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THE EXPORT PERFORMANCE OF THE EURO AREA: A PANEL QUANTILE REGRESSION APPROACH

ABSTRACT: *This paper examines the impact of relevant factors on merchandise exports, volume growth, and the competitiveness of euro-area countries. It uses panel regressions to explain the development of merchandise exports in the euro-area countries by various price/cost competitiveness indicators, development of foreign and domestic demand, and the structure of merchandise exports. A cointegration analysis of panel time series was established by applying econometric tests and the cointegration equation for the period 1999–2018 was estimated using FMOLS (Fully Modified OLS) and DOLS (Dynamic OLS) estimators. We show that the increase in the share of information communication technology (ICT) product exports in the total merchandise exports of euro-area members had a positive impact on their export performance. The empirical results show that foreign demand has a positive impact on real merchandise exports, while the estimated coefficients decreased from the lower to upper quantiles. The results regarding price and cost competitiveness differ depending on the choice of indicators, but in general they are less robust. Therefore, we conclude that in the long run, non-price factors will play an increasingly important role in strengthening the competitive position of euro-area countries in international markets.*

KEY WORDS: *Exports, real effective exchange rate, competitiveness, foreign demand, internal demand, panel data, cointegration, quantile regression*

JEL CLASSIFICATION: E32, F32, F41, F44.

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1. INTRODUCTION

The establishment of the European Central Bank (ECB), which is responsible for monetary policy in the euro area, and the introduction of the euro as the official currency of 19 EU member countries created the framework for the emergence of a monetary union. The path to monetary union entailed harmonising economic conditions and regulations in a number of European Union countries. The coordination of macroeconomic policies is an important prerequisite for the normal functioning of the euro area and for the convergence of its members. A key pillar of coordination is the Stability Pact, which should allow the budget deficit to be kept under control (at no more than 3% of GDP). This threshold was first crossed by Germany, France, and especially Greece, which casts doubt on the eurozone's ability to uphold this rule. Thus, over the course of time, the differences in eurozone members' productivity and inflation levels have increased the pressure on public debt growth in countries that have lost competitiveness within the euro area. The single currency and the common monetary policy for the eurozone have abolished the possibility of using the exchange rate as an instrument of economic policy; that is, as an instrument for raising the export competitiveness of the economically weaker members of the euro area. In some member states the current account deficit has increased. Although the integration of the financial and capital markets has led to an equalisation of interest rates, the rise in government debt has created a gap in the interest rates on eurozone members' government bonds.

When the global financial crisis erupted in 2008 it quickly shifted to eurozone members, and shortly thereafter it was followed by a eurozone sovereign debt crisis.[1] This slowed the economic recovery of the eurozone, and additional difficulties arose with the rise of protectionism in the world economy. The current economic forecasts for the euro area's economic growth are much lower than for US and emerging markets (see IMF 2019 and OECD 2019). Although all euro-area members have made significant progress in reducing their current account imbalance and public debt, with the outbreak of the global crisis the constraints of

[1] Some authors believe that the eurozone crisis is not a sovereign debt crisis, but rather that major intra-eurozone capital flows occurred prior to the crisis (see Baldwin and Giavazzi 2015, p.23). The cost of resolving the crisis has been mostly referred to over-indebted eurozone countries (Frieden and Walter 2017).

the eurozone became apparent. The absence of a centralised fiscal policy, low labour mobility within the eurozone, and growing productivity differences after the outbreak of the crisis have all become visible. This makes it difficult to respond to asymmetric shocks. The ECB's non-standard monetary policy significantly eased the euro area's internal tensions but could not remove its inherent constraints.

