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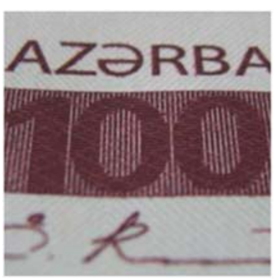

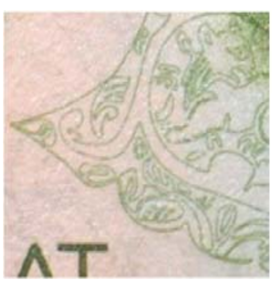

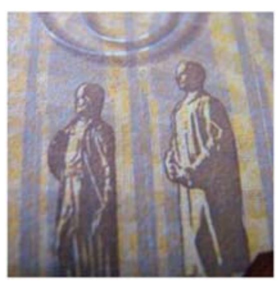

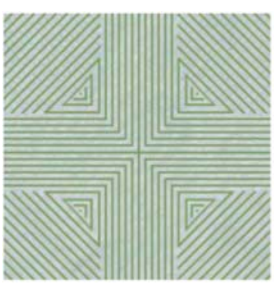

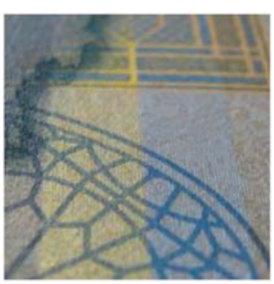

WEALTH EFFECTS IN POST-TRANSITION COUNTRIES: EVIDENCE FROM AZERBAIJAN

Abstract

This paper conducts an empirical analysis of the wealth effects in Azerbaijan. Applying the VECM methodology to the monthly data for the 2007-2013 period, we estimate that in the long-run, the elasticity of financial wealth is 0.26 and statistically significant, whereas the elasticity of housing wealth is 0.05 but statistically insignificant. Furthermore, we find that it takes households about one month and a half to adjust their consumption to the long-run equilibrium level.

Keywords: consumption, housing wealth effect, financial wealth effect, post-transition, Azerbaijan, VECM

JEL classification: C32, D12, E21, E44

1. Introduction

The collapse of the socialist block forced its members to start transition from the centrally planned system to market economy. The transition period was very painful because it was accompanied by high unemployment and high inflation and thereby resulted in a decline of standard of livings. However, since the late 1990s and the early 2000s, as countries started implementing structural reforms and effectively utilizing resources, the economic situation has improved. Household income and wealth increased and consequently households started increasing their consumption expenditures.

Compared with 2007, consumption of the Azerbaijani households increased by 91.3% in 2010. Such a surge of consumption was possible due to the rise in disposable income. During the same period, the disposable income increased by 84.3%. Economic boom also gave rise to the construction boom. The demand and prices for houses increased and within the 2007-2010 period, an average house price increased by 12.8%. Households accumulated large financial wealth. In the 2007-2010 years, the volume of household deposits increased 2.8 times.

The objective of the paper is to estimate the effect of changes in financial and housing wealth on the consumption of the Azerbaijani households during the 2007-2013 period. For this purpose, we estimate a vector error correction model using monthly data. The regression results show that disposable income and financial wealth have a significant and positive effect on household consumption, whereas housing wealth has a positive but insignificant effect on consumption. It is estimated that a 10% increase in disposable income and financial wealth raises household consumption by 4.8% and 1.8%.

The rest of the paper is organized as follows. The next section provides review of the recent literature on wealth effects. In the third section, we give a brief description of the model which will be used to estimate the impact of wealth effects on the consumption of the Azerbaijani households. The section also introduces the methodology of the paper. The fourth section describes the date and the fifth section presents the estimation results. Finally, the last section concludes with the main findings and policy implications.

2. Literature review

The importance of consumption in understanding business cycles encouraged researchers to pursue extensive research on the topic. As a theoretical foundation, the studies use the life cycle and the permanent income hypothesis models; however, papers differ in terms of wealth specification, data structures, and estimation methods. To estimate wealth effects, some studies use aggregate wealth while the others separate financial and housing wealth to account for their different characteristics. Furthermore, since wealth data are not available for many countries, many authors use proxies: the usual proxy for financial wealth is a stock market index and the common proxy for housing wealth is a house price. In regard to data structures, one strand of the literature uses panel data to estimate wealth effects for country groups and the other focuses on single countries. Since the purpose of this paper is to quantify both financial and housing wealth effects in a single country, papers that use only aggregate wealth and panel data structures will not be reviewed.

