7
2006	32409	31206	1.46	55.5	35.9
2007	34053	32770	1.55	50.5	34.9
2008	37622	38733	1.65	55	33.8
2009	41589	41393	1.74	49.1	32.2
2010	41470	42507	1.7	79.9	30.9
2011	43937[6]	44305	1.74	49.8	31.2

The analysis in the private final consumption and the income by base social insurance clearly states that there is a statistical significant positive correlation between these 2 variables without 2009 and 2010, where the private final consumption has a trend of dynamic decrease that is due to the negative consequences from the global economic and financial crisis. This positive ratio between the final consumption of the households and the incomes by base of social insurance confirm our hypothesis that is in the research in this paper, that the increasing of the social insurance decreases the need of individuals to save because of the fact that they are safe from the benefits that are followed in a form of pensions after finishing their working period. As a result of the decreased need of the households to save in a form of real assets in order to secure their consumption after the work period, they "de facto" increase the current consumption.

Graph1. Final consumption of the households and income of the social insurance

4. **Models of intergenerational overlapping and their application in models of age pensions**

In this section we continue with the analysis of the neo-classical growth models, that are extended in the Samuelson (1958)[7] model and Diamond (1965)[8]. In the Samuelson model there exist no durable capital, while in the Diamond model durable capital is introduced, so that one can examine the case where individuals provide for their retirement years by lending from entrepreneurs. In the Diamond model population grows at rate;

$$L_t = (1+n)L_{t-1} \quad t = 0,1,2... \tag{4.1}$$

[7] Samuelson, P.,(1958), **An Exact Consumption-Loan Model of Interest with or without the Social Contrivance of Money,** *The Journal of Political Economy*, Vol. 66, No. 6. (Dec., 1958), pp. 467-482.
[8] Diamond, P.,(1965), ***National debt in Neo-classical growth model***, The American economic review, Vol.55 No(5),Part 1

Or the population growth rate[9] can be written as: $L_t = L_0(1+n)^t$, $t = 0,1,2...$ $n > -1$ .Division of resources in the economy is as follows: $Y_t + K_t = K_{t+1} + C_t$, so that current produced output and accumulated capital, should be divided between capital produced available for production in the future period and current consumption. Consumption is divided between the members of younger generation and older i.e. C_1 and C_2 .This can be written as :

$$Y_t + K_t = K_{t+1} + C_1 + C_2 \tag{4.2}$$

In contrast in Samuelson model , individuals live in three periods, they enter the labor market at 20 years of age, work 45 years, and 15 years are retired receiving pensions. In this model maximization of utility follows $U = (C_1, C_2, C_3)$, in the Diamond model since individuals live in two periods individuals maximize utility $U = (C_1, C_2)$, the Diamond model follows $C_1 + \frac{C_2}{(1+n)} = y - nk$, where $y - nk$ is the consumption constraint. In the first period there exist L_t , while in the second period there are $L_{t-1} = \frac{L}{1+n}$ individuals. Now, derivative of $\frac{dU}{dC_1} C_1 = 1$,because if we maximize the utility of younger and older generation it should be equal. Derivative for older generation is $\frac{dU}{dC_2} = \frac{1}{1+n}$, according to the quotient rule $\frac{\frac{d}{dx}(C_2)((1+n)) - (C_2) * \frac{d}{dx}(1+n)}{(1+n)^2}$, тука $\frac{dU}{dC_2}(C_2) = 1$ and $\frac{dU}{dC_2}(1+n) = 0$, that is $\frac{dU}{dC_2} = \frac{\frac{d}{dx}(C_2)((1+n)) - (C_2) * \frac{d}{dx}(1+n)}{(1+n)^2} = \frac{1+n}{(1+n)^2} = \frac{1}{1+n}$. In order result to be equal to 1, we have $\frac{dU}{dC_1} = (1+n)\frac{dU}{dC_2}$ .Here interest rate should equal to population growth rate, which is what is

[9] Here $L_{t-1} = \frac{L}{1+n}$ is the number of individuals that live in second period, because they live in two periods

known as biological optimum. This also means that $\frac{dU}{dC_1} = (1+r)\frac{dU}{dC_2}$. In the previous expression r is the interest rate. Savings can be expressed as function of wages w, and interest rate. Diamond's optimality condition is :

$$\frac{dU}{dw} = \frac{dU}{dC_1}\frac{dC_1}{dw} + \frac{dU}{dC_2}\frac{dC_2}{dw} = \frac{dU}{dC_1}\left[\frac{dC_1}{dw} + \frac{1}{1+r}\frac{dC_2}{dw}\right] \tag{4.3}$$

Here we know that $\frac{dU}{dC_2} = \frac{1}{1+n} = \frac{1}{1+r}$, Diamond finds that ;

$$\frac{dU}{dr} = \frac{dU}{dC_1}\left[\frac{dC_1}{dr} + \left(\frac{1}{1+r}\right)\frac{dC_2}{dr}\right] = \frac{dU}{dC_1}\frac{C_2}{(1+r)^2} = \frac{dU}{dC_1}\frac{s}{1+r} \tag{4.4}$$

Marginal utility from interest rate expression is $\frac{dU}{dr} = \frac{dU}{dC_1}\frac{s}{1+r}$. Households face following budget constraint:

$$C_1 + S_t = W_t \text{ and } C_2 = (1+r_{t+1})S_t \tag{4.5}$$

Firms hire capital and labor force, $Y_t = F(K_t, L_t)$, production factors receive their marginal product and profits are zero. So in per capita terms we have:

$$\begin{Bmatrix} y_t = f(k_t) \\ W_t = f(k_t) - k_t f'(k_t) \\ r_{t+1} + \delta = f'(k_{t+1}) \end{Bmatrix} \tag{4.6}$$

Since $S_t = S(W_t, r_{t+1})$, and form the aggregate consumption expression $C_t \equiv L_{t-1} * C_1 + L_t * C_2$, consumption of elders as group is equal on non-amortized(δ is the rate of depreciation) part of the capital plus interest rate charges from the firms for the engaged capital, $L_{t-1} * C_1 = (r_t + \delta)K_t + (1-\delta)K_t$, while the consumption of younger satisfies $L_t * C_2 = W_t * L_t - S_t L_t$, if we replace we get :

$$C_t \equiv (r_t + \delta)K_t + (1-\delta)K_t + W_t * L_t - S_t L_t \qquad (4.7)$$

Because $Y_t = (r_t + \delta)K_t + W_t * L_t$ from the previous expression we can write:

$$C_t \equiv Y_t + (1-\delta)K_t - S_t L_t \qquad (4.8)$$

Utility of the households is CRRA function , i.e. Consant Relative Risk Aversion function:

$$U_t = \frac{C_1^{1-\sigma}}{1-\sigma} + (1+\rho)^{-1}\frac{C_2^{\ 1-\sigma}}{1-\sigma} \qquad \sigma > 0 \qquad (4.9)$$

Here $(1+\rho)^{-1}$ is the discount factor[10], because $C_2 = (1 + r_{t+1})S_t$, on a long run interest rate is a sort of discount factor for the consumption, and because $C_1 + S_t = W_t$, so we get two periods consumption constraint, that is related to the utility function of consumption; $C_1 + \frac{C_2}{1+r_{t+1}} = W_t$, which is inter-temporal budget constraint in the Diamond model.One of the applications of Diamond and Samuelson model is in the study of old age pensions, $\frac{L_{t-1}}{L_t} = \frac{1}{1+n}$ are the number of retired people divided by the population , and this number is constant. Previous identities $C_1 + S_t = W_t - T_t$ and $C_2 = (1 + r_{t+1})S_t + Z_{t+1}$, are augmented by T_t taxes set for the younger, и Z_{t+1} transfers towards elders[11]. Government in its finance distinguishes two methods; fully funded system $(1 + r_{t+1})T_t = Z_{t+1}$, and PAYG (Pay-As-You-Go) system where $L_{t-1}Z_t = L_t T_t \Leftrightarrow Z_t = (1+n)T_t$, where n is biological interest rate. Because budget constraint in fully funded pension insurance is:

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10 $U(c) = \begin{cases} \frac{C^{1-\sigma}}{1-\sigma}; \sigma. \neq 1 \\ \ln(C); \sigma. = 1 \end{cases}$

11 Now lifetime budget constraint will be $C_1 + \frac{C_2}{1+r_{t+1}} = W_t - T_t + \frac{Z_{t+1}}{1+r_{t+1}}$

$$C_1 + \frac{C_2}{1+r_{t+1}} = W_t - T_t + \frac{Z_{t+1}}{1+r_{t+1}} \tag{4.10}$$

while $(1+r_{t+1})T_t = Z_{t+1}$, follows that $C_1 + \frac{C_2}{1+r_{t+1}} = W_t - T_t + T_t \rightarrow C_1 + \frac{C_2}{1+r_{t+1}} = W_t$, which proves that with or without fully funded pension insurance (Heijdra, Van Der Ploeg, 2002). PAYG system is system of generational solidarity. It means transfers from younger to elders in each period. Defined system of contributions is $Z_t = (1+n)T_t$, where $T_t = T$. Budget constraint in PAYG system is:

$$C_1 + \frac{C_2}{1+r_{t+1}} = W_t - \frac{r_{t+1}-n}{1+r_{t+1}} T \tag{4.11}$$

So that if $r_{t+1} > n$, PAYG system augments the households resources, and if $r_{t+1} < n$, PAYG decreases household resources.In practice interest rate is bigger than biological interest rate and wages decrease. On long run if T, which are taxes imposed to the younger population increase, wages fall, but interest rate rise which is good for the social wealth of the economy. But if $r < n$, increase in T would lead to the equilibrium. If $r > n$, decrease in T would lead to equilibrium. One of the most popular models in macroeconomics, actually "workhorse model" is that of Blanchard –Yaary. In the Ramsey(1928), households live infinite, while in the Yaary (1965)[12], they live in the interval from [0, t_d].Lifetime utility of the economic agent is described by the following integral:

$$\Lambda(t_d) = \int_0^{t_d} U(C(t))e^{-\rho t}dt \tag{4.12}$$

Expected lifetime utility from the consumption it also incorporates that the consumer will be alive at time *t*, which utility is given as $1-F(t)$.

$$E\Lambda(t_d) = \int_0^{\bar{t}_d} 1 - F(t)U(C(t))e^{-\rho t}dt \tag{4.13}$$

Budget identity for the households is given as ;

[12] Yaari, M. E. (1965). ***Uncertain lifetime, life insurance, and the theory of the consumer***. *Review of Economic Studies,* 32:137-150.

