



## Happiness, taxes and social provision: A note



Marina Albanese<sup>a</sup>, Mariangela Bonasia<sup>b,e</sup>, Oreste Napolitano<sup>b,e,\*</sup>, Nicola Spagnolo<sup>c,d,e</sup>

<sup>a</sup> Department of Political Science, University of Naples Federico II, Italy

<sup>b</sup> Department of Business and Economic Studies, University of Naples Parthenope, Italy

<sup>c</sup> Economics and Finance, Brunel University London, UK

<sup>d</sup> Centre for Applied Macroeconomic Analysis (CAMA), National Australian University, Australia

<sup>e</sup> ISSM-Istituto di Studi sulle Società del Mediterraneo, Italy

### HIGHLIGHTS

- The effects of the ratio between taxes and social provision on population well-being for ten European countries.
- We use a panel cointegration analysis.
- We control for the 2008 financial crisis.

### ARTICLE INFO

#### Article history:

Received 25 May 2015

Received in revised form

23 July 2015

Accepted 29 July 2015

Available online 13 August 2015

#### JEL classification:

C22

D60

I31

O10

#### Keywords:

Happiness

Panel cointegration

Social provision

### ABSTRACT

This paper has analyzed the effects of the ratio between taxes and social provision on population well-being for ten European countries. The linkages between what citizens would expect in return of the taxes paid and their well-being have clearly become stronger after the crisis and it should be taken into account in the debate on public policies and how these translates in population well-being.

© 2015 The Authors. Published by Elsevier B.V.

This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

### 1. Introduction

There is emerging consensus that happiness surveys can provide an important complementary tool for public policy. The appetite to enhance well-being is being used ever more often in driving policy makers decisions. The World Happiness Report (Helliwell et al., 2012) suggests that the transition from the GDP to the well-being era has well started.

In the literature on the use of aggregate happiness as a guideline for economic policy, two general perspectives prevail. The first one incorporates the insights of the economics of happiness directly into public policy, using the cost–benefit analysis traditional

framework (Layard, 2006). This perspective, as Stutzer and Frey (2014) underline, enables one to derive optimal policies in a numerical way; it gives a measure of social welfare based on happiness data. In sharp contrast to postulating a purely theoretical social welfare function at aggregate level based on a wide range of different micro/macro variables, the well-being figures provided by population feedbacks on happiness do look at informations based on individual's judgments. The second perspective, by Frey and Stutzer (2012), is based on the insights of the public choice theory. Their vision is focused on the fundamental hypothesis that the quality of the political process is the key to people's happiness. In their perspective the results gained from happiness research should be taken as inputs into the democratic political process.

Di Tella et al. (2001), among others, investigated empirically the role of business cycles as a key determinant of happiness, and to what extent a welfare state can help to mitigate the costs of these business cycle fluctuations. Pacek and Radcliff (2008) and Haller

\* Correspondence to: University of Naples Parthenope, 80133, Napoli, Italy. Tel.: +39 081 5474727; fax: +39 081 5474750.

E-mail address: [napolitano@uniparthenope.it](mailto:napolitano@uniparthenope.it) (O. Napolitano).

and Hadler (2006) argue that the welfare state contributes, clearly and unequivocally, to human well-being.

The dynamic link between taxes and social provision on one side, and national happiness on the other, has not been fully established. Yet, it is argued that the direction and strength of this relationship depend mainly on economic performances. In this paper, we move one step forward in that direction. We examine whether happiness is influenced by the percentage of taxes returned to population in the form of social provision. We use a variable to proxy the “value for money”, or share of welfare, offered to tax payers in return of taxes paid. Furthermore, the second novel contribution is to analyze whether the sensitiveness of happiness to the social expenditure–tax ratio is strengthened, or not, by the 2008 financial crisis. We take a completely agnostic approach, and we are mainly interested in measuring the ability of our “value for money” indicator to translate into happiness. Within a panel data framework, the paper focuses on ten European countries. The layout of the paper is as follows. Section 2 outlines the econometric model, describes the data and presents the empirical findings. Section 3 summarizes the main findings and offers some concluding remarks.