Many countries' trading performance is influenced by Global Value Chains (GVCs). These production models are widespread in manufacturing processes worldwide, especially in the manufacturing sector. The existence of GVCs greatly affects international trade between large countries and eurozone export performance is significantly influenced by GVCs.[2] The eurozone countries are heavily involved in cross-border production chains, and their participation in GVCs is large compared to the world average, and significantly higher than in the US and China (ECB 2019, p.12). In addition, euro-area countries are more involved in regional than in global GVCs. As a result, an increasing share of foreign value added is emerging in euro-area exports (ECB 2017, p.77) so that the countries are competing with each other at certain stages of global value creation. The participation in GVCs can increase foreign demand elasticity outside the eurozone.

Prior to the outbreak of 2008 global financial crisis the current account balance in the euro-area countries varied between countries. The indebted euro-area countries (Greece, Portugal, Spain, Ireland) which run large current account deficits entered an adjustment process after the 2008 financial crisis. The deficits that had been accumulated prior to the outbreak of the crisis have led to these countries having large external indebtedness. Efstathiou and Wolff (2017) studied the adjustment processes in these countries for the period 2007–2016 and found that in most countries adjustment was achieved through exports, while imports remained flat or increased more slowly. According to their survey, the trade balance of Spain and Portugal was adjusted by about 8.5 percentage points of GDP, exports contributed 8 and 11 percentage points respectively, while the contribution of imports (increase in imports) was 0.5 and –2.5 percentage points, respectively. In Ireland, according to the same survey, exports contributed to the improvement of the trade balance by 60pp. and imports by 43pp. Only in Greece

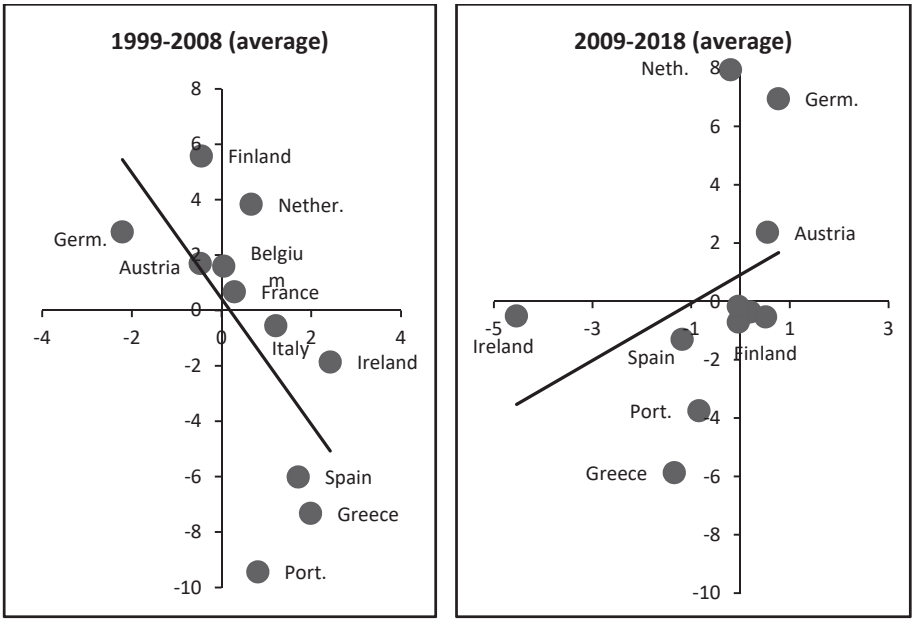
[2] Although the growth of global value chains has slowed since the global financial crisis of 2008–2009, it has not actually been interrupted. Data for 2017 show that complex GVCs grew faster than GDP (Li, Meng, and Wang 2019, p.9).

has a massive contraction in imports contributed to reduction in the deficit, while exports did not play a significant role in the adjustment. Thus, the research shows that export growth is the main channel of current account adjustment in the indebted euro-area countries.

The export competitiveness of euro-area countries is significantly influenced by labour costs, which are recorded in the development of their current account balances (Figure 1).