$$\frac{dRA(t)}{dt} = r(t)RA(t) + y(t) - C(t) \tag{4.14}$$

In this differential equation term RA denotes real assets (Real Assets), $r(t)$ is the interest rate, $y(t)$ noninterest revenue, $C(t)$ is the consumption. The answer of the optimization problem with the wealth is given as:

$$\frac{\dot{\Omega}(t)}{\Omega(t)} = \rho - r(t) \tag{4.15}$$

Here $\Omega(t)$ represents marginal utility of wealth, same as in Ramsey model (1928).Euler equation for the consumption is given as:

$$\frac{\dot{C}(t)}{C(t)} = \sigma(C(t))[r(t) - \rho - \mathrm{M}(t)] \tag{4.16}$$

Here σ is intertemporal elasticity of substitution , $\mathrm{M}(t)$ is the instantaneous probability of death. In the Yaari model one of the instruments of insurance by which households secure their assets is ***actuarial note***. Revenue from that note is $r^{A}(t) = r(t) + M(t)$, where $r^{A}(t)$ is the actuarial revenue.In Blanchard (1985)[13], economic agents live from zero to infinity. The probability of death is the same for the young and old. Blanchard model is also known as ***perpetual youth model***. In the model random variable χ has exponential distribution:

$$\int_0^{\infty} tMe^{(-Mt)}dt \tag{4.17}$$

From here probability of death is $\frac{1}{M} = M^{-1}$, which means that as much as probability of death comes near zero, effective horizon of the individuals is infinite. That is

[13] Blanchard, O.,(1985), **Debt, Deficits, and Finite Horizons,** *The Journal of Political Economy*, Vol. 93, No. 2. (Apr., 1985), pp. 223-247.

the Ramsey (1928)[14] case where individuals live infinite time. Population growth rate is $n = br - mr$, where br is the birth rate, and mr is the mortality rate.

Budget constraint that all individual consumers face is :

$$\frac{\partial af_{ind}(t_0,,t)}{\partial t} = (r(t) + mr)af_{ind}(t_0,,t) + w(t) - c(t_0,,t) \qquad (4.18)$$

af_{ind} is the individual wealth, $w(t)$ is real wages, actuarial revenue is same as in Yaari (1965) $r^A(t) = r(t) + M(t)$ .Initial human wealth is given such as :

$$h_w(t_0,0) = \int_0^\infty w(t) * e^{-\int_0^t (r(t_1)+mr \ \ dt_1} \ \ dt = h_w(0) \qquad (4.19)$$

optimization condition is given such as:

$$\lim_{t\to\infty} af_{ind}(t_0,t) * e^{-\int_0^t (r(t_1)+mr \ \ dt_1} = 0 \qquad (4.20)$$

and we continue:

$$\lim_{t\to\infty} e^{-\int_0^t (r(t_1)+mr \ \ dt_1} = e^{-\infty} * \int_0^t (r(t_1) + mr \ \ dt_1 =$$
$$\lim_{t\to\infty} \frac{1}{e^\infty} * \int_0^t (r(t_1) + mr \ \ dt_1 = 0 * \int_0^t (r(t_1) + mr \ \ dt_1 = \lim_{t\to\infty} 0 = 0 \qquad (4.21)$$

aggregate financial wealth is the sum of individual welfares

$$\sum_{i=1}^{n} af_{ind} = af_{tot}(t) = \int_{-\infty}^{t} c(t_0,t)N(t_0,t)dt_0 \qquad (4.22)$$

where af_{tot} is the total individual wealth (just for remainder af_{ind} was individual wealth).Propensity to consume is equal for all generations:

$$C(t) = (\rho + mr)\left(af_{tot} + h_{wtot}\right) \qquad (4.23)$$

[14] Ramsey, F. P.(1928). ***A mathematical theory of savings***. *Economic Journal,* 38:543-559.

ρ are the time preferences as in neo-classical function

5. Data, sources, descriptive statistics and variables description

Mostly data are collected from the World bank data base , and IMF and Econstats. Panel sample cover 13 countries, for the time period 1993 to 2011. Countries in the sample are :Albania, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Macedonia, Moldova, Romania, Russian Federation, Slovak Republic, Slovenia, Ukraine. Descriptive statistics for the variables of interests is presented in the following table ;

	Variable	Arithmetic mean	Standard deviation	Minimum	Maximum	Observations
Final consumption(% of GDP)	overall	23.51442	1.291819	20.78289	26.65972	N = 240
	between		1.306024	21.23264	26.06764	n = 13
	within		0.23856	22.96834	24.12151	T-bar = 18.4615
Disposable income(% of GDP)	overall	3.969261	6.664905	0.01	34.5	N = 230
	between		6.02173	0.475556	19.29765	n = 13
	within		3.266701	-15.2684	19.17161	T-bar = 17.6923
Social contributions percentage per revenue	overall	33.23939	7.534956	12.42	47.33	N = 179
	between		7.676122	16.61571	43.97579	n = 13
	within		2.9795	24.20359	47.38339	T-bar = 13.7692
Gross domestic savings (% of GDP)	overall	17.6142	11.79618	-33.67	47.2	N = 245
	between		10.51897	-1.26368	31.32579	n = 13
	within		6.012101	-14.7921	65.60368	T-bar = 18.8462
Gross capital formation proxy for wealth	overall	2.28E+10	5.54E+10	1.62E+08	4.64E+11	N = 247
	between		4.32E+10	8.61E+08	1.63E+11	n = 13
	within		3.65E+10	-1.12E+11	3.24E+11	T = 19
Tax revenue, % of GDP	overall	16.84172	4.332618	5.96	26.87	N = 180
	between		3.748632	8.715555	21.87529	n = 13
	within		1.887674	12.16547	22.18383	T-bar = 13.8462

Unemployment rate	overall	11.20787	7.231255	3.9	37.3	N = 216
	between		7.357442	6.431579	33.93333	n = 13
	within		2.495072	3.639449	19.43945	T-bar = 16.6154

From the above table we can see the arithmetic mean of the variables , standard deviation , minimum and maximum of the variables, and how many observations, panel and average time periods. Final consumption variable, or formerly total consumption variable, this variable is the sum of household consumption and government consumption. This variables overall in all 13 panels and 240 observations has a mean value of **23.51442,** i.e. accounts for about 24 percents of GDP. Source of this variable are from World Bank national accounts data, and OECD National Accounts data files. Final consumption variable range is from **20.78** to **26.66** percents from GDP. Disposable income is what is left of income for consumption after paying the taxes, this variable is expressed as percentage to GDP. This variable also includes workers remittances of the employees received. Sources of this variable are World Bank national accounts data, and OECD National Accounts data files. Disposable income variable accounts for **3.969261** percentages of GDP of the panel countries in the sample. This variable includes 230 observations in 13 panels. Social security contributions or social security wealth variable, includes social security contributions by employees, employers, and self-employed individuals, and other contributions whose source cannot be determined. They also include actual or imputed contributions to social insurance schemes operated by governments. Social contributions are calculated as percentage from revenue. On average this variable accounts for **33.23939** percentages from revenue. Sources of this variable observations are: International Monetary Fund, Government Finance Statistics Yearbook and data files. Gross domestic savings as percentage from GDP , are calculated as GDP less final consumption expenditure (total consumption).Sources of this variable are: World Bank national accounts data, and OECD National Accounts data files. Mean value of this variable is **17.6142** % from GDP. Range of this variable is from **-33.67** to **47.2** percentages, *i.e.* there exists negative saving. Gross capital formation is proxy variable for wealth of the economy, its overall arithmetic mean is **2.28E+10**,which is a big number that represents on average the overall value of gross capital formation of this countries. Tax revenues as percentage to GDP, refers to compulsory transfers to the central government for public purposes. Overall on average this variable accounts for **16.84172** percent from GDP. Sources of this variable are; International Monetary Fund, Government Finance Statistics Yearbook and data files, and World Bank and OECD GDP estimates. Unemployment rate variable has mean **11.20787** percents in the panel countries, source of this variable is the World development indicators data base at World bank.

6. Methodology of this research

In this paper we use panel data related to the countries in the sample. Because there is bound to heterogeneity in data for different countries, panel data estimation seems appropriate since it takes into account that heterogeneity, Gujaraty (2003)[15]. Panel data are also more informative data, they include more variability, less collinearity and more efficiency. The question which researcher poses is which estimator to use Random effects model, or Fixed effects model. Random effect model seems appropriate when we think that unobserved effect is uncorrelated with all of the explanatory variables, Wooldridge, (2002)[16].Estimation of Random effects model by Generalized least squares is easy and routinely done by many econometric software packages. The basic model is as follows :

$$y_{it} = \beta_0 + \beta_1 x_{it1} + ... + \beta_k x_{itk} + a_i + u_{it} \quad (6.1)$$

Previous equation becomes RE model when unobserved effect a_i is uncorrelated with all of the explanatory variables i.e. covariance is zero:

$$Cov(x_{itn}, a_i) = 0 \qquad t = 1,2,....T, n = 1,2...k \quad (6.2)$$

Now for the fixed effect if we have the following expression $y_{it} = a_i + \beta_1 X_{it} + u_{it}, t = 1,2...T$, for each cross-sectional unit average, this equation becomes, $\bar{y}_{it} = a_i + \beta_1 \bar{X}_{it} + \bar{u}_{it}$, here

[15] Gujarati, Damodar N. (2003), ***Basic Econometrics***. New York: McGraw-Hill

[16] Wooldridge, Jeffrey , (2002), ***Introductory Econometrics A Modern Approach***, Thomson

$\bar{y}_{it} = \frac{\sum_{t=1}^{T} y_{it}}{T}$, if we subtract two previous equations(in order to eliminate the unobserved time constant)[17] we get:

$$y_{it} - \bar{y}_{it} = \beta_1(x_{it} - \bar{x}_i) + u_{it} - \bar{u}_i = \Delta y_{it} = \beta_1 \Delta x_{it} + \Delta u_{it} \quad (6.3)$$

So the fixed effects estimator is efficient when idiosyncratic errors are serially uncorrelated, and there is no assumption about the correlation between the unobserved effect a_i and the explanatory variables.

