Mariusz Doszyń

Women and men propensities to smoke and drink alcohol

2013

WOMEN AND MEN PROPENSITIES
TO SMOKE AND DRINK ALCOHOL

Mariusz Doszyń, Ph.D.

Szczecin University
Econometrics and Statistics Institute
71-101 Szczecin, Mickiewicza 64, room 320
e-mail: mariusz.doszyn@gmail.com

Abstract

In the article problems connected with possibilities of analyzing human behavior in context of propensities were discussed. Main focus was put on differences in propensities with respect to sex, also in context of E. Fromm's personality theory. Methodological issues related to propensities were presented. Definition of propensity and methods of measuring propensities were also proposed. In empirical example differences in propensity to smoke cigarettes and propensity to drink alcohol with respect to sex in Polish voivodeships in year 2004 were estimated. Also, econometric models explaining that kind of propensities were introduced.

Keywords: propensity, propensity measures, theories of propensities, propensities according to sex, propensity to smoke and drink alcohol, econometric analysis of propensities impact.

JEL classification: B21, B40, C01, C13, C21, C50.

Introduction

What is propensity? According to the proposed definition, propensity could be defined as a "slope of posture" towards something (or somebody) that makes probability of certain event higher[1]. Propensities impact human behavior and make probabilities of many events different. There are many kind of propensities that influence economic processes. The most important are propensity to consume, save, invest, money storing, risk, and cooperate. In case of propensity to consume many specific propensities could be distinguished, as for example the propensity to consume tobacco or alcoholic beverages, etc.

The main hypothesis of the article is that sex is one of the most important factors influencing many kinds of propensities, among them the propensity to smoke and drink alcohol. In many situations researchers do not have *a priori* knowledge about propensities. That *a priori* knowledge could originate from psychological, sociological or medical surveys. If we did not possess that kind of *a priori* knowledge, we could use such variable as sex as a proxy variable.

Why propensities might matter in economics? In many economic theories, especially in theories based on G.S. Becker *homo oeconomicus* scheme, there are many assumptions concerning human behaviour that are rarely fulfilled in economic reality. In neoclassical economics it is established that people calculate precisely, maximize utility and are to a high extent egoistic. It has been proved that these statements are not always consistent with real behaviour.

Representatives of *behavioural economics* (D. Kahneman, A. Tversky, R. Thaler, M. Rabin) argued that people make many systematic errors in judgment processes and rather use certain set of simple *heuristics* while making decisions (*heuristics and biases paradigm*)[2]. It was also proved that people make systematic mistakes while evaluating past and future utility, so it is hard to maintain the assumption about utility maximization. In case of social behaviour not only selfishness but also *the rule of reciprocity* seems to be important. Detailed discussion into these phenomena and other issues related with propensities could be find in Doszyń's and Hozer's publications[3].

Propensities also constitute a very important part of John M. Keynes' economic system. According to Keynes, propensities are determined by a "psyche" of the society[4], while H. Leibenstein thought that propensities and tastes made calculation subjective and not so rigorous, so people were being pushed out of G.S. Becker's *homo oeconomicus* scheme. H. Leibenstein also believed that propensities affected *the efficiency X* (level of effort specific for a given person).

According to philosophical literature, two groups of propensity theories could be distinguished. The first group consists of theories in which propensity is understood as *a characteristic of a whole situation*. In this attitude propensity depends both on objective and subjective factors. *Human (psychological) propensities* are just one of the conditions that determine *propensity of a whole situation*. These theories are mostly based on K. Popper's works[5].

The second group contains these theories in which propensity depends on *internal characteristic of given object* (human being, collectivity, certain thing). In case of human beings propensities depend mainly on psychological structure or – in other words – on type of personality. In this view, propensity describes internal (psychological) structure of people. This attitude to propensity was presented by C. Peirce[6]. His concept of propensity is used in this article. Propensities are understood as factors describing psychological aspects of human behavior that make probabilities of certain events higher. Propensities are therefore generalized *psychological* causes of events. Psychological features of men and women are to a high extent different, so sex could be treated as a factor differentiating the propensities. There are psychological differences between men and women, so propensities may be also different according to sex. It refers to such propensities as propensity to smoke and drink alcohol.