The countries which experienced improvements in their current account (as % of GDP) for the period 1999–2008 were also the countries where the unit labour costs (ULC) were stagnant (Germany, Austria, Finland), while the countries with a rise in ULC experienced worsening current accounts (Greece, Portugal, Spain, Ireland, and Italy). In the post-crisis period (2009–2018), Greece, Spain, and Portugal reduced labour costs but still had a current account deficit, which was lower than before the outbreak of the crisis.

Figure 1: Current account and unit labour costs

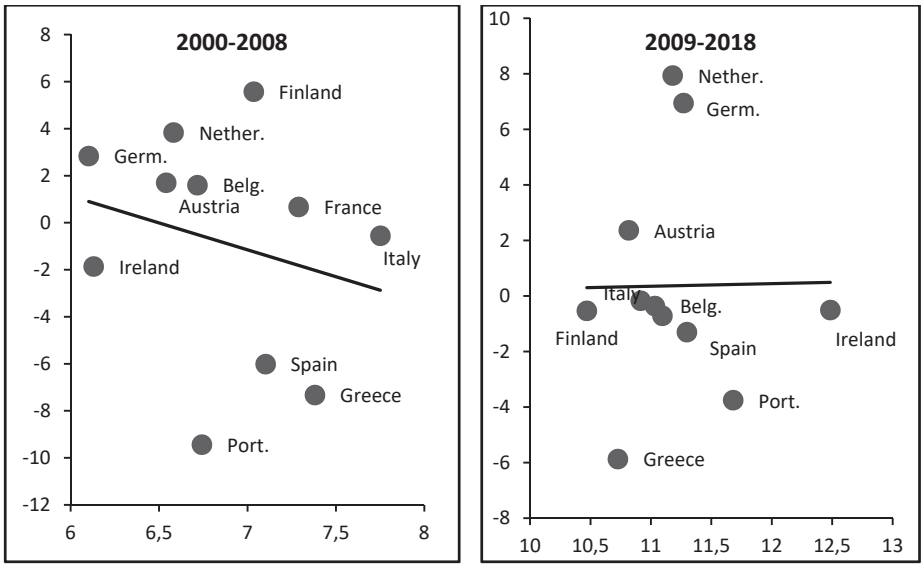


Note: X axis – unit labour costs (year on year); Y axis – current account (GDP percentage points).
Source: Autor's calculation based on Eurostat data.

The increase in exports has significantely contributed to the reduction of the current account deficit in most euro-area countries. The relationship between exports and the current account balance of the selected euro-area countries is given in Figure 2.

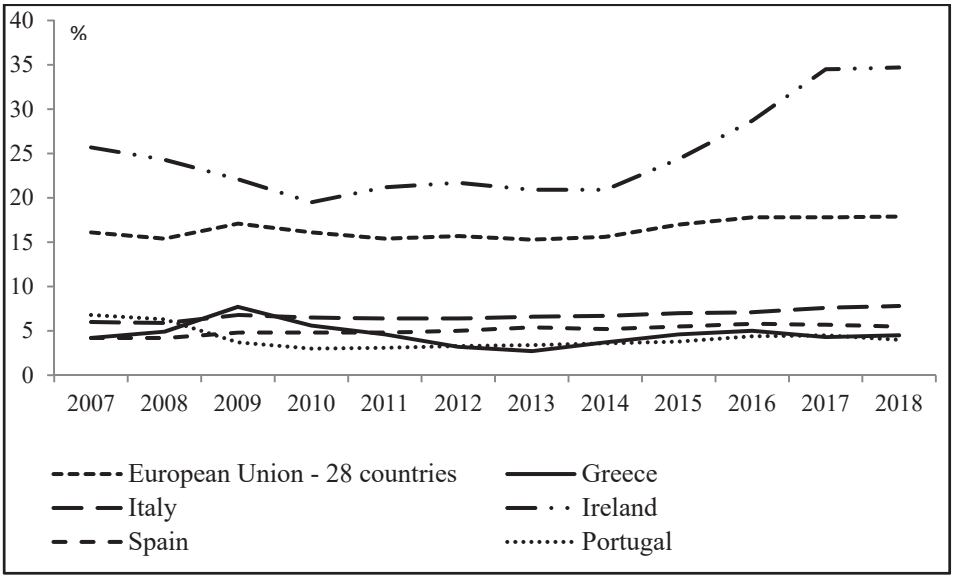
According to Figure 2, countries that lost cost competitiveness in the period before 2008 had a significant increase in volume exports of goods and services (the costs expressed through unit labour costs are given in Figure 1). At the same time, these countries accumulated a larger current account deficit (as % of GDP) than the other countries. In the period 2009–2018 the current account balance of all periphery EU members improved. In some countries, such as Greece, this improvement was the result of a reduction in imports due to a reduction in domestic demand.