Next, just to test for the robustness of the results we employ, Dynamic panel data estimator namely Arelano/Bond GMM estimator[18], the basic model with lagged dependent variables is :

$$y_{it} = a_i + \gamma y_{it-1} + u_{it}, t = 1,2...T \quad (64)$$

In the previous equation residuals are assumed to follow normal distribution, i.e. $u_{it}, \sim (0, \sigma_u^2)$. Here y_{it-1} depends positively on a_i , this is easy to see when we are inspecting the model for t-1 period ;

$$\gamma y_{it-1} = a_i + \gamma y_{it-2} + u_{it-1}, t = 1,2...T \quad (6.5)$$

So there exist endogeneity problem and OLS and GLS , i.e. FE and RE are not consistent. But the Arelano/Bond GMM estimator is consistent. The moment conditions use the

[17] Wooldridge, Jeffrey , (2002), ***Econometric Analysis of Cross Section and Panel Data***, MIT press

18 Arellano, Manuel & Bond, Stephen, (1991), ***Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations,*** Review of Economic Studies, Wiley Blackwell, vol. 58(2), pages 277-97, April.

properties of the instruments ,and the instruments in the GMM Arelano /Bond model are the differenced explanatory variables:

$$y_{it-m}; m \geq 2 \tag{6.6}$$

So that the instruments are uncorrelated with the future errors u_{it} and u_{it-1} . So the increasing number of moment of conditions is $t = 3,4 \ldots T$. GMM estimation is combined with RE and FE estimator because as $T \rightarrow \infty$,estimates of the RE and FE model begin to converge.

7. Econometric estimations and results

Since data cover 13 countries, and period from 1993 to 2011, we apply panel estimation techniques. Panel data actually are cross-sectional data observed over time. First equation we will estimate is[19]:

$$\log(C_{it}) = \alpha_i + \beta_1 DY_{it} + \beta_2 \left(DY_{it} - DY_{it-1}\right) + \beta_3 S_{it} + \beta_4 W_{it} + \beta_5 T_{it} + \beta_6 SC_{it} + \varepsilon_{it} \tag{7.1}$$

In the previous equation:

- $\log(C_{it})$ represents logarithm of the final consumption expenditure household and government consumption
- $\alpha_i \, (i = 1, \ldots.. n)$ is unknown intercept for each country
- DY_{it} is the disposable income for each country as percentage of income
- S_{it} are the gross savings as percentage of GDP

[19] This equation is based mostly on Feldstein (1977) formulation of consumption function, with a modification of our own.

- W_{it} is the domestic investment as percent from GDP ,and it is a proxy variable for wealth.
- T_{it} is the tax revenue as percentage from GDP
- sc_{it} are social contributions as percentage from revenue
- ε_{it} is the error term

This equation actually is consumption function, where in log form consumption is a function of disposable income, and first difference of the disposable income, where β_1 is the marginal propensity to consume. Also equation includes, savings, tax revenues, wealth, and social contributions, which together with pensions and health insurance is what makes wealth of the households, Gustman, Mitchell, Samwick, Steinmeier,(1997)[20]. Results are presented in the following table (See Appendix 1)[21].The results are presented on a Table on a next page. Standard model is final consumption as dependent variable while explanatory variables are : Disposable income, first difference disposable income, gross domestic savings as percentage to GDP,gross capital formation which is proxy for wealth of the nation, tax revenue which is calculated as percentage from GDP, and social contributions which are paid by workers and these are calculated as percentage per revenue.

[20] Gustman,A. ,Mitchell,O., Samwick.A., & Steinmeier, T.,(1997). "***Pension and Social Security Wealth in the Health and Retirement Study***," NBER Working Papers 5912, National Bureau of Economic Research, Inc.

[21] See Appendix 1 Fixed effects model and random effects model 1

Table Results for the fixed and random effects model estimation for the first model

Variable	Symbol	Random effects GLS regression	Fixed-effects (within) regression
Final consumption	$\log(C_{it})$	**Coefficient (P-value)**	**Coefficient (P-value)**
Constant	α_i	21.97 (0.000)	22.18 (0.000)
Disposable income	DY_{it}	0.034 (0.000)	0.034 (0.000)
First difference disposable income	$D.DY_{it}$	-0.020 (0.022)	-0.020 (0.016)
Gross domestic savings (% of GDP)	S_{it}	0.016 (0.000)	0.014 (0.000)
Gross capital formation wealth	W_{it}	2.96E-12 (0.000)	2.78E-12 (0.000)
Tax revenue, % of GDP	T_{it}	0.025 (0.001)	0.025 (0.004)
Social contributions percent per revenue	SC_{it}	0.021 (0.000)	0.018 (0.001)
R^2		0.53	0.54
Breusch and Pagan Lagrangian multiplier test for random effects (H_0:variances across entities are zero)		0.000	n.a.
Hausman specification tests, Prob> χ^2 Ho: difference in coefficients not systematic		0.0120	
N-(number of observations)		165	165
Number of groups		13	13

Here we run fixed and random effects model. The Hausman test tests the null hypothesis that the coefficients estimated by the efficient random effects estimator are the same as the ones estimated by the consistent fixed effects estimator. If they are (insignificant P-value, Prob> χ^2 larger than 0.05) then it is safe to use random effects. If you get a significant P-value, however, you should use fixed effects. The result is in favor of fixed effects model, actually fixed effects model is OLS, Ordinary least squares, while Random effects model is GLS, and Generalized Least Squares. But the Breusch-Pagan LM test proved that there is significant difference of variance across countries i.e. we cannot use simple OLS but rather Random effects model. Ambiguity of these two tests made us use the RE and FE models.

Fixed effects model assumes that individual heterogeneity is captured by the intercept term, while Random effects model assumes that individual heterogeneity is captured by the intercept term and some random component μ_i [22].But the coefficients of the variables in the two models are similar in size and they are of the same sign. The social security wealth sign (social contributions in percentage value per revenue) coefficient of **0.021**, is positive and highly statistically significant. This means that if on average social contributions in percentage value per revenue increase on average by 1%, final consumption will increase by 0.021 percentage points. This coefficient as we said is highly statistically significant its p-value is 0.000. The coefficient on the disposable income, i.e. marginal propensity to consume is positive and is of the size **0.034** in the fixed and random effects model, and is highly statistically significant p-value is 0.000. The coefficient on the first differenced disposable income proved to be negatively associated with the final consumption, coefficient is of **-0.020** in the both models, and this coefficient also is very significant its p-value is 0.022. Wealth of the countries is positively and statistically significantly associated with the final consumption, but the coefficients in either of the two models is of very small size i.e., 2.96e-12 and 2.78e-12 respectively, and the p-value is 0.000. Gross domestic saving is positive with a size **0.016** and **0.014** in a GLS and FE model respectively. Also this coefficient is highly statistically significant, which is in favor of its economic interpretation, that is current savings positively affect the current final consumption. Tax revenues coefficient is **0.025** in both models, and its p-value is 0.001 and 0.004 in the GLS and FE model respectively, which makes him highly statistically significant. The sign on this variables is expected, because final consumption consist of household consumption and government consumption, for the second taxes are revenues. Goodness of fit of the regression is 53% i.e. 54% respectively, which is good explanatory power of the models. The sample consists of 165 observation in 13 groups (panels). Next we introduce

[22] In general for fixed effects we have : $y_{it} = a_i + \beta_1 X_{it} + \varepsilon_{it}$,where $\varepsilon_{it} = v_{it}$, where $\mu_i = 0$, and for the random effects $y_{it} = a_i + \beta_1 X_{it} + \varepsilon_{it}$,where $\varepsilon_{it} = \mu_i + v_{it}$

unemployment rate variables, to see what effect it has on social security wealth and other variables in the model. And the model we estimate is as follows:

$$\log(C_{it}) = \alpha_i + \beta_1 DY_{it} + \beta_2 (DY_{it} - DY_{it-1}) + \beta_3 S_{it} + \beta_4 W_{it} + \beta_5 T_{it} + \beta_6 SC_{it} + \beta_7 UR_{it} + \varepsilon_{it} \quad (7.2)$$

In the previous expression UR_{it} is the unemployment rate, while other variables remain the same from the first model (See Appendix 2)[23].

Table Results for the fixed and random effects model estimation for the second model

Variable	Symbol	Random effects GLS regression Coefficient (P-value)	Fixed-effects (within) regression Coefficient (P-value)
Final consumption	$\log(C_{it})$		
Constant	α_i	22.66 (0.000)	23.20 (0.000)
Disposable income	DY_{it}	0.031 (0.000)	0.037 (0.000
First difference disposable income	$D.DY_{it}$	-0.012 (0.270)	-0.016 (0.073)
Grossdomestic savings (% of GDP)	S_{it}	0.014 (0.002)	0.084 (0.023)
Gross capital formation wealth	W_{it}	2.95E-12 (0.000)	2.78E-12 (0.000)
Tax revenue, % of GDP	T_{it}	0.012 (0.239)	0.022 (0.947)
Social contributions percent per revenue	SC_{it}	0.020 (0.002)	0.017 (0.041)
Unemployment rate	UR_{it}	-0.025 (0.000)	-0.024 (0.000)
R^2		0.58	0.60
Breusch and Pagan Lagrangian multiplier test for random effects (H_0:variances across entities are zero)		0.000	n.a.
Hausman specification tests, Prob> χ^2 Ho: difference in coefficients not systematic		0.0016	
N-(number of observations)		154	154
Number of groups		12	12

[23] See Appendix 2 Fixed and Random effects for the model 2

Adding unemployment rate to the equation does improves explanatory power of the model, which now rise up to **0.58** and **0.60** respectively in GLS and FE models. Adding unemployment rate slightly decreased the coefficient on social security wealth that now is **0.020** and **0.017** respectively. This coefficient also proves to be highly statistically significant, its p-value is 0.000 in both models. The coefficient on unemployment rate is negative, as we expected and if unemployment rate increases by 1%, the final consumption will decrease on average by **0.025** or **0.024** percentage points, respectively. This coefficients are also highly statistically significant, probability of making Type I error is 0.000. In the Random effects model adding unemployment reduces marginal propensity to consume coefficient, by 0.003 percentage points, and the coefficient on the disposable income now is **0.031**. While adding unemployment it does increase the coefficient on the marginal propensity to consume in the fixed effects model. The coefficient on the gross domestic savings is also reduced when we add unemployment rate, in the random effects model, and now is **0.014,** and statistically highly significant**.** Its p-value is 0.002. While in the fixed effects model, the coefficient when adding unemployment is increased and now is **0.084,** statistically also highly significant with a p-value of 0.023.Adding unemployment rate to the models in the random effects model also reduces the proxy variable for wealth of the countries,but this variables although statistically significant is of small size. Adding unemployment rate cause tax revenue to fall, and now the coefficient on tax revenues is **0.012** and **0.022** respectively, and is statistically highly insignificant, p-value is 0.239 and 0.947 respectively. Hausman specification test is in favor of fixed effects model, because since the p-value is significant. So, this is in favor of the hypotheses that differences in coefficients is not systematic. P-value is **0.0016**.But Breusch and Pagan LM test, proved that there is enough evidence to reject the null hypothesis that variances across entities (countries) are zero. This test is in favor of RE model. So again, because of the ambiguous results of the two standard panel tests, we use RE and FE models. Robert Barro in (1978)[24], made a useful suggestion that unemployment rate should be specified as multiplier of disposable income. So in the following model we include this interaction term also, and the

[24] Barro, J.R.,(1978), ***The impact of social security on private savings***, The American enterprise institute studies,

new specification of the model is:

$$\log(C_{it}) = \alpha_i + \beta_1 DY_{it} + \beta_2 (DY_{it} - DY_{it-1}) + \beta_3 S_{it} + \beta_4 W_{it} + \beta_5 T_{it} + \beta_6 SC_{it} + \beta_7 UR_{it} DY_{it} + \varepsilon_{it} \quad (7.3)$$

In the previous expression $UR_{it}DY_{it}$ is the interaction term of unemployment rate and disposable income (See Appendix 3)[25].