1. Why economic propensities of women and men are different?

There are many factors influencing human decisions and actions. Among them the type of personality seems to be crucial. It is often stated that, in general, women and men differ according to their type of personality. The hypothesis could be set that some types of personalities are more common amongst women and some – amongst men.

According to E. Fromm, personality could be understood as a set of innate and acquired psychical peculiarities that characterize given person[7]. Innate properties constitute temper while acquired – character. Character could be, to some extent, shaped. E. Fromm claimed that character influenced not only behavior, but feelings and thoughts as well.

It could be assumed that character determines propensities. Characterological orientation is a specific emotional array that expresses itself also by means of certain propensities. Propensities might be understood as derivatives of a character.

E. Fromm proposed dynamic concept of character that should be treated as an evolvement of S. Freud's concept, according to which character is a system of endeavors that are the basis of human behavior (but are not always identical with it). E. Fromm accepted some of S. Freud's

assumptions that character traits are fundaments of behavior and should be deduced from it. Character qualities form strong, often unconscious, forces and the most important are not single traits but the whole characterological orientation that shapes specific personal traits[8].

According to E. Fromm, character could be defined as a relatively stable form of energy distribution in processes of assimilation (of things) and socialization. E. Fromm marked out five types of characterological orientations: receptive, exploitative, hoarding, marketing and productive. The character of every person consists of elements of all the aforementioned orientations but usually one of them is prevailing. E. Fromm classified first four orientations as being unproductive. They could have positive and negative aspects depending on the level of personal vitality. Typical attributes of these orientations are presented in Table 1.

Table 1. Positive and negative aspects of characterological orientations according to E. Fromm

Positive aspects	Negative aspects
Receptive orientation	
Acceptable, sensitive, sacrificing, modest, engaging, elastic, adapted, idealistic, polite, optimistic, trustful	Passive, without opinion, subordinate, without pride, parasitical, without rules, servile, unrealistic, cowardly, wishful, naive
Exploitative orientation	
Active, able to initiative, demanding, proud, impulsive, self confident, winsome	Exploitative, aggressive, egocentric, conceited, impetuous, arrogant, seductive
Hoarding orientation	
Practical, economical, cautious, with reserve, patient, careful, conservative, calm, not stressful, systematic, loyal	Without imagination, stingy, suspicious, cold, lethargic, anxious, stubborn, pedantic, obsessive, greedy
Marketing orientation	
Purposeful, changeable, youthful, thinking about future, open minded, sociable, experimenter, not dogmatic, effective, curious, intelligent, adaptive, tolerant, brilliant, generous	Opportunistic, inconsequent, infantile, without past and future, without values, without goals, relativistic, too active, tactless, indifferent, stupid, wasteful

Source: Fromm (1999), pp. 98–99.

Productive orientation characterizes a mature, independent, conscious, active, creative and spontaneous person. It is some kind of an ideal type of character (and personality). According to E. Fromm everybody is productive but to a different extent.

To sum up, economic propensities of women and men could vary because of differences in their personality types. It is commonly stated that women have different character orientations than men. It is generally acknowledged that women more often have traits that are typical of receptive, hoarding and marketing orientations while men typically have features typical of

exploitative orientation. This could cause differences in economic behavior of women and men also in the context of propensity to smoke and drink alcohol.

There is a common opinion that women are less inclined to smoke and drink alcohol. There are probably many reasons for this. Focusing on psychological causes, it could be due to the fact that receptive, hoarding and marketing orientation prevails amongst women. With respect to the receptive orientation it could be assumed that women are usually more sacrificing, modest, engaging, idealistic and trustful. In many cases women are also more practical, economical, cautious, patient, careful, systematic and loyal. These characteristics describe the hoarding orientation. According to the marketing orientation, women often think about future and are open minded, sociable, less dogmatic, tolerant and generous. As it has been emphasized, all these traits constitute receptive, hoarding and marketing orientation and could make women less prone to smoke and drink alcohol.