Figure 2: Current account and exports



Note: X axis – exports of goods and services, chain-linked volumes, index 2010=100 (cumulative); Y axis – current account (GDP percentage points) (average).
Source: Author's calculation based on Eurostat data.

Figure 3: High-tech exports – Exports of high technology products as a share of total exports



Note: The data shows the share of exports of all high technology products in total exports. High technology products are defined according to SITC Rev. 4 (2007) as the sum of the following products: Aerospace, Computers–office machines, Electronics–telecommunications, Pharmaceuticals, Scientific instruments, Electrical machinery, Chemicals, Non-electrical machinery, Armaments. The total exports do not include intra-EU trade. Data for years prior to 2007 is not available.
Source: Author's calculation based on Eurostat data.

The structure of merchandise exports significantly influences the export dynamics and trends of certain euro-area countries (see Figure 3). Figure 3 shows that in the export of high-technology products the peripheral euro-area members are lagging behind the EU average, as the main market for their merchandise exports.

According to Figure 3, the peripheral EU members have a lower share of high-tech products in their exports than the EU average (the exception is Ireland, which has a higher share). This means that products with a lower level of technological intensity dominate in the exports of peripheral countries. This export structure suggests that exporters from these countries are facing strong

export competition from low-income countries (mostly exports from China).[3] Countries with a higher share of high-tech products than the euro-area average have higher export opportunities in the world market.[4]

The aim of this paper is to examine the impact of price competitiveness and foreign and domestic demand on euro-area merchandise exports. This will determine whether the most indebted euro-area countries divert domestic production into exports when faced with a fall in domestic demand, thereby compensating for the losses resulting from the reduced domestic demand.

A significant indicator of international price competitiveness is the movement in the real effective exchange rate (REER). The tendencies of the REER of euro-area countries are given in Figure 4. It shows the periphery countries, as they experienced the greatest loss of competitiveness.

Figure 4 shows that the REER indices of peripheral euro-area members had an upward trend after the introduction of the euro. The REER of Italy and Portugal entered the appreciation area in 2003, joined by Ireland in 2004, Spain in 2007, and Greece in 2009. This REER growth trend pushed competitiveness downwards, both in relation to third countries and within the Economic and Monetary Union (EMU). After 2012 all countries (except Italy in 2013 and 2014) experienced REER depreciation. Greece and Ireland had the best competitiveness performance. The growth trend of this index has been registered in all the countries since 2015. REER based on export unit values has the same trend, appreciating steadily in Greece and Italy by some 20% between 2000 and 2003. Moving into the REER appreciation area meant a loss in price competitiveness of exports (see ECB 2005, p.15).