Table Results for the fixed and random effects model estimation for the third model

Variable	**Symbol**	**Random effects GLS regression Coefficient (P-value)**	**Fixed-effects (within) regression Coefficient (P-value)**
Final consumption	$\log(C_{it})$		
Constant	α_i	23.19 (0.000)	23.28 (0.000)
Disposable income	DY_{it}	0.041 (0.000)	0.042 (0.000)
First difference disposable income	$D.DY_{it}$	-0.018 (0.115)	-0.020 (0.053)
Gross capital formation wealth	S_{it}	2.89E-12 (0.000)	2.66E-12 (0.000)
Social contributions percent per revenue	W_{it}	0.009 (0.058)	0.075 (0.11)
Unemployment*disposable income(interaction term)	SC_{it}	-0.0014 (0.179)	-0.009 (0.316)
R^2		0.49	0.49
Breusch and Pagan Lagrangian multiplier test for random effects (H_0:variances across entities are zero)		0.000	n.a.
Hausman specification tests, Prob> χ^2 Ho: difference in coefficients not systematic		0.2237	
N-(number of observations)		155	155
Number of groups		12	12

Unlike the previous two models in this model Hausman test is in favor of random effects model, p-value, Prob> χ^2 larger than 0.05, i.e. **0.2237>0.05** , so it is safe to use random effects model. Here is sufficient evidence to reject the null hypothesis that difference in

[25] See Appendix 3 Fixed effect model and Random effect s model for model 3

coefficients is not systematic. Also Breusch Pagan LM test result. Is in favor of RE model, since there is sufficient evidence to reject the null hypothesis that variances across entities (countries) are zero. So now we rely in our analysis mostly on the RE model results, although FE model is included just for comparison. Inclusion of the interaction term **unemployment rate*disposable income** slightly decreases in size coefficient of social security wealth, and now the coefficient is **0.009**, and slightly decreases its statistical significance, p-value now being 0.058. The coefficient on the unemployment rate variable is now negative and very insignificant, i.e. not significantly different from zero. The coefficient on the disposable income is highly statistically significant, and of small size **0.041**. Wealth of the countries also increase final consumption, but the coefficient is of very small size 2.89e-12, but the coefficient is statistically different from zero. Next just to test the robustness of the results we employ Dynamic panel data estimators.

Table Results for the Arellano-Bond dynamic panel data estimator (See Appendix 4)[26]

Variable	**Symbol**	Arellano-Bond dynamic panel-data estimation
Final consumption	$\log(C_{it})$	**Coefficient (P-value)**
Constant	α_i	4.59 (0.000)
Final consumption (L.1) ONE LAG	$\log(C_{it})(-1)$	0.805274 (0.000)
Disposable income	DY_{it}	0.008632 (0.000)
First difference disposable income	$D.DY_{it}$	0.009761 (0.001)
Gross capital formation wealth	W_{it}	5.73E-13 (0.000)
Social contributions percent per revenue	SC_{it}	0.003153 (0.039)
Unemployment*disposable income(interaction term)	$UR_{it}DY_{it}$	-0.00999 (0.000)
Sargan test H_0: overidentifying restrictions are valid		0.0155
Group variable		Country
Time variable		Year
Number of observations		155
Number of groups		12

[26] See Appendix 4 Arellano-Bond dynamic panel-data estimation

Instruments for differenced equation GMM-type: L(2/.).lfinalconsum Standard: D.disposiableincomewages D.Ddisposiableincomewages D.grosscapitalformationwealth D.socialcontributionspercentperrev D.unemploymentrate

Instruments for level equation Standard: _constant

According to Sargan statistics, the model no longer cannot be rejected at 1% level of statistical significance. Social security wealth coefficient remains positive and statistically significant, the coefficient is **0.031**, and statistically different from zero, p-value is 0.039.

The consumption is statistically significant and positively associated with its own lag, coefficient is **0.8052**.While the wealth of the countries, also positively and very statistically significantly influences the final consumption, but the coefficient is of very small size **5.73e-13**.

The sign on the marginal propensity of consume is as expected positive, and very statistically significant and different from zero, p-value is 0.000, but of small size **0.0086**.

The difference from previous models is that here in this model, coefficient on the first difference of the disposable income is positive, statistically very significant p-value is 0.001, and the coefficient is of small size **0.0097**.

This means that if on average, first difference disposable income (actually growth of the disposable income from the previous period) had increased by 1% on average final consumption would increase by 0.0097 percentage points.

Instruments for this regression are the first difference of the independent variables in the model. The interaction term is negative of very small size but statistically significant, its size is **-0.0099.**But this coefficient is statistically significant.

Next, we introduce Arellano-Bover/Blundell-Bond[27] estimator, this estimator formed additional moment conditions in which lagged differences of the dependent variable are orthogonal to the levels of disturbances.

[27] Arellano, M., and O. Bover. 1995.***Another look at instrumental variables estimation of error-component models.*** Journal of Econometrics 68: 29–51.; Blundell, R., and S. Bond. 1998**. *Initial conditions and moment restrictions in dynamic panel-data models***.Journal of Econometrics 87: 115–143.

To get this additional moment conditions, they assumed that panel level effect is unrelated to the first observable first difference of the dependent variable.

Next in the following Table it is presented system dynamic panel data estimation.

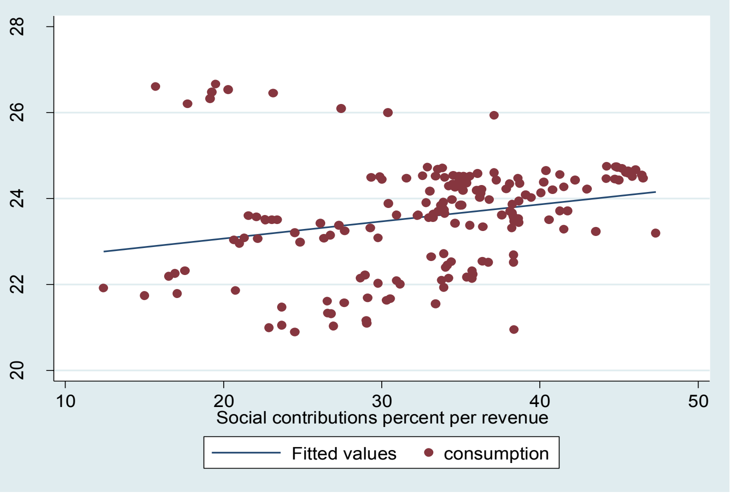
Table Results for the Arellano-Bover/Blundell-Bond dynamic panel data estimator (See Appendix 5)[28]

Variable	Symbol	System dynamic panel-data estimation **Coefficient (P-value)**
Final consumption	$\log(C_{it})$	
Constant	α_i	1.25 (0.000)
Final consumption (L.1) ONE LAG	$\log(C_{it})(-1)$	0.945 (0.000)
Disposable income	DY_{it}	0.011 (0.000)
First difference disposable income	$D.DY_{it}$	0.019 (0.000)
Gross capital formation wealth	W_{it}	4.93E-13 (0.000)
Social contributions percent per revenue	SC_{it}	0.002 (0.098)
Unemployment_disposable income(interaction term)	$\log(C_{it})$	-0.0011 (0.000)
Sargan test H_0: overidentifying restrictions are valid		0.0000
Group variable		Country
Time variable		Year
Number of observations		155
Number of groups		12

[28] See Appendix 5 Arellano-Bover/Blundell-Bond dynamic panel data estimator

Again social security wealth has positive and statistically significant coefficient **0.002**, and its p-value is 0.098. Marginal propensity to consume is **0.019**, and very statistically significant, its p-value is 0.000. The interaction term in the equations is negative and statistically significant, but of very small size **-0.0011**, and p-value is 0.000. Wealth of the countries also has positive influence on the final consumption but, the coefficient is of very small size **4.93e-13**. First difference of the disposable income also has positive effect on final consumption, the coefficient size is **0.011,** and p-value is 0.000. On the next scatter it is also graphically depicted the relationship between social security wealth (social contributions per revenue), and final consumption.

Scatter social security wealth and final consumption



From the scatter we can see that the association between social contributions per revenue and final consumption there exists positive linear trend. Most of the observations are around the trend but there exist also outliers. Next, we try to capture marginal effect of social contributions per revenue on final consumption, and marginal effect of social contributions per revenue on marginal propensity to consume. For this we create dummy variables that control for countries (See Appendix 6)[29].

Table marginal effect of social contributions per revenue on final consumption, and marginal effect of social contributions per revenue on marginal propensity to consume

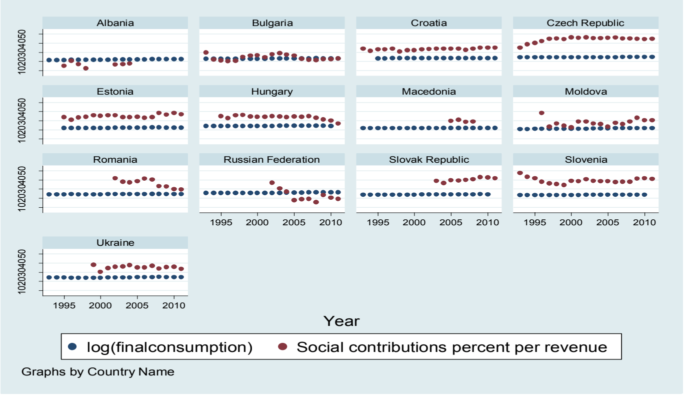
Number	**Country**	Marginal effect of social contributions per revenue on final consumption **Coefficient (p-value)**	Marginal effect of social contributions per revenue on propensity to consume (disposable income) **Coefficient (p-value)**
1.	**Albania**	0.026 (0.055)	-0.29 (0.055)
2.	**Bulgaria**	0.040 (0.003)	-0.46 (0.000)
3.	**Croatia**	0.039 (0.001)	-0.38 (0.000)
4.	**Czech Republic**	0.023 (0.089)	-0.41 (0.000)
5.	**Estonia**	0.044 (0.000)	-0.38 (0.000)
6.	**Hungary**	0.038 (0.001)	-0.39 (0.000)
7.	**Macedonia**	0.037 (0.002)	-0.29 (0.000)
8.	**Moldova**	0.020 (0.051)	-0.24 (0.000)
9.	**Romania**	0.037 (0.002)	-0.38 (0.000)

[29] Appendix 6 marginal effect of social contributions per revenue on final consumption, and marginal effect of social contributions per revenue on marginal propensity to consume

10.	**Russian Federation**	0.078 (0.000)	-0.48 (0.00)
11.	**Slovak Republic**	0.038 (0.002)	-0.39 (0.000)
12.	**Slovenia**	0.044 (0.000)	-0.37 (0.000)
13.	**Ukraine**	0.0378 (0.002)	-0.38 (0.000)

From the table above highest marginal effect social security wealth on final consumption has in Russian Federation, there marginal effect is **0.044**, also in Estonia coefficient is **0.044**, followed by Bulgaria **0.040**, and other countries coefficient in Macedonia is **0.037.**On the other hand highest marginal effect of social security wealth on disposable income we have in Russian Federation also where coefficient is **-0.048,** also highly statistically significant p-value is 0.000. This followed by Bulgaria where marginal coefficient is **-0.46**, and highly statistically significant, with a p-value 0.000. On the next table of graphs we present scatter of log of final consumption and social contributions per revenue (social security wealth) by countries in the panel.