At the international level, there is rich evidence on wealth effects in developed and emerging economies. For example, Boone et al (2001) finds that financial and housing wealth has a statistically significant impact on consumption in developed countries. Particularly, the authors estimate that in the long run propensities to consume out of financial wealth range from 0.04 for United States and United Kingdom to 0.08-0.12 for France, Italy, Canada and Japan. The estimated propensities to consume out of housing wealth vary between 0.03 and 0.05 for United States, United Kingdom and France while for Canada and Japan the propensities are 0.19 and 0.34 respectively. The estimates are obtained by applying the VECM methodology to quarterly data covering the period from 1970 to 1999.

For Sweden, Chen (2006) applies the VECM framework to the quarterly data from 1980 to 2004 and finds that the average marginal propensities to consume out of financial wealth and housing wealth are 0.119 and 0.128 correspondingly. Castro (2007) employs the Dynamic OLS method to estimate the wealth effects for Portugal. The used dataset is quarterly and covers the period from 1980 to 2005. The estimated marginal propensities to consume out of financial and housing wealth are 0.02.

To quantify the wealth effects for emerging market economies, Peltonen et al (2009) apply the Dynamic GMM method to quarterly data ranging from the first quarter of 1990 to the second quarter of 2008. They conclude that housing wealth has a significant effect on consumption only in three out of six examined countries whereas financial wealth affects consumption significantly in all six countries. The reported elasticities of housing wealth are 0.069 for Hong Kong, 0.151 for Singapore and 0.386 in Thailand. Financial wealth estimates range between 0.047 for Taiwan and 0.135 for Singapore.

Although there are a lot of studies on wealth effects in developed and emerging economies, there are few studies that focused on post-transition economies. To our best knowledge, there is only one time series study on wealth effects in post-transition economies done by Vizek (2011). The author applies the co-integration methodology to the quarterly data of four transition economies for the period from 1996 to 2010 and finds that the financial wealth effect is statistically insignificant only in Estonia and the housing wealth effect is significant only in Czech Republic. The elasticity of stock market prices is 0.12 in Bulgaria, 0.06 in Croatia, and 0.09 in Czech Republic and the elasticity of house prices is 0.19 in Czech Republic.

The contribution of the current study will be twofold. First, the paper will produce new empirical evidence on wealth effects in post-transition countries. Second, studying the relationship between household wealth and household consumption in a country which has experienced oil boom will give us evidence on whether windfall petrodollars resulted in higher wealth effects than in post-transition which did not have such an advantage.

3. Theoretical model

The workhorse model for the estimation of the wealth effect is the Life Cycle/Permanent Income Hypothesis model. The Life Cycle model supposes that households accumulate and spend down their wealth to keep their consumption stable in the course of their lives (Ando and Modigliani, 1963). According to this model, households adapt their consumption plans only in the case of unexpected changes in wealth. The Permanent Income Hypothesis model implies that permanent changes in wealth affect consumption while transitory changes produce no effect (Friedman, 1957). In these models, a representative consumer chooses a consumption path that maximizes his life time utility. Thus, the model for the estimation of wealth effects has the following representation:

$$\max E_t \sum_{t=0}^{\infty} \beta^t u(c_t)$$
$$s.t.\ \ w_{t+1} = (1+r)w_t + y_t - c_t$$

where w_t is the consumer's wealth at the beginning of the period, $c_t$is household consumption,y_t is current labor income, r is real interest rate, β is the time preference factor.