In case of men such features as impulsiveness, confidence, aggressiveness, egocentricity, conceit, impetuosity, arrogance or seductiveness are more frequent. These traits could in turn make men more inclined to smoke and drink alcohol.

In general, sex is often related with personality type. Personality types are in turn related with specific propensities, also with the propensity to smoke and drink alcohol. If certain types of personality are more frequent amongst women, we could assume that given propensities depend on sex as well.

2. Methods of measuring propensities

Intensity of a propensity could be measured by means of frequency and trigonometric methods[9]. In frequency method the level of propensity is calculated as a:

$$s = \frac{m}{n} \tag{1}$$

where:

  s − measure of propensity,
  m − number of cases in which propensity appears,
  n − number of all possible cases.

Propensity might also be presented in degrees, by means of trigonometric measure. In trigonometric method propensity is defined as a specified angle (see Figure 1).
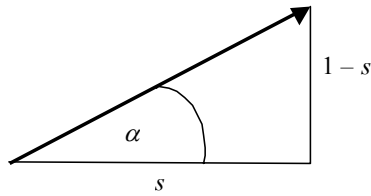
Fig. 1. Trigonometric interpretation of propensity

Source: individual study.

In trigonometric method propensity is measured as an angle α. Tangent of this angle could be obtained on the basis of the following formula:

$$\operatorname{tg} \alpha = \frac{1-s}{s} \qquad (2)$$

where s – frequency measure of propensity.

The higher the propensity, the higher the "slope" (and the lower the angle α). The trigonometric method could be useful while presenting the strength of propensity in a graphical way.

3. Empirical example

In the empirical research the author estimated the propensity to smoke cigarettes and drink alcohol according to sex in Polish voivodeships in 2004. At the first stage both frequency (1) and trigonometric (2) method were used. The above mentioned propensities are important in the context of economic processes because they could determine what H. Leibenstein called *the X efficiency*. We might assume that a person with higher propensity to smoke cigarettes and higher propensity to drink alcohol has lower *X efficiency*.

It was established that a given person has a propensity to smoke cigarettes if he (or she) smokes cigarettes every day. The propensity to drink alcohol was assigned to people who drink alcohol 1–4 times a week (or more often).

Table 2. Frequency measure of the propensity to smoke cigarettes (%)
in Polish voivodeships in 2004

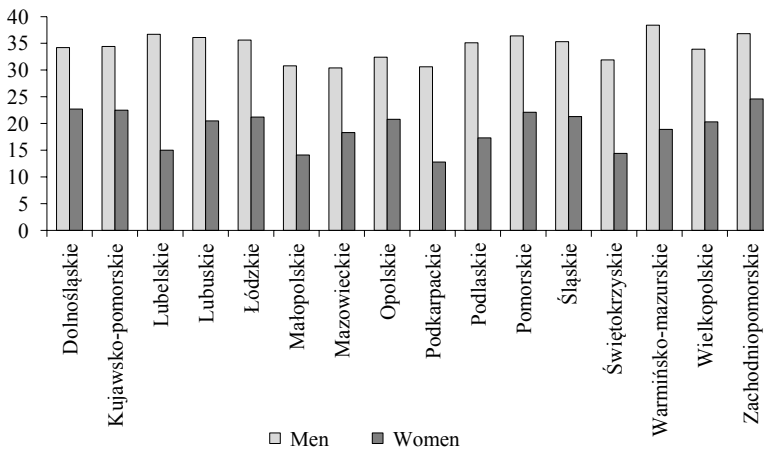| Voivodeship	Men	Women
Dolnośląskie	34.2	22.7
Kujawsko-pomorskie	34.4	22.5
Lubelskie	36.7	15.0
Lubuskie	36.1	20.5
Łódzkie	35.6	21.2
Małopolskie	30.8	14.1
Mazowieckie	30.4	18.3
Opolskie	32.4	20.8
Podkarpackie	30.6	12.8
Podlaskie	35.1	17.3
Pomorskie	36.4	22.1
Śląskie	35.3	21.3
Świętokrzyskie	31.9	14.4
Warmińsko-mazurskie	38.4	18.9
Wielkopolskie	33.9	20.3
Zachodniopomorskie	36.8	24.6
Total	33.9	19.3

Source: GUS.