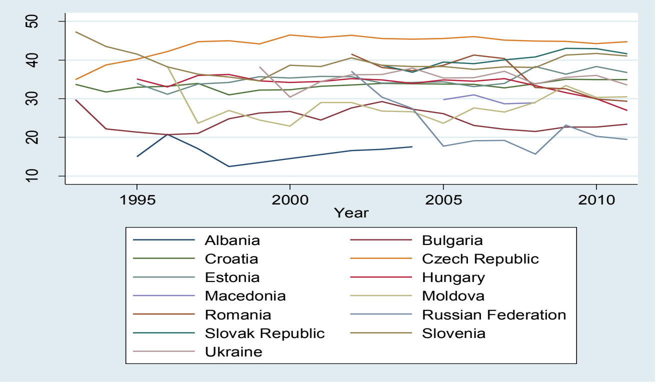
Table of graphs log of final consumption and social contributions per revenue (social security wealth)



From the above graph we can see movement of final consumption and social contributions per revenue as time series graphs, for each country from 1993 to 2011.

From the graph can be seen also that highest social contributions per revenue has Czech Republic, which can be also spotted from the following panel line plot of the time series movement of social contributions per revenue.

Graph social contributions per revenue panel line overlaid



From the above graph we can see and confirm that for the time period 1993-2011 Czech Republic has highest social security wealth, or highest percentage of social contributions pre revenue, followed by Slovenia. While Albania with the available data has lowest social security wealth. Macedonia in this group is somewhere in middle with a slights decrease below 30 percent of paid social contribution percent per revenue.

8.Conclusion

From the above models we conclude that once again for this sample of countries social security wealth system(system of social contributions), positively affects final consumption, *i.e.* decreases private savings. The inclusion of unemployment rate decreases final consumption, *i.e.* increases private savings in the model. From the dummy variables models, highest marginal effect social security wealth on final consumption has in Russian Federation, same applies for the disposable income where highest negative effect of social contributions per revenue on the disposable income variable. Social contributions per revenue variable in Macedonia has coefficient of 0.037, which is statistically significant marginal effect on the final consumption. The effects of social contributions per revenue on disposable income in Macedonia is as expected -0.029 negative and significant.

Appendix 1 Fixed effects model and random effects model 1

```
Random-effects GLS regression                   Number of obs      =       165
Group variable: country                         Number of groups   =        13

R-sq:  within  = 0.5374                         Obs per group: min =         4
       between = 0.6459                                        avg =      12.7
       overall = 0.4449                                        max =        18

                                                Wald chi2(5)       =         .
corr(u_i, X)   = 0 (assumed)                    Prob > chi2        =         .

------------------------------------------------------------------------------
lfinalconsum |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
disposiabl~s |   .0337951   .0044407     7.61   0.000     .0250915    .0424986
Ddisposiab~s |   -.020143   .0087964    -2.29   0.022    -.0373836   -.0029024
grossdomes~p |    .016311   .0037323     4.37   0.000     .0089958    .0236262
grosscapit~h |   2.96e-12   3.81e-13     7.79   0.000     2.22e-12    3.71e-12
taxrevenue~p |   .0254866   .0079397     3.21   0.001     .0099251    .0410481
socialcont~v |    .020699   .0052539     3.94   0.000     .0104015    .0309964
       _cons |   21.97625   .3566798    61.61   0.000     21.27717    22.67533
-------------+----------------------------------------------------------------
     sigma_u |  .73342173
     sigma_e |  .13905463
         rho |   .9653003   (fraction of variance due to u_i)
```

```
Breusch and Pagan Lagrangian multiplier test for random effects

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

        Estimated results:
                         |       Var     sd = sqrt(Var)
                ---------+-----------------------------
                lfinalc~m |   1.567838       1.252133
                        e |   .0193362       .1390546
```

```
                       u |   .5379074       .7334217

        Test:   Var(u) = 0

                              chi2(1) =   412.71

                          Prob > chi2 =     0.0000



Fixed-effects (within) regression               Number of obs      =       165

Group variable: country                         Number of groups   =        13

R-sq:  within  = 0.5401                         Obs per group: min =         4

       between = 0.5731                                        avg =      12.7

       overall = 0.3494                                        max =        18

                                                F(6,146)           =     28.57

corr(u_i, Xb)  = 0.4546                         Prob > F           =    0.0000

------------------------------------------------------------------------------
lfinalconsum |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
disposiabl~s |   .0341495   .0042013     8.13   0.000     .0258463    .0424527
Ddisposiab~s |   -.020295   .0083126    -2.44   0.016    -.0367236   -.0038663
grossdomes~p |   .0140095   .0035646     3.93   0.000     .0069645    .0210544
grosscapit~h |   2.78e-12   3.62e-13     7.68   0.000     2.06e-12    3.49e-12
taxrevenue~p |   .0225557   .0076138     2.96   0.004     .0075082    .0376032
socialcont~v |   .0177606   .0050676     3.50   0.001     .0077452     .027776
       _cons |   22.17692   .2827248    78.44   0.000     21.61816    22.73569
-------------+----------------------------------------------------------------
     sigma_u |  1.2076963
     sigma_e |  .13905463
         rho |  .98691615   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(12, 146) =   263.12             Prob > F = 0.0000
```

```
. hausman randome_effects1 fixed1

Note: the rank of the differenced variance matrix (5) does not equal the number of
        coefficients being tested (6); be sure this is what you expect, or there may be
        problems computing the test.  Examine the output of your estimators for anything
        unexpected and possibly consider scaling your variables so that the coefficients
        are on a similar scale.

                 ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             |  randome_ef~1    fixed1       Difference          S.E.
-------------+----------------------------------------------------------------
disposiabl~s |    .0337951     .0341495       -.0003545        .0014383
Ddisposiab~s |    -.020143     -.020295         .000152        .0028769
grossdomes~p |     .016311     .0140095        .0023016        .0011061
grosscapit~h |    2.96e-12     2.78e-12        1.87e-13        1.19e-13
taxrevenue~p |    .0254866     .0225557         .002931        .0022514
socialcont~v |     .020699     .0177606        .0029384        .0013866
------------------------------------------------------------------------------
                           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(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =       14.65
                Prob>chi2 =      0.0120
```

Appendix 2 Fixed and Random effects for the model 2

```
Random-effects GLS regression                   Number of obs      =       154
Group variable: country                         Number of groups   =        12

R-sq:  within  = 0.5840                         Obs per group: min =         4
       between = 0.3814                                        avg =      12.8
       overall = 0.2855                                        max =        18

                                                Wald chi2(6)       =         .
corr(u_i, X)   = 0 (assumed)                    Prob > chi2        =         .

------------------------------------------------------------------------------
lfinalconsum |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
disposiabl~s |      .0317   .0062514     5.07   0.000     .0194475    .0439524
Ddisposiab~s |  -.0119916   .0108775    -1.10   0.270    -.0333111    .0093278
grossdomes~p |   .0136907   .0043176     3.17   0.002     .0052285     .022153
grosscapit~h |   2.95e-12   4.08e-13     7.23   0.000     2.15e-12    3.74e-12
taxrevenue~p |   .0119572   .0101631     1.18   0.239    -.0079622    .0318766
socialcont~v |    .019869   .0064073     3.10   0.002      .007311     .032427
unemployme~e |  -.0252201   .0057162    -4.41   0.000    -.0364237   -.0140165
       _cons |   22.66762   .4195677    54.03   0.000     21.84528    23.48995
-------------+----------------------------------------------------------------
     sigma_u |  .43940117
     sigma_e |  .12662021
         rho |  .92332753   (fraction of variance due to u_i)

Breusch and Pagan Lagrangian multiplier test for random effects

        lfinalconsum[country,t] = Xb + u[country] + e[country,t]
```

```
Estimated results:
                |       Var     sd = sqrt(Var)
        ---------+-----------------------------
       lfinalc~m |   1.410381       1.187595
               e |   .0160327       .1266202
               u |   .1930734       .4394012

Test:   Var(u) = 0
                     chi2(1) =   369.29
                 Prob > chi2 =     0.0000
```

```
Fixed-effects (within) regression               Number of obs      =       165
Group variable: country                         Number of groups   =        13

R-sq:  within  = 0.5401                         Obs per group: min =         4
       between = 0.5731                                        avg =      12.7
       overall = 0.3494                                        max =        18

                                                F(6,146)           =     28.57
corr(u_i, Xb)  = 0.4546                         Prob > F           =    0.0000

------------------------------------------------------------------------------
lfinalconsum |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
disposiabl~s |   .0341495   .0042013     8.13   0.000     .0258463    .0424527
Ddisposiab~s |   -.020295   .0083126    -2.44   0.016    -.0367236   -.0038663
grossdomes~p |   .0140095   .0035646     3.93   0.000     .0069645    .0210544
grosscapit~h |   2.78e-12   3.62e-13     7.68   0.000     2.06e-12    3.49e-12
taxrevenue~p |   .0225557   .0076138     2.96   0.004     .0075082    .0376032
socialcont~v |   .0177606   .0050676     3.50   0.001     .0077452     .027776
       _cons |   22.17692   .2827248    78.44   0.000     21.61816    22.73569
-------------+----------------------------------------------------------------
     sigma_u |  1.2076963
     sigma_e |  .13905463
```

```
         rho |  .98691615   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(12, 146) =   263.12            Prob > F = 0.0000

. hausman randome_effects2 fixed_effects2

Note: the rank of the differenced variance matrix (6) does not equal the number of
        coefficients being tested (7); be sure this is what you expect, or there may be
        problems computing the test.  Examine the output of your estimators for anything
        unexpected and possibly consider scaling your variables so that the coefficients
        are on a similar scale.

                 ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             |  randome_ef~2 fixed_effe~2    Difference          S.E.
-------------+----------------------------------------------------------------
disposiabl~s |       .0317     .0377029       -.0060029        .0033445
Ddisposiab~s |   -.0119916    -.0163849        .0043933        .0059878
grossdomes~p |    .0136907     .0084454        .0052453        .0022773
grosscapit~h |    2.95e-12     2.50e-12        4.43e-13        2.21e-13
taxrevenue~p |    .0119572     .0005864        .0113708        .0050364
socialcont~v |     .019869      .011506         .008363        .0031521
unemployme~e |   -.0252201    -.0245051        -.000715        .0029284
------------------------------------------------------------------------------
                           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(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =       21.29
                Prob>chi2 =      0.0016
```