## 2. The model and empirical results

The dependent variable used in the empirical analysis is the Happiness Index collected yearly from Veenhoven (1993). The index is based on a survey question such as ‘How satisfied are you with the life you live?’ with answers ranked from 1 (no satisfied) to 4 (very satisfied), transformed by Veenhoven in a range from 0 to 10.<sup>1</sup> Furthermore, we use as explicative variable the percentage of taxes returned back to citizens in the form of social benefits, defined as ‘Value for Money’ (henceforth VfM). The positive relationship between welfare state and human well-being, stated in the literature by Pacek and Radcliff (2008) and Haller and Hadler (2006), motivates the choice of VfM as a potential determinant of happiness. Since it is a money’s worth measure, we believe it can provide further guidance to policy makers about redistribution policies and their effects on the aggregate level of happiness. Specifically, VfM is the ratio between public social expenditure and total tax revenue per capita. Public social expenditure<sup>2</sup> is the provision by public institutions of benefits to, and financial contributions targeted at, households and individuals in order to provide support during circumstances which adversely affect their welfare, provided that the provision of the benefits and financial contributions constitutes neither a direct payment for a particular good or service nor an individual contract or transfer. Such benefits can be either in the form of cash transfers, or by direct (“in-kind”) provision of goods and services. Total tax revenue, instead, is defined as compulsory, unrequited payments to general government. They are unrequited in the sense that benefits provided by government to taxpayers are not normally in proportion to their payments. The data on total tax revenue shown here refer to the revenues collected from taxes on income and profits, social security contributions, taxes levied on goods and services, payroll taxes, on the ownership and transfer of property, and other taxes. Data and definition were sourced by the OECD database. The rate of unemployment, usually considered to be one of the main determinants of happiness, is also included and sourced by the International Monetary Fund, World Economic Outlook Database. Furthermore, in

order to account for the possible effects of the recent sovereign debt crisis, we include a dummy variable with a switch on 2008, i.e. on the year in which Lehman Brothers declared bankruptcy. Therefore, dummy variables are associated to the constant (to measure possible shift in the Happiness Index) and to the Value for Money and Unemployment variables in order to investigate and test the effects of the crisis on the dynamics linking the social spending/tax ratios and unemployment, and happiness. We use yearly data for the following countries: Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, and Spain over the period 1980–2011 for a total of 300 observations. The empirical investigation consists of a panel cointegration analysis, aimed to disentangle the long vs short run relationship among the Happiness Index and its determinants.<sup>3</sup>

Preliminary analysis, using Breusch–Pagan LM test and modified Wald test for group-wise heteroskedasticity and cross-section independence, reject the null hypothesis (Table 1, Panel A). Therefore, we apply the second-generation tests of panel unit root (CADF by Pesaran, 2007) and cointegration (Westerlund, 2007). The former test concerns the existence of cross-sectional dependences, depending on whether unit root tests allow for potential correlations across residuals of panel units, while the latter test have good small-sample properties and high power compared to other popular tests like Pedroni (2004). Moreover, bootstrap  $p$ -values are computed under very general forms of cross-sectional dependence.<sup>4</sup> The null hypothesis of no cointegration has been tested by means of group-mean tests ( $G_a$ ,  $G_t$ ) and panel tests ( $P_a$ ,  $P_t$ ). The null hypotheses of no cointegration are rejected by all four tests (Table 1, Panel C).

After having highlighted the presence of cointegration, we proceed with the estimation of our panel model. The use of the Pooled Mean Group estimation (PMG) allows for the identification of the long-run equilibrium relationship (cointegration) amongst the variables of interest, taking into account for country specific effects. The PMG estimates a common long-run relationship across countries but still allowing for unrestricted country heterogeneity in the adjustment dynamics and fixed effects.<sup>5</sup>

Following Blackburne and Frank (2007), we assume an autoregressive distributive lag (ARDL) ( $p$ ,  $q$ ) dynamic panel specification of the following form:

$$H_{i,t} = \alpha_i + D\alpha_i + \sum_{j=1}^p \lambda_{i,j} H_{i,t-j} + \sum_{j=0}^q (\beta_{i,j} + D_{i,j}) X_{i,t-j} + \varepsilon_{i,t} \quad (1)$$

where  $H_{i,t}$  is the aggregate level of happiness in country  $i$  at time  $t$ ,  $\alpha_i$  is the country specific effect,  $D\alpha_i$  is a dummy variable

<sup>3</sup> Although bounded integer-valued random variables, such as the Happiness Index, cannot be integrated in the usual sense, see the discussion in Granger (2010), in many theoretical and applied studies they are modeled as  $I(1)$  processes. Cavaliere (2005) and Cavaliere and Xu (2014) are the only attempts to explain how the concept of  $I(1)$  can coexist with the constraints of a bounded process. They show that in the presence of (one or two) bounds, unit root tests based on standard asymptotic critical values become over-sized. As far as our analysis is concerned, we feel that in light of Cavaliere (2005) and Cavaliere and Xu (2014)’s findings (unit root tests based on standard asymptotic critical values become over-sized), not rejecting the null hypothesis further strengthens our findings.