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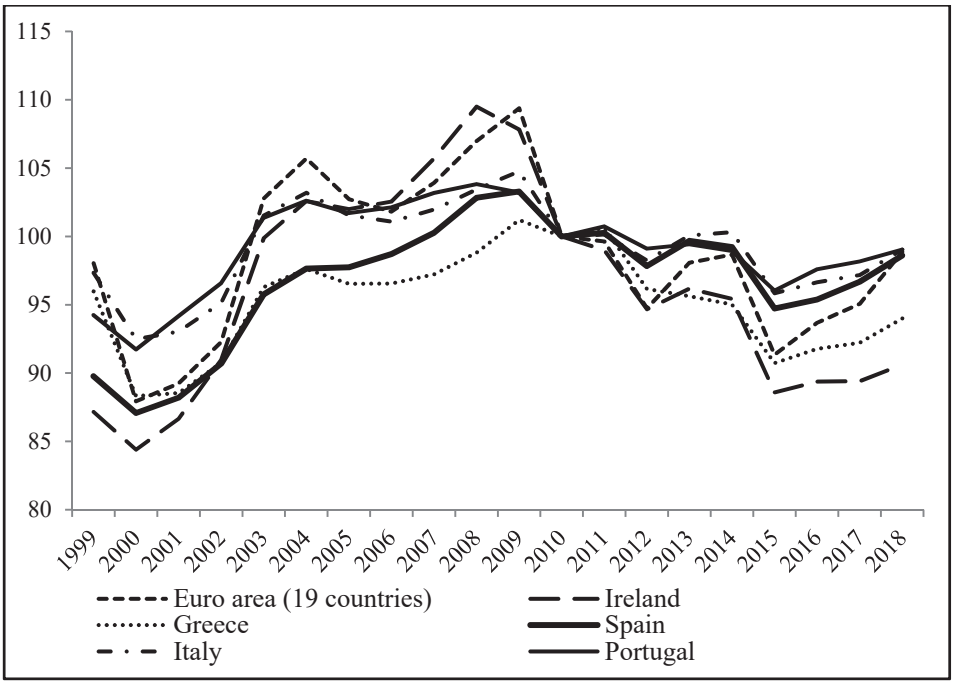
[3] Wierts, van Kerkhoff and de Haan (2011) find that the euro area countries (core EMU countries) have a higher technological intensity of exported goods and lower export elasticity with respect to the real exchange rate, while the opposite occurs in peripheral members. Higher technological intensity provides the opportunity for higher profit margins.

[4] The ECB (2019) study analyses the dynamics of the share of total euro-area merchandise exports in world merchandise exports. The research finds that in the period 2000–2014 the old members lost and the new members increased global market share. The changes in market share are similar for gross exports and exports based, on the value added concept.

Figure 4: Real effective exchange rate of eurozone peripheral members



Note: Real effective exchange rate (deflator: consumer price index – 42 trading partners – industrial countries) Index, 2010=100. Double export weights are used to calculate REERs, reflecting not only competition in the home markets of the various competitors, but also competition in export markets elsewhere. A rise in the index means a loss of competitiveness.
Source: Author's calculation based on Eurostat data.

The deep recession in 2009 led to a deterioration in the eurozone's macroeconomic performance. There was a physical decline in euro-area merchandise exports in 2009. Although recovery in all countries had already taken place in 2010, euro-area merchandise exports failed to return to the pre-crisis trend track. The euro-area economies hardest hit by the crisis managed to increase their physical export volumes in the post-crisis period, thereby reducing their current account deficits (Ireland, Greece, Cyprus). Estonia, Lithuania, Latvia, and Slovenia also achieved a dynamic increase in the volume of their goods exports.

Our paper aims to examine the impact of relevant factors on euro-area merchandise exports. Given that the eurozone was hit by a deep recession in 2009 and that there was a structural break in the time series representing merchandise exports and economic growth – as with most other variables, in our paper we will estimate the parameters for two periods: the period before the crisis in 2008 (1999–2008), and the period after the crisis (2009–2018). The appearance of a structural break in the time series in 2009 will be modelled by the introduction of a 'step' dummy variable, since there has been a change in the intercept and slope of the time series trend. This dummy variable will also include the impact of the sovereign debt crisis, which began with the collapse of Iceland's banking system in 2008 and then spread to Portugal, Italy, Ireland, Greece, and Spain in 2009.