Appendix 3 Fixed effect model and Random effect s model for model 3

```
Random-effects GLS regression                   Number of obs      =       155
```

```
Group variable: country                         Number of groups   =        12

R-sq:  within  = 0.4918                         Obs per group: min =         4

       between = 0.0316                                        avg =      12.9

       overall = 0.0082                                        max =        18

                                                Wald chi2(4)       =         .

corr(u_i, X)   = 0 (assumed)                    Prob > chi2        =         .

------------------------------------------------------------------------------

lfinalconsum |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]

-------------+----------------------------------------------------------------

disposiabl~s |   .0409729   .0080568     5.09   0.000     .0251818     .056764

Ddisposiab~s |  -.0181047   .0114996    -1.57   0.115    -.0406435     .004434

grosscapit~h |   2.89e-12   4.04e-13     7.16   0.000     2.10e-12    3.69e-12

socialcont~v |   .0098768   .0052021     1.90   0.058    -.0003192    .0200727

unemdispin~e |  -.0013918   .0010362    -1.34   0.179    -.0034226     .000639

       _cons |   23.19843   .2805835    82.68   0.000      22.6485    23.74836

-------------+----------------------------------------------------------------

     sigma_u |  .68136817

     sigma_e |  .14135969

         rho |  .95873462   (fraction of variance due to u_i)

-------------------------------------------------------------------



Breusch and Pagan Lagrangian multiplier test for random effects

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

        Estimated results:
                         |       Var     sd = sqrt(Var)
                ---------+-----------------------------
                lfinalc~m |   1.417117       1.190427
                       e |   .0199826       .1413597
                       u |   .4642626       .6813682
```

```
        Test:   Var(u) = 0
                              chi2(1) =   484.59
                          Prob > chi2 =     0.0000

Fixed-effects (within) regression               Number of obs      =       155
Group variable: country                         Number of groups   =        12

R-sq:  within  = 0.4957                         Obs per group: min =         4
       between = 0.0007                                        avg =      12.9
       overall = 0.0006                                        max =        18

                                                F(5,138)           =     27.13
corr(u_i, Xb)  = -0.2322                        Prob > F           =    0.0000

------------------------------------------------------------------------------
lfinalconsum |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
disposiabl~s |   .0419233     .00743     5.64   0.000     .0272319    .0566146
Ddisposiab~s |  -.0206063   .0105435    -1.95   0.053     -.041454    .0002414
grosscapit~h |   2.66e-12   3.71e-13     7.16   0.000     1.93e-12    3.40e-12
socialcont~v |   .0075359    .004803     1.57   0.119     -.001961    .0170329
unemdispin~e |  -.0009647   .0009582    -1.01   0.316    -.0028594    .0009299
       _cons |    23.2846   .1678251   138.74   0.000     22.95276    23.61644
-------------+----------------------------------------------------------------
     sigma_u |  1.3323154
     sigma_e |  .14135969
         rho |  .98886794   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(11, 138) =   305.72             Prob > F = 0.0000

. hausman randome_effects3 fixed_effects3

Note: the rank of the differenced variance matrix (4) does not equal the number of
        coefficients being tested (5); be sure this is what you expect, or there may be
```

```
        problems computing the test.  Examine the output of your estimators for anything
        unexpected and possibly consider scaling your variables so that the coefficients
        are on a similar scale.

                 ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             |  randome_ef~3 fixed_effe~3    Difference          S.E.
-------------+----------------------------------------------------------------
disposiabl~s |    .0409729     .0419233       -.0009504        .0031157
Ddisposiab~s |   -.0181047    -.0206063        .0025016        .0045907
grosscapit~h |    2.89e-12     2.66e-12        2.33e-13        1.59e-13
socialcont~v |    .0098768     .0075359        .0023408        .0019984
unemdispin~e |   -.0013918    -.0009647       -.0004271        .0003943
------------------------------------------------------------------------------
                           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(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =        5.69
                Prob>chi2 =      0.2237
                (V_b-V_B is not positive definite)
```

Appendix 4 Arellano-Bond dynamic panel-data estimation

```
Arellano-Bond dynamic panel-data estimation  Number of obs         =       143
Group variable: country                      Number of groups      =        12
Time variable: year
                                             Obs per group:    min =         3
                                                               avg =  11.91667
                                                               max =        17

Number of instruments =    136               Wald chi2(5)          =   2007.77
                                             Prob > chi2           =    0.0000
```

```
One-step results
------------------------------------------------------------------------------
lfinalconsum |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
lfinalconsum |
         L1. |   .8052735    .025493    31.59   0.000     .7553082    .8552388
disposiabl~s |   .0086321   .0016269     5.31   0.000     .0054435    .0118207
Ddisposiab~s |   .0097612   .0028922     3.37   0.001     .0040925    .0154298
grosscapit~h |   5.73e-13   1.31e-13     4.39   0.000     3.17e-13    8.29e-13
socialcont~v |   .0031534   .0015285     2.06   0.039     .0001576    .0061491
unemployme~e |  -.0099907   .0017159    -5.82   0.000    -.0133537   -.0066276
       _cons |   4.589445   .6015621     7.63   0.000     3.410405    5.768485
------------------------------------------------------------------------------
Instruments for differenced equation
        GMM-type: L(2/.).lfinalconsum
        Standard: D.disposiableincomewages D.Ddisposiableincomewages
                  D.grosscapitalformationwealth D.socialcontributionspercentperrev
                  D.unemploymentrate
Instruments for level equation
        Standard: _cons

. estat sargan
Sargan test of overidentifying restrictions
        H0: overidentifying restrictions are valid

        chi2(129)    =  166.0234
        Prob > chi2  =    0.0155

.
```

Appendix 5 Arellano-Bover/Blundell-Bond dynamic panel data estimator

```
System dynamic panel-data estimation         Number of obs         =       155
Group variable: country                      Number of groups      =        12
Time variable: year
                                             Obs per group:    min =         4
                                                               avg =  12.91667
```

```
                                                       max =         18
Number of instruments =    153               Wald chi2(5)          =   7932.18
                                             Prob > chi2           =    0.0000
One-step results
------------------------------------------------------------------------------
lfinalconsum |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
lfinalconsum |
         L1. |   .9446508    .011557    81.74   0.000     .9219995    .9673021
             |
disposiabl~s |   .0113461   .0023463     4.84   0.000     .0067474    .0159448
Ddisposiab~s |    .019207   .0035356     5.43   0.000     .0122775    .0261366
grosscapit~h |   4.93e-13   1.17e-13     4.20   0.000     2.63e-13    7.23e-13
unemdispin~e |  -.0011028   .0003082    -3.58   0.000    -.0017068   -.0004989
socialcont~v |   .0022274   .0013455     1.66   0.098    -.0004096    .0048645
       _cons |   1.247828   .2704268     4.61   0.000     .7178013    1.777855
------------------------------------------------------------------------------
Instruments for differenced equation
        GMM-type: L(2/.).lfinalconsum
        Standard: D.disposiableincomewages D.Ddisposiableincomewages
                  D.grosscapitalformationwealth D.unemdispincome
                  D.socialcontributionspercentperrev
Instruments for level equation
        GMM-type: LD.lfinalconsum
        Standard: _cons


. estat sargan
Sargan test of overidentifying restrictions
        H0: overidentifying restrictions are valid

        chi2(146)    =  242.4892
        Prob > chi2  =    0.0000
```

Appendix 6 marginal effect of social contributions per revenue on final consumption, and marginal effect of social contributions per revenue on marginal propensity to consume