The first-order conditions imply that:

$$u'(c_t) = E_t\beta(1+r)u'(c_{t+1})$$

If we assume that $u(c_t) = ac_t - bc_t^2$ and $\beta(1+r) = 1$, then

$$c_t = E_t c_{t+1} \quad (1)$$

Furthermore, solving the intertemporal budget constraint as a difference equation, we obtain:

$$w_t = -\sum_{j=0}^{\infty} (1+r)^{-j-1}(y_{t+j} - c_{t+j})$$

Since the budget constraint must hold for any realizations of shocks, it must hold in expectation, so

$$w_t = -\sum_{j=0}^{\infty} E_t(1+r)^{-j-1}(y_{t+j} - c_{t+j}) \quad (2)$$

After applying some algebra and result (1) to expression (2), we have:

$$c_t = r\left(w_t + \sum_{j=0}^{\infty} (1+r)^{-j-1} E_t y_{t+j} \right) \quad (3)$$

To make the above equation testable, we need to model the expectations of future labor income:

$$y_t = \rho y_{t-1} + v_t$$
$$E_t y_{t+j} = \rho^j y_t$$

Then (3) can be written as

$$c_t = r w_t + \frac{r}{1+r-\rho} y_t \quad (4)$$

In the estimation of the wealth effect some caution is required because of its heterogeneity. Different wealth components have different characteristics regarding liquidity, collateral, bequest and risk and therefore households respond differently to variations of its components (De Castro, 2007; Sousa, 2009). Generally, wealth is split into two main components: financial and housing. The former includes deposits, debt securities, shares, and insurance reserves; the latter is a market value of houses (Sousa, 2009). Hence, (4) can be expressed as follows:

$$c_t = \alpha + \beta f w_t + \gamma h w_t + \eta y_t + \varepsilon_t \quad (5)$$

where fw_t is financial wealth, hw_t is housing wealth, y_t is disposable income and ε_t is the error term.

Changes in wealth can affect consumption through various transmission channels. Ludwig and Slok (2002) distinguish three mechanisms on how an increase in financial wealth can influence household consumption. The first channel, named a realized wealth effect, assumes that households increase their spending through immediate spending of wealth gains. The second channel, an unrealized wealth effect, supposes that households increase consumption not through converting wealth gains into cash but due to optimism regarding future income.

Finally, the third channel, named a liquidity constraints effect, suggests that households increase consumption through increased borrowing since an increase in wealth raises the value of collateral against which they can borrow.An increase in housing wealth can affect household consumption through the same channels as financial wealth gains do; however, additionally, it can influence consumption via a budget constraint effect and a substitution effect (Ludwig and Slok, 2002).The budget constraint effect assumes an increase in a value of houses for renters implies higher rents and therefore lower non-durable and durable consumption. The substitution effect means that households, who are about to buy houses, can respond to an increase in house prices by reducing private consumption to afford a house purchase or buy smaller houses.

4. Methodology

The vector autoregression (VAR) is widely used in the analysis of interrelated time series. In contrast to the single equations, the VAR approach allows avoiding a simultaneity issue because the right-hand side of the equations includes predetermined endogenous regressors. Furthermore, since all equations have identical right-hand side variables, OLS estimates are still consistent and asymptotically efficient in the presence of contemporaneous correlation in errors (Enders, 2004). The VAR representation of (5) is the following:

$$y_t = A_1 y_{t-1} + ... + A_p y_{t-p} + \varepsilon_t \quad (6)$$

where $y_t = \begin{pmatrix} c_t \\ fw_t \\ hw_t \\ y_t \end{pmatrix}$ and εt is the vector of innovations.

When variables are I(1) and co-integrated, they need to be modeled as a vector error correction model (VECM) which is a restricted version of a VAR model. The VECM which is due to Johansen (1988, 1991) restricts endogenous variables to converge to their co-integrating relationships in the long run while allowing for short run adjustments. We can rewrite (6) to obtain the VECM form:

$$\Delta y_t = \Pi y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta y_{t-i} + \varepsilon_t \quad (7)$$

where $\Pi = \sum_{i=1}^{p} A_i - I$ and $\Gamma_i = -\sum_{j=i+1}^{p} A_j$.

If the coefficient matrix Π has rank r<k (k is the number of endogenous variables), then there existkxr matrices α and β each with rank r such that $\Pi = \alpha\beta'$ and $\beta' y$ is I(0). Hereα is the vector of adjustment parameters, r is the number of co-integrating equations and β is the matrix of co-integrating equations.

To determine the number of co-integrating relations, Johansen (1988) proposed the likelihood ratio test which consists of trace and maximal eigenvalue statistics.

The null hypothesis of the trace statistics is that there is r co-integrating vectors against the alternative hypothesis of k co-integrating vectors, while the null hypothesis of the maximal eigenvalue statistics is that there is r co-integrating vectors against the alternative hypothesis of r+1 co-integrating vectors.