Fig. 2. Frequency measure of propensity to smoke cigarettes (%) in Polish voivodeships
in 2004

Source: GUS.

In all voivodeships men have much higher propensity to smoke cigarettes than women and
the differences are rather remarkable. Amongst men the highest propensity to smoke cigarettes

was in Warmińsko-mazurskie, Zachodniopomorskie and Lubelskie. Amongst women the propensity was the highest in Zachodniopomorskie, Dolnośląskie and Kujawsko-pomorskie. The analyzed propensity was at the lowest level in Mazowieckie, Podkarpackie and Małopolskie (men) and Podkarpackie, Małopolskie and Świętokrzyskie (women).

Also, a trigonometric method was used to present the intensity of the propensity to smoke cigarettes (in total) with respect to sex (Figure 3). We could see that "slope" is much higher in case of men (the angle α is much smaller). This confirms the previous conclusions about the higher propensity to smoke cigarettes amongst men.
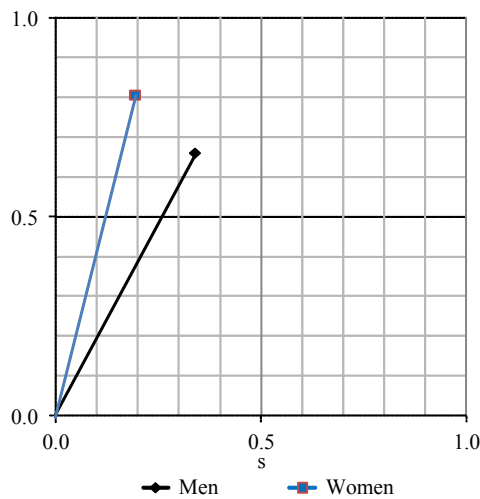

Fig. 3. Trigonometric measure of the propensity to smoke cigarettes among men ($\alpha_m = 62.85°$) and women ($\alpha_w = 76.55°$) in Poland in 2004

Source: own calculations.

Table 3. Frequency measure of the propensity to drink alcohol (%) in Polish voivodeships in 2004

Voivodeship	Men	Women
1	2	3
Dolnośląskie	27.7	8.5
Kujawsko-pomorskie	22.1	5.4
Lubelskie	25.2	6.7
Lubuskie	25.5	6.7
Łódzkie	27.1	10.6
Małopolskie	24.1	8.1
Mazowieckie	27	9.6

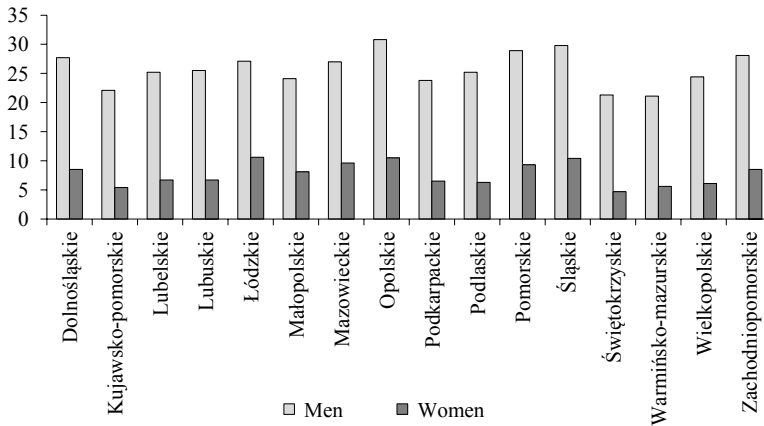| 1	2	3
Opolskie	30.8	10.5
Podkarpackie	23.8	6.5
Podlaskie	25.2	6.3
Pomorskie	28.9	9.3
Śląskie	29.8	10.4
Świętokrzyskie	21.3	4.7
Warmińsko-mazurskie	21.1	5.6
Wielkopolskie	24.4	6.1
Zachodniopomorskie	28.1	8.5
Total	26.2	8.1

Source: GUS.