<sup>4</sup> Since in small sample, as in this study, Westerlund (2007) warns that the results of the tests could be sensitive to the choice of the lag and lead lengths, we keep them equal to one. The  $p$ -values are for a one-sided test based on 800 bootstrap replications.

<sup>5</sup> Please note that as a robustness check, unit root as well as cointegration analyses, on individual series, were also performed controlling for the presence of structural breaks. Results, not reported for space constraints and available from the authors upon request, suggest the presence of unit root in all variables under consideration and a long run equilibrium among the Happiness Index and its determinants.

<sup>1</sup> If questions were essentially equivalent, a standardization process run by experts was allowed. Hence, these indices, by countries, are homogenized through the expert-transformation methodology (see Veenhoven, 1993, chapter 7).

<sup>2</sup> Devoted to health, old age, survivors, incapacity related, active and passive labor policies, family and housing.

**Table 1**  
Panel cointegration estimation.

Panel A. Cross-section independence			
Test	Test statistics ( $\chi^2$ )	p-value	
Breusch–Pagan LM test	88.588	0.000	
Modified Wald test	68.22	0.000	
Panel B. Panel unit root tests—CADF			
Variables	Test statistics (Z[t-bar])	p-value	
$H_{i,t}$	−0.242	0.404	
$VfM_{i,t}$	−0.699	0.242	
$U_{i,t}$	−0.626	0.734	
$\Delta H_{i,t}$	−10.253***	0.000	
$\Delta VfM_{i,t}$	−3.246***	0.001	
$\Delta U_{i,t}$	−3.233***	0.001	
Panel C. Westerlund ECM panel cointegration test			
	Test statistics	p-value	
Gt	−1.964**	0.021	
Ga	−1.424***	0.000	
Pt	−2.946**	0.015	
Pa	−4.096***	0.000	
Panel D. Panel cointegration results			
Parameters	Long-run coefficients	Parameters	Short-run coefficients
$\alpha_i$	3.240*** (0.628)	$\alpha_i$	3.763*** (0.335)
$D\alpha_i$	0.340*** (0.095)	$\Delta VfM_{i,t-1}$	0.057 (0.055)
$VfM_{i,t-1}$	0.171*** (0.054)	$\Delta DVfM_{i,t-1}$	3.773** (1.579)
$U_{i,t-1}$	−0.022*** (0.006)	$\Delta U_{i,t-1}$	−0.034*** (0.0109)
$DU_{i,t}$	−0.139* (0.079)	$\Delta DU_{i,t-1}$	−0.114 (0.153)
		$\omega_i$	−0.453*** (0.076)
Observations	290		290
Number of countries	10		10

Note: The Westerlund (2007) test assume no cointegration as the null hypothesis. Robust p-values are for a one-sided test based on 800 bootstrap replications.

\* Reject the null at 10%.

\*\* Reject the null at 5%.

\*\*\* Reject the null at 1%.

associated to the constant and  $X_{i,t}$  is the vector of four explanatory variables namely, (i)  $VfM_{i,t}$  is the ‘Value for Money’; (ii)  $U_{i,t}$  is unemployment; (iii)  $DVfM_{i,t}$  and (iv)  $DU_{i,t}$  are two dummy variables (corresponding to the 2008 global financial crisis) associated to value for money and unemployment, respectively.

The aim is to investigate the long-run equilibrium between  $H_{i,t}$  and  $X_{i,t}$  along with the short-run dynamics and deviation from the equilibrium. The estimation of the short-run coefficients, speed of adjustment, country-specific intercepts, and country-specific error variances are performed on a country-by-country basis. Hence, it is common to reparameterize (Eq. (1)) into the following error correction representation:

$$\Delta H_{i,t} = \alpha_i + \sum_{j=1}^{p-1} \lambda_{i,j} \Delta H_{i,t-j} + \sum_{j=0}^{q-1} (\beta_{i,j} + D_{i,j}) \Delta X_{i,t-j} + \omega_i (\varepsilon_{i,t-1}) + \mu_{it} \quad (2)$$

where  $\Delta$  is the first difference operator,  $\omega_i$  is the country-specific error correction speed of adjustment term,  $\lambda_{i,j}$  and  $\beta_{i,j}$  are the coefficients of the lagged variables,  $\alpha_i$  is the country specific effect,<sup>6</sup>

$D_{i,j}$  is a dummy variable associated to the constant and  $\mu_{it}$  is the disturbances term. The existence of a meaningful long-run effect with a stable adjustment dynamics requires  $\omega_i < 0$ . The results are presented in Table 1 (Panel D). The economic theory would suggest the level of happiness being positively related to changes in the portion of tax returned to citizens in the form of social spending. Consistent with the recent literature, we also control for unemployment that is expected to have a negative impact.