When we implement the Johansen's likelihood ratio test, we need to make assumptions regarding deterministic components in the data and co-integrating equations. Johansen (1995) considers five models:

Model 1. No deterministic components in the data, no constants and trends ether in co-integrating or error-correction equations

Model 2. No deterministic components in the data, but constants in co-integrating equations

Model 3.Linear trend in the data, constants in both co-integrating and error-correction equations.

Model 4. Linear trend in the data, constants and trends in co-integrating equations, and constants in error-correction equations

Model 5. Quadratic trend in the data, constants and trends in both co-integrating and error-correction equations

The results of the likelihood ratio test can be sensitive to the specification of deterministic components in the data and co-integrating equations. Therefore, Johansen (1992) suggests using the Pantula principle to determine the rank and deterministic component. According to the Pantula principle, the first step is to estimate all five models and order results from the most restrictive model (model 1 and r=0) to the least restrictive one (model 5 and r=k-1). In the next step, moving from the most restrictive specification to the least restrictive one, we compare the test statistics with their critical values and stop the process when we fail to reject the null for the first time.

5. Data description

For the empirical analysis of the wealth effects, we use monthly data covering the period from January, 2007 to July, 2013. The data on household consumption and households' disposable income were collected from the database of the State Statistics Committee of Azerbaijan Republic. Household deposits are used as a proxy for financial wealth and a price of a square meter of a house on the secondary market is used as a proxy for housing wealth.The records on household deposits and house prices were extracted from the database of the Central Bank of AzerbaijanRepublic. The price statistics of Brent oil, which will be used in the VECM as an exogenous variable to improve the model, was taken from the database of the US Department of Energy. All variables were seasonally adjusted by Census X12 and converted into real terms by general CPI. Additionally, all of them except house prices are expressed in per capita terms, in logs and in the national currency.

We also use a binary variable to account for a structural break in house price series caused by the global financial crisis of 2008-09. To identify the break period precisely, we apply the procedure suggested by Hahm et al (2013) to define a stock market crisis period. According to their procedure, a financial crisis is period when the growth rate of stock market index belongs to the bottom 3% tail of the distribution. Applying the same technique to our house price series, we define a break point as a first time when the change in house prices belong to the bottom 3% and find that the break point for house price series is May, 2009.

6. Empirical results

We start our analysis by checking time series properties of variables using the Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) tests. The test results are reported in Table 1 and Table 2. The lag length for the ADF test is determined by Scwartz information criterion with a maximum lag order of 11. For the PP test we use Bartlett kernel estimation method and choose a bandwidth using Newey-West method. The results of both tests allow us to conclude that consumption and income are trend stationary processes, while financial wealth, housing wealth and oil prices are integrated of order one (I(1)) processes[1].

Table 1. Augmented Dickey Fuller Test Results

		None			Constant			Constant and trend		
		Level	1st diff	2nd diff	Level	1st diff	2nd diff	Level	1st diff	2nd diff
c	test statistic	0.56	-10.01^{**}	-8.50^{**}	-2.33	-9.99^{**}	-8.44^{**}	-4.43^{**}	-9.92^{**}	-8.38^{**}

[1] In the case of the ADF test, we accept the result of the "constant" specification for financial wealth which indicates that it is I(1) because in this specification a constant term is statistically significant at the 5% level, whereas in the "constant and trend specification", a trend term is not statistically significant. For housing wealth, we accept the "none" specification which assumes that it is I(1) because in the "constant" specification, a constant term is statistically insignificant and in the "constant and trend" specification, neither a constant term nor a trend term is statistically significant.