Fig. 4. Frequency measure of the propensity to drink alcohol (%) in Polish voivodeships in 2004

Source: GUS.

Even higher were differences between men and women with respect to the propensity to drink alcohol. In case of men the propensity to drink alcohol was the highest in Opolskie, Śląskie and Pomorskie and the lowest – in Warmińsko-mazurskie, Świętokrzyskie and Kujawsko-pomorskie. In case of women the analyzed propensity was the highest in Łódzkie, Opolskie and Śląskie and the lowest – in Świętokrzyskie, Kujawsko-pomorskie and Warmińsko-mazurskie.

The total propensity to drink alcohol obtained by means of trigonometric method confirms the conclusion that the intensity of this phenomenon is much higher in case of men (Figure 5).
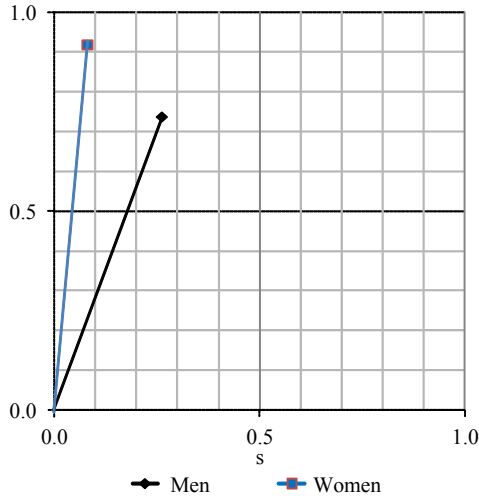
Fig. 5. Trigonometric measure of the propensity to smoke cigarettes among men ($\alpha_m = 70.45°$) and women ($\alpha_w = 84.96°$)

Source: own calculations.

In the next stage econometric impact of income and price index of tobacco and alcoholic beverages on propensity to smoke and drink alcohol with respect to sex was analyzed. Also model explaining average expenditures on tobacco and alcoholic beverages was estimated. In the last model all kind of propensities as well as income and price index were taken as explanatory variables. Data describe voivodeships in Poland in year 2004.

In the model clarifying the men's propensity to smoke all the explanatory variables (income and price index) are not significant (significance level $\alpha = 0.05$). The price index (x_{2i}) is significant only in the model (3) but the estimate next to this variable is positive and very high so this variable has been omitted.

The estimated models have the following form:

$$\ln \hat{s}_{swi} = -7.897 + 0.960 \ln x_{1i} \tag{3}$$

$$\ln \hat{s}_{dmi} = -5.462 + 0.632 \ln x_{1i} \tag{4}$$

$$\ln \hat{s}_{dwi} = -13.357 + 1.660 \ln x_{1i} \tag{5}$$

$$\ln \hat{y}_i = 0.428 + 0.417 \ln s_{swi} + 0.251 \ln s_{dmi} + 0.546 \ln x_{1i} \tag{6}$$

where:

s_{sw} – frequency measure of the women's propensity to smoke,

s_{dm} – frequency measure of the men's propensity to drink alcohol,

s_{dw} – frequency measure of the women's propensity to drink alcohol,

x_{1i} – disposable income *per capita* (in PLN),

x_{2i} – price index of tobacco and alcoholic beverages (previous year = 100),

y_i – average expenditures for tobacco and alcoholic beverages.

All the parameters' estimates in the models (3)–(6) are valid (significance level $\alpha = 0.05$).

In the models (3)–(5) the estimates next to the income (x_{1i}) and the price index (x_{2i}) are interpretable as elasticities with respect to frequency measures of propensity. As we can see, income elasticity is equal to 0.960 with respect to the women's propensity to smoke, 0.632 – with respect to the men's propensity to drink and, which is quite surprising, 1.660 – with respect to the women's propensity to drink. In the latter instance the income elasticity is higher than one, so in case of women the propensity to drink could be treated as some kind of a "luxury" good. In other cases income elasticity was lower than one.

What is particularly interesting when analyzing socio-economic processes is the impact of propensities on other phenomena. In the model (6) all the presented propensities are taken as explanatory variables in the model which explains average expenditures on tobacco and alcoholic beverages. Therefore, in the model (6) the propensity to smoke and drink alcohol with respect to sex as well as the income and price index constitute the original set of explanatory variables.