.

```
. reg  lfinalconsum socialcontributionspercentperrev ctry_dum_1

      Source |       SS       df       MS              Number of obs =     174
-------------+------------------------------           F(  2,   171) =    8.38
       Model |  23.5747501     2  11.7873751           Prob > F      =  0.0003
    Residual |  240.640122   171  1.40725218           R-squared     =  0.0892
-------------+------------------------------           Adj R-squared =  0.0786
       Total |  264.214872   173   1.5272536           Root MSE      =  1.1863

------------------------------------------------------------------------------
lfinalconsum |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
socialcont~v |   .0257512   .0133219     1.93   0.055    -.0005454    .0520478
  ctry_dum_1 |  -1.206513   .5122273    -2.36   0.020    -2.217616   -.1954103
       _cons |   22.78777   .4606235    49.47   0.000     21.87853    23.69701
------------------------------------------------------------------------------

. reg  lfinalconsum socialcontributionspercentperrev ctry_dum_1

      Source |       SS       df       MS              Number of obs =     174
-------------+------------------------------           F(  2,   171) =    8.38
       Model |  23.5747501     2  11.7873751           Prob > F      =  0.0003
    Residual |  240.640122   171  1.40725218           R-squared     =  0.0892
-------------+------------------------------           Adj R-squared =  0.0786
       Total |  264.214872   173   1.5272536           Root MSE      =  1.1863

------------------------------------------------------------------------------
```

```
lfinalconsum |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
socialcont~v |   .0257512   .0133219     1.93   0.055    -.0005454    .0520478
  ctry_dum_1 |  -1.206513   .5122273    -2.36   0.020    -2.217616   -.1954103
       _cons |   22.78777   .4606235    49.47   0.000     21.87853    23.69701
------------------------------------------------------------------------------

. reg  lfinalconsum socialcontributionspercentperrev ctry_dum_2

      Source |       SS       df       MS              Number of obs =     174
-------------+------------------------------           F(  2,   171) =    5.43
       Model |  15.7876023     2  7.89380113           Prob > F      =  0.0052
    Residual |   248.42727   171  1.45279105           R-squared     =  0.0598
-------------+------------------------------           Adj R-squared =  0.0488
       Total |  264.214872   173   1.5272536           Root MSE      =  1.2053

------------------------------------------------------------------------------
lfinalconsum |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
socialcont~v |   .0404831   .0132503     3.06   0.003     .0143279    .0666382
  ctry_dum_2 |   .0379681   .3209856     0.12   0.906    -.5956363    .6715725
       _cons |   22.24616   .4642776    47.92   0.000      21.3297    23.16261
------------------------------------------------------------------------------

. reg  lfinalconsum socialcontributionspercentperrev ctry_dum_3

      Source |       SS       df       MS              Number of obs =     174
-------------+------------------------------           F(  2,   171) =    5.53
       Model |  16.0568328     2   8.0284164           Prob > F      =  0.0047
    Residual |  248.158039   171   1.4512166           R-squared     =  0.0608
-------------+------------------------------           Adj R-squared =  0.0498
       Total |  264.214872   173   1.5272536           Root MSE      =  1.2047

------------------------------------------------------------------------------
lfinalconsum |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
```

```
-------------+----------------------------------------------------------------
socialcont~v |    .039768   .0120887     3.29   0.001     .0159058    .0636303
  ctry_dum_3 |   .1374071   .3076154     0.45   0.656    -.4698053    .7446196
       _cons |   22.26061   .4121555    54.01   0.000     21.44704    23.07418
------------------------------------------------------------------------------

. reg  lfinalconsum socialcontributionspercentperrev ctry_dum_4

      Source |       SS       df       MS              Number of obs =     174
-------------+------------------------------           F(  2,   171) =    8.44
       Model |  23.7444995     2  11.8722498           Prob > F      =  0.0003
    Residual |  240.470373   171  1.40625949           R-squared     =  0.0899
-------------+------------------------------           Adj R-squared =  0.0792
       Total |  264.214872   173   1.5272536           Root MSE      =  1.1859

------------------------------------------------------------------------------
lfinalconsum |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
socialcont~v |   .0234851   .0137387     1.71   0.089     -.003634    .0506043
  ctry_dum_4 |   .7926804   .3328166     2.38   0.018     .1357225    1.449638
       _cons |   22.72788   .4480352    50.73   0.000     21.84348    23.61227
------------------------------------------------------------------------------

. reg  lfinalconsum socialcontributionspercentperrev ctry_dum_5

      Source |       SS       df       MS              Number of obs =     174
-------------+------------------------------           F(  2,   171) =   19.20
       Model |  48.4594391     2  24.2297195           Prob > F      =  0.0000
    Residual |  215.755433   171  1.26172768           R-squared     =  0.1834
-------------+------------------------------           Adj R-squared =  0.1739
       Total |  264.214872   173   1.5272536           Root MSE      =  1.1233

------------------------------------------------------------------------------
lfinalconsum |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
```

```
socialcont~v |   .0444257   .0113067     3.93   0.000     .0221071    .0667444
  ctry_dum_5 |  -1.464547   .2877163    -5.09   0.000     -2.03248   -.8966145
       _cons |   22.26254   .3836309    58.03   0.000     21.50528    23.01981
------------------------------------------------------------------------------

. reg  lfinalconsum socialcontributionspercentperrev ctry_dum_6

      Source |       SS       df       MS              Number of obs =     174
-------------+------------------------------           F(  2,   171) =    9.13
       Model |   25.485555     2  12.7427775           Prob > F      =  0.0002
    Residual |  238.729317   171  1.39607788           R-squared     =  0.0965
-------------+------------------------------           Adj R-squared =  0.0859
       Total |  264.214872   173   1.5272536           Root MSE      =  1.1816

------------------------------------------------------------------------------
lfinalconsum |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
socialcont~v |   .0384903   .0118667     3.24   0.001     .0150661    .0619145
  ctry_dum_6 |   .8186275   .3102748     2.64   0.009     .2061656    1.431089
       _cons |   22.24116   .4036991    55.09   0.000     21.44429    23.03804
------------------------------------------------------------------------------

. reg  lfinalconsum socialcontributionspercentperrev ctry_dum_7

      Source |       SS       df       MS              Number of obs =     174
-------------+------------------------------           F(  2,   171) =    8.18
       Model |  23.0747338     2  11.5373669           Prob > F      =  0.0004
    Residual |  241.140138   171  1.41017625           R-squared     =  0.0873
-------------+------------------------------           Adj R-squared =  0.0767
       Total |  264.214872   173   1.5272536           Root MSE      =  1.1875

------------------------------------------------------------------------------
lfinalconsum |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
socialcont~v |   .0378518   .0119474     3.17   0.002     .0142684    .0614353
```

```
  ctry_dum_7 |  -1.371103    .602315    -2.28   0.024    -2.560033   -.1821732
       _cons |   22.36915    .407827    54.85   0.000     21.56413    23.17417
------------------------------------------------------------------------------

. reg  lfinalconsum socialcontributionspercentperrev ctry_dum_8

      Source |       SS       df       MS              Number of obs =     174
-------------+------------------------------           F(  2,   171) =   48.59
       Model |  95.7420198     2  47.8710099           Prob > F      =  0.0000
    Residual |  168.472852   171  .985221358           R-squared     =  0.3624
-------------+------------------------------           Adj R-squared =  0.3549
       Total |  264.214872   173   1.5272536           Root MSE      =  .99258

------------------------------------------------------------------------------
lfinalconsum |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
socialcont~v |   .0200359   .0101993     1.96   0.051    -.0000968    .0401685
  ctry_dum_8 |  -2.402664   .2666757    -9.01   0.000    -2.929064   -1.876263
       _cons |   23.14984   .3527327    65.63   0.000     22.45357    23.84611
------------------------------------------------------------------------------

. reg  lfinalconsum socialcontributionspercentperrev ctry_dum_9

      Source |       SS       df       MS              Number of obs =     174
-------------+------------------------------           F(  2,   171) =    7.91
       Model |  22.3619624     2  11.1809812           Prob > F      =  0.0005
    Residual |   241.85291   171   1.4143445           R-squared     =  0.0846
-------------+------------------------------           Adj R-squared =  0.0739
       Total |  264.214872   173   1.5272536           Root MSE      =  1.1893

------------------------------------------------------------------------------
lfinalconsum |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
socialcont~v |   .0373051   .0119907     3.11   0.002     .0136362    .0609739
  ctry_dum_9 |   .8405157    .389248     2.16   0.032     .0721659    1.608866
```

```
       _cons |   22.30747   .4065066    54.88   0.000     21.50505    23.10989
------------------------------------------------------------------------------

. reg  lfinalconsum socialcontributionspercentperrev ctry_dum_10

      Source |       SS       df       MS              Number of obs =     174
-------------+------------------------------           F(  2,   171) =   87.69
       Model |  133.774197     2  66.8870983           Prob > F      =  0.0000
    Residual |  130.440675   171  .762810968           R-squared     =  0.5063
-------------+------------------------------           Adj R-squared =  0.5005
       Total |  264.214872   173   1.5272536           Root MSE      =  .87339

------------------------------------------------------------------------------
lfinalconsum |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
socialcont~v |   .0784787   .0092978     8.44   0.000     .0601255    .0968319
 ctry_dum_10 |   3.754106   .3018292    12.44   0.000     3.158315    4.349897
       _cons |   20.77355   .3216845    64.58   0.000     20.13856    21.40853
------------------------------------------------------------------------------

. reg  lfinalconsum socialcontributionspercentperrev ctry_dum_11

      Source |       SS       df       MS              Number of obs =     174
-------------+------------------------------           F(  2,   171) =    5.59
       Model |  16.2205613     2  8.11028063           Prob > F      =  0.0044
    Residual |  247.994311   171  1.45025913           R-squared     =  0.0614
-------------+------------------------------           Adj R-squared =  0.0504
       Total |  264.214872   173   1.5272536           Root MSE      =  1.2043

------------------------------------------------------------------------------
lfinalconsum |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
socialcont~v |   .0384552   .0123358     3.12   0.002     .0141052    .0628052
 ctry_dum_11 |   .2487909   .4450114     0.56   0.577    -.6296323    1.127214
       _cons |   22.30617    .415924    53.63   0.000     21.48516    23.12717
```

```
------------------------------------------------------------------------------

. reg  lfinalconsum socialcontributionspercentperrev ctry_dum_12

      Source |       SS       df       MS              Number of obs =     174
-------------+------------------------------           F(  2,   171) =    6.44
       Model |  18.5109816     2  9.25549081           Prob > F      =  0.0020
    Residual |   245.70389   171  1.43686486           R-squared     =  0.0701
-------------+------------------------------           Adj R-squared =  0.0592
       Total |  264.214872   173   1.5272536           Root MSE      =  1.1987

------------------------------------------------------------------------------
lfinalconsum |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
socialcont~v |   .0445823   .0125071     3.56   0.000     .0198942    .0692705
 ctry_dum_12 |  -.4287677   .3102853    -1.38   0.169     -1.04125     .183715
       _cons |   22.15861   .4174662    53.08   0.000     21.33456    22.98266
------------------------------------------------------------------------------

. reg  lfinalconsum socialcontributionspercentperrev ctry_dum_13

      Source |       SS       df       MS              Number of obs =     174
-------------+------------------------------           F(  2,   171) =    7.50
       Model |   21.298786     2   10.649393           Prob > F      =  0.0008
    Residual |  242.916086   171  1.42056191           R-squared     =  0.0806
-------------+------------------------------           Adj R-squared =  0.0699
       Total |  264.214872   173   1.5272536           Root MSE      =  1.1919