	lag	1	0	2	1	0	2	0	0	2
	t(const)	-	-	-	2.36*	0.65	0.14	4.44**	0.38	0.22
	t(trend)	-	-	-	-	-	-	3.50**	-0.07	-0.17
y	test statistic	0.52	-12.05**	-8.43**	-2.36	-12.01**	-7.45**	-6.04**	-11.94**	-7.41**
	lag	1	0	0	1	0	9	0	0	9
	t(const)	-	-	-	2.38*	0.61	-0.89	6.05**	0.52	-0.91
	t(trend)	-	-	-	-	-	-	4.91**	-0.26	0.61
fw	test statistic	7.88	-1.78	-8.55**	-1.27	-7.75**	-8.50**	-3.37	-7.73**	-8.58**
	lag	0	4	3	0	0	3	0	0	3
	t(const)	-	-	-	1.84	5.16**	-0.31	3.47**	3.44**	-1.14
	t(trend)	-	-	-	-	-	-	3.22**	-0.56	1.12
hw	test statistic	-0.16	-2.32*	-9.47**	-0.71	-2.30	-9.41**	-0.66	-2.35	-9.44**
	lag	2	3	2	0	3	2	0	3	2
	t(const)	-	-	-	0.70	-0.16	0.00	0.65	-1.00	-0.80
	t(trend)	-	-	-	-	-	-	-0.25	1.04	0.90
oil	test statistic	-0.09	-5.93**	-13.67**	-2.24	-5.89**	-13.58**	-2.27	-5.85**	-13.49**
	lag	1	0	0	1	0	0	1	0	0
	t(const)	-	-	-	2.24*	0.03	0.03	2.25*	0.01	-0.05
	t(trend)	-	-	-	-	-	-	0.42	0.00	0.07

	Test critical values				*t* statistics critical values
	None	Constant	Constant and trend		
1%	-2.60	-3.52	-4.08	1%	2.66
5%	-1.94	-2.90	-3.47	5%	2.00

Note: H_0: a variable has a unit root; ** statistical significance at the 1% level; * statistical significance at the 5% level

Table 2. Phillips-Perron Test Results

	None	Constant	Constant and trend

		level	1st dif	2nd dif	level	1st dif	2nd dif	level	1st dif	2nd dif
c	test statistic	1.38	-13.71**	-57.53**	-2.18	-15.72**	-57.12**	-4.48**	-15.78**	-56.70**
	band	21	15	31	6	17	31	3	17	31
	t(const)	-	-	-	2.55*	0.65	0.06	4.44**	0.38	-0.01
	t(trend)	-	-	-	-	-	-	3.50**	-0.07	0.05
y	test statistic	1.40	-17.80**	-107.68*	-3.08*	-22.90**	-106.78**	-6.04**	-23.81**	-106.21**
	band	15	13	74	0	15	74	0	15	74
	t(const)	-	-	-	3.10**	0.61	0.01	6.05**	0.52	-0.02
	t(trend)	-	-	-	-	-	-	4.91**	-0.26	0.03
fw	test statistic	6.79	-4.82**	-30.54**	-1.19	-7.75**	-30.89**	-3.44	-7.73**	-35.59**
	band	3	2	25	2	0	25	3	0	23
	t(const)	-	-	-	1.84	5.16**	-0.27	3.47**	3.44**	-0.70
	t(trend)	-	-	-	-	-	-	3.22**	-0.56	0.64
hw	test statistic	-0.04	-8.42**	-41.22**	-1.00	-8.38**	-40.88**	-1.21	-8.34**	-56.02**
	band	5	5	31	5	5	31	5	5	28
	t(const)	-	-	-	0.70	-0.09	-0.00	0.65	-0.45	-0.40
	t(trend)	-	-	-	-	-	-	-0.25	0.47	0.46
oil	test statistic	-0.05	-5.97**	-20.21**	-2.15	-5.93**	-20.03**	-2.17	-5.90**	-19.86**
	band	4	2	12	4	2	12	4	2	12
	t(const)	-	-	-	1.52	0.03	0.03	1.52	0.01	-0.05
	t(trend)	-	-	-	-	-	-	0.19	0.01	0.07

	Test Critical values				*t* statistics critical values
	None	Constant	Constant and trend		
1 %	-2.60	-3.52	-4.08	1%	2.66
5 %	-1.95	-2.90	-3.47	5%	2.00

Note: H_0: a variable has a unit root; ** statistical significance at the 1% level; * statistical significance at the 5% level

The presence of the structural break in house price series can raise some concerns regarding the validity of the ADF test and PP test results because a break in a trend causes serial correlation which resembles a random walk and therefore the traditional unit root tests are prone to erroneously accept the null hypothesis of a unit root for series with a break (Perron, 1989).However, in our case, the break in house price series is not problematic since our finding that house price series is I(1) is similar to those of the previous studies, e.g. Vizek (2008) and Chen (2008).