Table 4. Estimated standard errors (S_e), adjusted determination ratios ($\bar{R}^2$), information criteria (*AIC*, *BIC*, *HQC*) and empirical significance levels in Doornik-Hansen and White tests

Statistic/model	3	4	5	6
S_e	0.174	0.096	0.197	0.043
$\bar{R}^2$	0.220	0.299	0.425	0.914
AIC	−8.739	−27.687	−4.689	−51.747
BIC	−7.194	−26.142	−3.144	−48.656
HQC	−8.660	−27.608	−4.610	−51.588
Doornik-Hansen test	0.360	0.975	0.728	0.772
White test	0.107	0.951	0.944	0.215

Source: own calculations.

Three variables turn out to be significant (their significance level $\alpha = 0.05$): the women's propensity to smoke, the men's propensity to drink alcohol and the disposable income. All these variables are positively related with average expenditures on tobacco and alcoholic beverages.

The characteristics of the models are presented in Table 4. Such diagnostic measures as the estimated standard error (S_e), the adjusted determination ratio ($\bar{R}^2$) and the information criteria (*AIC*, *BIC*, *HQC*) are exhibited. Also, the empirical significance levels for Doornik-Hansen test (residuals normality) and White test (residuals homoscedasticity) are calculated. As we can see, only the model (6) is well fitted. In other models the adjusted determination ratio is between 0.299–0.436. In all the models there is no reason to reject a null hypothesis that residuals are normally distributed and homoscedastic.

Conclusions

Many economic theories are based on the assumptions concerning human behavior that are inconsistent with real processes of decision making and human actions. This is why such category as human propensities could be useful while analyzing socio-economic phenomena. Gender is one of the most important factors that differentiate human behavior. Differences between men and women are often remarkable and should be taken into account in economic theories. Many differences between men and women might be a result of differences in personality types. It could be assumed that women have other psychological features than men and this could cause different propensities and behavior. The differences are particularly remarkable in case of such propensities as the propensity to smoke and drink alcohol which are much higher in case of men.

Notes

[1]   Hozer, Doszyń (2004).
[2]   Rabin (1996).
[3]   Doszyń (2008); Doszyń, Hozer (2008).
[4]   Keynes (1946); Doszyń (2012).
[5]   Popper (1990).
[6]   Gillies (2000).
[7]   Fromm (1999).
[8]   Ibidem.
[9]   Hozer, Doszyń (2004).

References

Doszyń, M. (2008). *Statystyczno-ekonometryczna analiza skłonności ludzkich*. Szczecin: Wydawnictwo Naukowe Uniwersytetu Szczecińskiego.

Doszyń, M. (2012). Econometric Analysis of the Impact of Propensities on Economic Occurrences – a Macroeconomic Perspective. *Folia Oeconomica Stetinensia* 10 (18) 2011 (12).

Doszyń, M. & Hozer, J. (2008). Econometric Models of Propensities. *Folia Oeconomica Stetinensia* 6 (14) 2007.

Fromm, E. (1999). *Niech się stanie człowiek*. Warszawa–Wrocław: Wydawnictwo Naukowe PWN.

Fromm, E. (2000). *Zerwać okowy iluzji*. Poznań: Rebis.

Fromm, E. (2005). *Ucieczka od wolności*. Warszawa: Czytelnik.

Gillies, D. (2000). Varietes of Propensity. *British Journal for the Philosophy of Science*. 51.

Hozer, J. & Doszyń, M. (2004). *Ekonometria skłonności*. Warszawa: PWE.

Hozer, J. (2002). Ekonometryczna interpretacja skłonności w ekonomii. *Przegląd Statystyczny* No. 3/2002.

Keynes, J.M. (1946). *The General Theory of Employment. Interest and Money*. London: Mac-Millan and Co.

Popper, K.R. (1990). *A World of Propensities*. Bristol: Thoemmes.

Rabin, M. (1996). *Psychology and economics.* Berkeley: University of California.