Our results can be summarized as follows. There is a long-run equilibrium between happiness and ‘Value for Money’ and unemployment with associated weights being statistically significant and with a positive (0.171) and a negative (−0.022) sign, respectively. There is no evidence of changes in the long run relationship following the recent financial crisis.

The error correction term (Eq. (2)) is negative and highly significant ( $\omega = -0.453$ ) suggesting cointegration among the variables and showing a rather fast speed of adjustment towards the equilibrium. Looking at the short run relationship we observe that while the VfM variable is not significant before the crisis, it becomes significant after the crisis (3.773). As for unemployment, the opposite pattern emerges with a negative and significant effect (−0.034) on happiness before the crisis only.

### 3. Conclusions

This paper has analyzed the effects of the ratio between taxes and social provision on the Happiness Index for ten European

<sup>6</sup> Pesaran et al. (1999, 2001) justify the use of a common long-run slope coefficient on the following ground: “there are often good reasons to expect the long-run equilibrium relationship between variables to be similar across groups/countries...”. This statement applies well to our group of countries, all belonging to the European Union and nine out of ten to the European Monetary Union.

countries using yearly data for the period 1980–2011. It uses, unlike previous studies, the ratio between taxes and social provision as a proxy for population share of welfare. The results can be summarized as follows. We found strong evidences of a relationship between social–tax ratio and happiness. Moreover, our findings suggest the important informations captured by the social–tax ratio variable in determining the Happiness Index. Of particular interest is the finding that the latter has become highly responsive to the former during the recent crisis. The linkages between what citizens would expect in return of the taxes paid and their well-being have clearly become stronger after the crisis and it should be taken into account in the debate on public policies and how these are perceived by tax-payers.

### Acknowledgments

We would like to thank the Editor, an anonymous referee and O. Cassero for very helpful comments and suggestions.

### References

- Blackburne, E.F., Frank, M.W., 2007. Estimation of nonstationary heterogeneous panel. *Stata J.* 7 (2), 197–208.
- Cavaliere, G., 2005. Limited time series with a unit root. *Econometric Theory* 21, 907–945.
- Cavaliere, G., Xu, F., 2014. Testing for unit roots in bounded time series. *J. Econometrics* 178 (2), 259–272.
- Di Tella, R., MacCulloch, J., Oswald, A.J., 2001. Preferences over inflation and unemployment: Evidence from surveys of happiness. *Amer. Econ. Rev.* 91 (1), 335–341.
- Frey, B.S., Stutzer, A., 2012. The use of happiness research for public policy. *Soc. Choice Welf.* 38 (4), 659–674.
- Granger, C.W.J., 2010. Some thoughts on the development of cointegration. *J. Econometrics* 158, 3–6.
- Haller, M., Hadler, M., 2006. How social relations and structures can produce happiness and unhappiness: An international comparative analysis. *Soc. Indicators Res.* 75 (2), 169–216.
- Helliwell, J.F., Layard, R., Sachs, J. (Eds.), 2012. *World Happiness Report*. The Earth Institute, Columbia University, New York.
- Layard, R., 2006. Happiness and public policy: A challenge to the profession. *Econ. J.* 116 (510), 24–33.
- Pacek, A.C., Radcliff, B., 2008. Assessing the welfare state: The politics of happiness. *Perspect. Polit.* 6 (2), 267–277.
- Pedroni, P., 2004. Panel cointegration: Asymptotic and finite sample properties of pooled time series tests with application to the PPP hypothesis. *Econometric Theory* 20, 597–625.
- Pesaran, M.H., 2007. A simple panel unit root test in the presence of cross section dependence. *J. Appl. Econometrics* 22, 265–312.
- Pesaran, M.H., Shin, Y., Smith, R.P., 1999. Pooled mean group estimation of dynamic heterogeneous panels. *J. Amer. Statist. Assoc.* 94, 621–634.
- Pesaran, M.H., Shin, Y., Smith, R.J., 2001. Bounds testing approaches to the analysis of level relationships. *J. Appl. Econometrics* 16 (3), 289–326.
- Stutzer, A., Frey, B.S., 2014. *Recent Developments in the Economics of Happiness*. Edward Elgar, Cheltenham, UK.
- Veenhoven, R., 1993. *Happiness in Nations: Subjective Application of Life in 56 Nations*. Erasmus University, Rotterdam.
- Westerlund, J., 2007. Testing for error correction in panel data. *Oxford Bull. Econ. Stat.* 69, 709–748.