If variables are I(1) processes and there is co-integration among variables, we can model their relationships with the help of VECM. But before checking for co-integration, we need to correctly specify the VAR model of these variables. A correct specification of a VAR model implies the absence of serial correlation and the normality of residuals.

The VAR/VECM estimates are very sensitive to the lag order. Therefore, to choose the optimal lag length criteria, we will use AIC, SC and HQ information criteria. Their values of criteria, displayed in Table 3, suggest one lag.

Table 3. VAR Lag Order Selection Criteria

Lag	AIC	SC	HQ
0	1.50	1.76	1.60
1	-14.07*	-13.30*	-13.76*
2	-13.88	-12.60	-13.37
3	-13.58	-11.80	-12.88
4	-13.49	-11.19	-12.57
5	-13.47	-10.67	-12.36
6	-13.35	-10.04	-12.03
7	-13.32	-9.50	-11.80

Note:The optimal lag orders are indicated by an asterisk

The serial correlation test finds no serial correlation in the residuals of the VAR model with one lag (see Table 4). The normality test indicates that although theskewness of the residuals is close to normal, in general, they are non-normal (see Table 5)[1].Although nonnormality of the residuals does not call into question the validity of such statistical procedures of VAR models as granger causality tests, impulse response functions and variance decomposition, it can affect the results of the co-integration tests. For this reason, to check whether variables are co-integrated or not, we use trace statistics rather than maximum eigenvalue statistics because it is found that the trace test is more robust to large skewness and excess curtosis than the eigenvalue co-integration test (Cheung and Lai, 1993)[2].

Table 4.VAR Residual Serial Correlation LM Tests

(H0: no serial correlation at lag order h)

	VAR(1)		VAR(2)		VAR(3)		VAR(4)	
Lags	LM-Stat	P-value	LM-Stat	P-value	LM-Stat	P-value	LM-Stat	P-value
1	17,66	0,34	20,88	0,18	16,42	0,42	16,73	0,40
2	9,60	0,89	14,91	0,53	22,19	0,14	18,66	0,29

[1]The non-normality in the residuals usually indicates deficiencies of the model which can be result of structural breaks in the time series. In fact, we have taken into account a structural break by including a binary variable for a break in house price series. Additionally, to improve the model, we include oil prices into VECM as an exogenous variable. However, both measures do not help.

[2]Cheung and Lai (1993) propose that the superiority of the trace test over the maximal eigenvalue test can be explained by the construction of the former.

3	15,45	0,49	13,21	0,66	18,32	0,31	24,84	0,07
4	23,35	0,10	18,95	0,27	15,25	0,51	19,12	0,26
5	19,47	0,24	19,21	0,26	25,93	0,06	18,19	0,31
6	12,81	0,69	12,31	0,72	8,06	0,95	8,80	0,92
7	19,44	0,25	22,67	0,12	20,83	0,19	25,12	0,07
8	13,69	0,62	12,63	0,70	13,68	0,62	9,60	0,89
9	11,31	0,79	12,09	0,74	8,90	0,92	12,40	0,72
10	14,04	0,60	13,46	0,64	11,34	0,79	12,95	0,68
11	8,48	0,93	10,68	0,83	12,49	0,71	16,50	0,42
12	19,61	0,24	23,65	0,10	23,98	0,09	25,04	0,07

Note: H_0: no serial correlation at lag order h

Table 5. VAR Residual Normality Tests

	VAR(1)		VAR(2)		VAR(3)		VAR(4)	
	Stat	P-value	Stat	P-value	Stat	P-value	Stat	P-value
Skewness	4,03	0,40	9,52	0,05	13,90	0,01	10,40	0,03
Kurtosis	36,46	0,00	55,71	0,00	34,45	0,00	24,32	0,00
Jarque-Bera	40,49	0,00	65,23	0,00	48,34	0,00	34,72	0,00

Note: H_0: residuals are multivariate normal; orthogonalization by Cholesky.