------------------------------------------------------------------------------
lfinalconsum |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
socialcont~v |   .0378555   .0120015     3.15   0.002     .0141654    .0615457
 ctry_dum_13 |   .6805284   .3448692     1.97   0.050    -.0002207    1.361277
       _cons |   22.28666   .4071299    54.74   0.000     21.48302    23.09031
------------------------------------------------------------------------------
```

```
.
reg  disposiableincomewages socialcontributionspercentperrev ctry_dum_1

      Source |       SS       df       MS              Number of obs =     176
-------------+------------------------------           F(  2,   173) =   24.71
       Model |  1816.40436     2  908.202179           Prob > F      =  0.0000
    Residual |  6359.75838   173  36.7616091           R-squared     =  0.2222
-------------+------------------------------           Adj R-squared =  0.2132
       Total |  8176.16274   175  46.7209299           Root MSE      =  6.0631

------------------------------------------------------------------------------
disposiabl~s |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
socialcont~v |  -.2919493    .068766    -4.25   0.000    -.4276777   -.1562209
  ctry_dum_1 |   8.001666   2.629109     3.04   0.003     2.812406    13.19093
       _cons |   13.39357   2.389811     5.60   0.000     8.676625    18.11051
------------------------------------------------------------------------------

. reg  disposiableincomewages socialcontributionspercentperrev ctry_dum_2

      Source |       SS       df       MS              Number of obs =     176
-------------+------------------------------           F(  2,   173) =   24.08
       Model |  1780.36218     2  890.181088           Prob > F      =  0.0000
    Residual |  6395.80056   173  36.9699455           R-squared     =  0.2178
-------------+------------------------------           Adj R-squared =  0.2087
       Total |  8176.16274   175  46.7209299           Root MSE      =  6.0803

------------------------------------------------------------------------------
disposiabl~s |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
socialcont~v |  -.4603432   .0663756    -6.94   0.000    -.5913535   -.3293329
  ctry_dum_2 |    -4.9507   1.725106    -2.87   0.005    -8.355664   -1.545736
       _cons |   19.78451    2.32638     8.50   0.000     15.19277    24.37625
------------------------------------------------------------------------------
```

```
. reg  disposiableincomewages socialcontributionspercentperrev ctry_dum_3

      Source |       SS       df       MS              Number of obs =     176
-------------+------------------------------           F(  2,   173) =   20.11
       Model |  1542.24653     2  771.123265           Prob > F      =  0.0000
    Residual |  6633.91621   173  38.3463365           R-squared     =  0.1886
-------------+------------------------------           Adj R-squared =  0.1792
       Total |  8176.16274   175  46.7209299           Root MSE      =  6.1924

------------------------------------------------------------------------------
disposiabl~s |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
socialcont~v |  -.3874433   .0624729    -6.20   0.000    -.5107505   -.2641361
  ctry_dum_3 |  -1.978697   1.504154    -1.32   0.190    -4.947552    .9901587
       _cons |   17.11395   2.143448     7.98   0.000     12.88327    21.34462
------------------------------------------------------------------------------

. reg  disposiableincomewages socialcontributionspercentperrev ctry_dum_4

      Source |       SS       df       MS              Number of obs =     176
-------------+------------------------------           F(  2,   173) =   19.32
       Model |  1492.73881     2  746.369403           Prob > F      =  0.0000
    Residual |  6683.42393   173  38.6325083           R-squared     =  0.1826
-------------+------------------------------           Adj R-squared =  0.1731
       Total |  8176.16274   175  46.7209299           Root MSE      =  6.2155

------------------------------------------------------------------------------
disposiabl~s |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
socialcont~v |  -.4110346   .0720674    -5.70   0.000    -.5532792     -.26879
  ctry_dum_4 |   1.145976    1.73516     0.66   0.510    -2.278833    4.570786
       _cons |   17.56433   2.366561     7.42   0.000     12.89328    22.23538
------------------------------------------------------------------------------
```

```
. reg  disposiableincomewages socialcontributionspercentperrev ctry_dum_5

      Source |       SS       df       MS              Number of obs =     176
-------------+------------------------------           F(  2,   173) =   20.84
       Model |   1587.1639     2   793.58195           Prob > F      =  0.0000
    Residual |  6588.99884   173  38.0866985           R-squared     =  0.1941
-------------+------------------------------           Adj R-squared =  0.1848
       Total |  8176.16274   175  46.7209299           Root MSE      =  6.1714

------------------------------------------------------------------------------
disposiabl~s |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
socialcont~v |  -.3799796   .0624193    -6.09   0.000    -.5031811   -.2567782
  ctry_dum_5 |  -2.698594   1.578786    -1.71   0.089    -5.814756    .4175689
       _cons |   16.91179   2.130295     7.94   0.000     12.70707     21.1165
------------------------------------------------------------------------------

. reg  disposiableincomewages socialcontributionspercentperrev ctry_dum_6

      Source |       SS       df       MS              Number of obs =     176
-------------+------------------------------           F(  2,   173) =   21.38
       Model |  1620.20244     2  810.101219           Prob > F      =  0.0000
    Residual |   6555.9603   173  37.8957243           R-squared     =  0.1982
-------------+------------------------------           Adj R-squared =  0.1889
       Total |  8176.16274   175  46.7209299           Root MSE      =   6.156

------------------------------------------------------------------------------
disposiabl~s |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
socialcont~v |  -.3854644   .0621141    -6.21   0.000    -.5080634   -.2628654
  ctry_dum_6 |  -3.065874   1.571065    -1.95   0.053    -6.166798    .0350498
       _cons |    17.1304   2.128088     8.05   0.000     12.93004    21.33076
------------------------------------------------------------------------------

. reg  disposiableincomewages socialcontributionspercentperrev ctry_dum_7
```

```
      Source |       SS       df       MS              Number of obs =     176
-------------+------------------------------           F(  2,   173) =   19.18
       Model |  1483.80738     2  741.903688           Prob > F      =  0.0000
    Residual |  6692.35536   173  38.6841351           R-squared     =  0.1815
-------------+------------------------------           Adj R-squared =  0.1720
       Total |  8176.16274   175  46.7209299           Root MSE      =  6.2197

------------------------------------------------------------------------------
disposiabl~s |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
socialcont~v |  -.3897879   .0629377    -6.19   0.000    -.5140126   -.2655633
  ctry_dum_7 |  -1.427669   3.155323    -0.45   0.652    -7.655555    4.800216
       _cons |   17.01107   2.159759     7.88   0.000      12.7482    21.27394
------------------------------------------------------------------------------

. reg  disposiableincomewages socialcontributionspercentperrev ctry_dum_8

      Source |       SS       df       MS              Number of obs =     176
-------------+------------------------------           F(  2,   173) =  164.66
       Model |  5360.27431     2  2680.13716           Prob > F      =  0.0000
    Residual |  2815.88843   173  16.2768117           R-squared     =  0.6556
-------------+------------------------------           Adj R-squared =  0.6516
       Total |  8176.16274   175  46.7209299           Root MSE      =  4.0345

------------------------------------------------------------------------------
disposiabl~s |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
socialcont~v |   -.242293   .0417742    -5.80   0.000    -.3247457   -.1598403
  ctry_dum_8 |   16.77227   1.085713    15.45   0.000     14.62932    18.91522
       _cons |   10.52905   1.452502     7.25   0.000     7.662141    13.39596
------------------------------------------------------------------------------

. reg  disposiableincomewages socialcontributionspercentperrev ctry_dum_9
```

```
      Source |       SS       df       MS              Number of obs =     176
-------------+------------------------------           F(  2,   173) =   19.06
       Model |  1475.99169     2  737.995845           Prob > F      =  0.0000
    Residual |  6700.17105   173  38.7293124           R-squared     =  0.1805
-------------+------------------------------           Adj R-squared =  0.1711
       Total |  8176.16274   175  46.7209299           Root MSE      =  6.2233

------------------------------------------------------------------------------
disposiabl~s |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
socialcont~v |   -.387275   .0630508    -6.14   0.000    -.5117228   -.2628273
  ctry_dum_9 |  -.1053848   2.034995    -0.05   0.959       -4.122    3.911231
       _cons |   16.90071   2.149597     7.86   0.000     12.65789    21.14352
------------------------------------------------------------------------------

. reg  disposiableincomewages socialcontributionspercentperrev ctry_dum_10

      Source |       SS       df       MS              Number of obs =     176
-------------+------------------------------           F(  2,   173) =   31.55
       Model |  2185.17036     2  1092.58518           Prob > F      =  0.0000
    Residual |  5990.99238   173  34.6300138           R-squared     =  0.2673
-------------+------------------------------           Adj R-squared =  0.2588
       Total |  8176.16274   175  46.7209299           Root MSE      =  5.8847

------------------------------------------------------------------------------
disposiabl~s |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
socialcont~v |  -.4854961   .0631883    -7.68   0.000    -.6102154   -.3607769
 ctry_dum_10 |  -9.229816   2.039434    -4.53   0.000    -13.25519   -5.204439
       _cons |   20.69872   2.197511     9.42   0.000     16.36134    25.03611
------------------------------------------------------------------------------

. reg  disposiableincomewages socialcontributionspercentperrev ctry_dum_11

      Source |       SS       df       MS              Number of obs =     176
```

```
-------------+------------------------------           F(  2,   173) =   19.07
       Model |  1476.80024     2  738.400122           Prob > F      =  0.0000
    Residual |   6699.3625   173  38.7246387           R-squared     =  0.1806
-------------+------------------------------           Adj R-squared =  0.1712
       Total |  8176.16274   175  46.7209299           Root MSE      =  6.2229

------------------------------------------------------------------------------
disposiabl~s |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
socialcont~v |  -.3896885   .0642723    -6.06   0.000    -.5165473   -.2628297
 ctry_dum_11 |   .3346376   2.180075     0.15   0.878    -3.968332    4.637607
       _cons |   16.95819   2.176104     7.79   0.000     12.66306    21.25332
------------------------------------------------------------------------------

. reg  disposiableincomewages socialcontributionspercentperrev ctry_dum_12

      Source |       SS       df       MS              Number of obs =     176
-------------+------------------------------           F(  2,   173) =   19.24
       Model |  1487.76665     2  743.883323           Prob > F      =  0.0000
    Residual |  6688.39609   173  38.6612491           R-squared     =  0.1820
-------------+------------------------------           Adj R-squared =  0.1725
       Total |  8176.16274   175  46.7209299           Root MSE      =  6.2178

------------------------------------------------------------------------------
disposiabl~s |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
socialcont~v |  -.3774785   .0653199    -5.78   0.000     -.506405    -.248552
 ctry_dum_12 |  -.8717551     1.5727    -0.55   0.580    -3.975905    2.232394
       _cons |   16.66172   2.190617     7.61   0.000     12.33795     20.9855
------------------------------------------------------------------------------

. reg  disposiableincomewages socialcontributionspercentperrev ctry_dum_13

      Source |       SS       df       MS              Number of obs =     176
-------------+------------------------------           F(  2,   173) =   19.22
```

```
       Model |  1486.42946     2  743.214732           Prob > F      =  0.0000
    Residual |  6689.73328   173  38.6689785           R-squared     =  0.1818
-------------+------------------------------           Adj R-squared =  0.1723
       Total |  8176.16274   175  46.7209299           Root MSE      =  6.2184

------------------------------------------------------------------------------
disposiabl~s |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
socialcont~v |   -.385055   .0629205    -6.12   0.000    -.5092456   -.2608644
 ctry_dum_13 |   -.938483   1.797437    -0.52   0.602    -4.486213    2.609247
       _cons |   16.88991   2.146701     7.87   0.000     12.65281    21.12701
------------------------------------------------------------------------------

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