The results of the trace test for VAR(1) are reported in Table 6[1]. Applying the Pantula principle, we conclude thatthe optimal specification is Model 2 with two co-integration relationships. To identify the model, it is necessary to impose restrictions on the co-integrating equations and adjustment coefficients. The restrictions should be theoretically motivated, so that the estimated co-integrating equations represent long-run associations among variables. In the first co-integrating vector, which is a consumption equation (5), we impose an identifying restriction on consumption. Furthermore, we impose a binding restriction on the adjustment term of income. The second restriction is motivated by the permanent income hypothesis of Friedman (1957) and assumes that transitory changes in income do not affect consumption. In the second co-integrating vector, which is an income equation, we impose an identifying restriction on income and binding restrictions on consumption, financial wealth and housing wealth. These restrictions imply that neither consumption nor financial or housing wealth influence income in the long-run. Additionally, we bind the first adjustment term assuming that the short-run deviations in consumption do not have an effect on income.

[1]When we run the trace test, we include p-1 lags for VAR(p) model because when we rewrite the VAR representation to obtain the VECM form we lose one lag (VAR(p) --> VECM(p-1)).

However, the VECM with zero lags and two co-integrating vectors did not yield plausible results. In particular, the signs of coefficients of some variables are in line with theory and additionally, the LR test rejects the null hypothesis of validity of restrictions. One can suggest that trace test can underreport the true number of co-integrating relations due to the inclusion of exogenous variables (citation) and therefore we fail to find sensible results. However, if we assume three co-integrating relationships[1] and reestimate the model, the results do not improve.

Table 6. The Johansen co-integration test: Trace statistic

	Model 2		Model 3		Model 4	
r	Stat	0.05 Critical Value	Stat	0.05 Critical Value	Stat	0.05 Critical Value
		Lag=0				
0	125,56	54,08	100,93	47,86	118,26	63,88
1	69,24	35,19	52,09	29,80	68,68	42,92
2	28,46	20,26	15,10*	15,49	31,67	25,87
3	7,23	9,16	5,81	3,84	6,72	12,52
		Lag=1				
0	92,49	54,08	75,51	47,86	96,91	63,88
1	58,13	35,19	43,01	29,80	59,09	42,92
2	26,28	20,26	14,66*	15,49	30,72	25,87
3	5,90	9,16	5,21	3,84	5,89	12,52
		Lag=2				
0	65,17	54,08	53,82	47,86	71,17	63,88
1	35,82	35,19	24,83*	29,80	38,08	42,92
2	15,61	20,26	10,48	15,49	16,89	25,87
3	4,45	9,16	2,26	3,84	4,60	12,52
		Lag=3				
0	71,77	54,08	60,81	47,86	83,76	63,88
1	35,55	35,19	27,27*	29,80	43,37	42,92
2	13,62	20,26	12,77	15,49	16,20	25,87
3	5,64	9,16	5,64	3,84	5,67	12,52

Note: H_0 of the trace test: k-1 co-integrating vectors and H_1 of the trace test: k co-integrating vectors; * indicates the specification when we fail to reject H_0 for the first time.

When we try other lag orders, we find that the least order of the VAR model with which the VECM produces plausible results is four. The residuals of the VAR(4) model do not have serial correlation, but as in the case of a VAR(1) model, the

[1]In third co-integrating vector, which is a financial wealth equation, we impose an identifying restriction on financial wealth and binding restrictions on consumption and housing wealth. In addition, we bind the first adjustment coefficient.

residuals are not normal (Table 4 and Table 5). Further, applying the Pantula principle to the trace test results, we find that the best option is Model 3 with two co-integrating vectors.

The estimates of the VECM (3) are displayed in Table 7. The co-integration equation reflects the long-run relationship and the error correction shows the short-run dynamics among variables. From the co-integration equation, we can infer that in the long-run, disposable income has a significantly positive effect on consumption. The magnitude of the coefficient implies that 1% increase in disposable income will lead to an increase of consumption of 0.48 %.

Table 7. Vector Error Correction Estimates

Co-integrating equations:		
	Equation 1	Equation 2
CONS(-1)	1.00	0.00
Y(-1)	-0.48**	1.00
	(-3.25)	(-)
FW(-1)	-0.18*	0.00
	(-2.41)	(-)
HW(-1)	-0.05	0.00
	(-0.39)	(-)
C	-1.01	-5.05
Adjustment terms:		
Adj. term 1	-0.68**	0.00
	(-4.00)	(-)
Adj. term 2	0.00	-0.12
	(-)	(-1.38874)
LR test for binding restrictions (rank = 2):		
Chi-square(3)	4.620596	
Probability	0.201782	
Observations after adjustments	74	

Note: t-statistics in parentheses; critical values: 1% - 2.66, 5% - 2.00; ** statistical significance at the 1% level; * statistical significance at the 5% level.

Furthermore, the estimation output shows that an increase of financial wealth causes upward movement in consumption in the long-run. Thus, 1% increase in financial wealth will cause growth of consumption of 0.18%. Finally, the coefficient of housing wealth implies that 1% increase in a price of a square meter leads to an increase of consumption by 0.05%; however, the effect is not statistically significant.

The reason why housing wealth effect is statistically insignificant and smaller in magnitude than the financial wealth effect can be relatively low liquidity of housing wealth in comparison with financial one. Furthermore, financial wealth comprised of deposits has a stronger effect because it is less volatile than the housing wealth which depends on the interaction of demand with supply in the housing market. The other explanation of comparatively low housing wealth is that an increase of house values benefits only those households which own houses while the other households experience wealth loss since their rent rates increase (Campbell and Coco, 2004; Case et al., 2011). Finally, housing wealth effects can be dampened by bequest motives of parents who are willing to leave larger bequests to their children rather than increase own consumption (Skinner, 1989). The bequest motive looks as a relevant factor in the context of Azerbaijan because the intergenerational bequest tradition has been historically strong, especially regarding real estate.

The speed-of-adjustment estimate has a significantly negative value which implies that households change their consumption in the current period to compensate for previous deviations from the long run prediction. The magnitude of the coefficient implies that households adjust their behavior to the short run fluctuations on average within 44 days.

7. Conclusions and policy implications

The empirical results suggest that in the long run the marginal propensities to consume out of financial and housing wealth are 0.18% and 0.05% correspondingly. However, the effect of the latter is not statistically significant at the conventional levels. Furthermore, it is estimated that the marginal propensity to consume out of disposable income is 0.48%. The magnitudes of all estimated propensities except that of financial wealth are in line with the previous studies. The marginal propensity to consume out of housing wealth is equal and close to those of Croatia and Sweden respectively and it falls into the range of the marginal propensities of developed countries. With the respect to the marginal propensity to consume out of disposable income, the coefficient is near to the propensity of Sweden but below the propensity to Portugal.

The estimated propensities suggest that the main channel for policy makers to focus on when they aim to stabilize consumption is the disposable income. Policy makers can influence disposable income by changing tax rates and amount of social transfers. Although the fiscal channel is straightforward, wealth channels can be also effectively exploited. As far as the financial wealth is comprised of deposits, policy makers can increase its volume by implementing financial policy which will lower insolvency risks of banks and allow for attractive interest rates (Finger and Hesse, 2009). Furthermore, since the housing wealth is determined by house prices set in the market, to take advantage of the housing wealth channel, policy makers can interfere in the housing market by means of mortgage instruments.

The current consumption determines not only the current level of the standard of living but also its future level because savings which has a positive correlation with economic growth is determined by consumption (Aghion et al., 2006; Carrol and Weil, 1994). Therefore, economies which have high saving rates are likely to grow faster than countries with low saving rates. Given that the marginal propensity to save in Azerbaijan, which is 0.54, is higher than in most of advanced countries, post-transition and emerging economies, other factors equal, we can expect that in the long run in terms of growth rates the Azerbaijani economy will have an opportunity to perform better than many developed economies, post-transition and emerging economies[1].

As for the further research, future studies should concentrate on the estimation of wealth effects in other post-transition countries and county groups to enrich evidence on wealth effects in post-transition economies. Regard to Azerbaijan, it will be reasonable to examine the wealth effect using micro level data to avoid loss of information usually incurred when aggregate data are used. Finally, given that we observed non-normality in the residuals of the VECM, future research should focus on the asymmetric short run adjustment of consumption to changes in financial and housing wealth.

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[1]For example, during the same period, the marginal propensity to save was estimated at 0.35 for France, 0.36 for Germany, 0.55 for Norway, 0.29 for Czech Republic, 0.21 for Poland, 0.39 for Slovakia, and 0.43 for Korea.

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