Although there is a large body of literature that analyses export demand equations, this paper expands the analysis of export competitiveness in the euro-area countries. It contributes to the existing literature by including an additional regressor in the export equation – the share of ICT product exports in the total merchandise exports of each euro-area member – as well as the traditional explanatory variables: price and income. In addition, this paper follows Esteves and Rua (2013) in including domestic demand as an additional explanatory variable. The empirical analysis in this paper uses panel methodology. This approach is less sensitive to outliers and the multicollinearity between explanatory variables (Baltagy 2008). In this paper we look at two models that are estimated using FMOLS and DOLS estimators (see Phillips and Hansen 1990). The analysis in this paper covers the period 1999–2018. The main contribution of this work is that it uses panel analysis and quantile regression to assess the impact of selected export factors on different points of merchandise exports' conditional distribution in euro-area countries. To the best of the author's knowledge, this paper is the first attempt at analysing export performance in euro-area countries using quantile regression.[5]

The rest of the paper is structured as follows. A more detailed literature review is given in section 2. The methodology and data for the empirical analysis in this

[5] Fugazza (2004) analyses the determinants of export performance for several countries by quantile regression. Wagner (2004) performs a microeconometric analysis of foreign trade by quantile regression in the case of the influence in the industrial sector of German companies' characteristics on export activities.

paper are described in section 3. Section 4 presents the empirical results and their interpretation. Section 5 summarises the main results and limitations and gives suggestions for further research.

2. LITERATURE REVIEW

Anderton, di Mauro, and Moneta (2004) analyse the elasticity of extra-euro-area exports, assessing the impact of demand and relative prices. They calculate that an 1% increase in foreign demand leads to a 1% increase in extra-euro-area export volumes in the long run, while a 1% improvement in relative export price competitiveness increases export volumes by 0.5%. Developments in the trade balance significantly affect the euro zone current account. Marsh and Tokarick (1996) assess the impact of three indicators of price and cost competitiveness (real exchange rate deflated by consumer prices, export unit values of manufacturing goods, and normalised unit labour costs in manufacturing) on the trade flows of G7 member countries.

Many papers assess the external competitiveness of the eurozone, based on the development of the real effective exchange rate and foreign demand. Bayoumi, Harmsen, and Turunen (2011) assess the impact of several variants of the real effective exchange rate (REER)[6] on manufactured eurozone exports (REER based on wholesale/producer price indices, the consumer price index, and unit labour costs in manufacturing).[7] The obtained elasticity coefficients with REER differ in terms of statistical significance and range between –0.6 and 0.01. The elasticity of export volume to foreign demand is estimated to be in the range between 1.8 and 1.9, and the coefficients are highly significant in each specification.[8]

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6 More details on the methodology of calculating REER can be found in Zanelo and Desruelle (1997).

7 For a more complete analysis of export competitiveness, see the ECB (2005). For an overview of the impact of non-price factors on the export competitiveness of the euro area see Di Mauro and Forster (2008). The export unit value-based REERs are particularly sensitive to changes in export structure (see more details at Silver, 2007).

8 Berthou and Dhyne (2018) analyse the heterogeneous effects of competitiveness within the euro area and find that the elasticity of export prices varies significantly across firms with low and high productivity, so that the distribution of productivity across firms in different countries can affect how changes in competitiveness affect external balance and other macroeconomic variables.

Ca' Zorzi and Schnatz (2007) estimate alternative export equations in which they use several different cost and price competitiveness euro-area indicators. Although each indicator has different advantages and disadvantages, the authors estimate that improving cost and price competitiveness by 1% is associated with an increase in extra-euro-area export volumes in the range of 0.3%–0.4% for most indicators. The exception is the indicator of relative export prices, where the reaction was stronger and amounted to 0.6%. These authors also find that a 1% growth in foreign demand generally implies a growth in extra-euro-area export volumes in the range of 0.75%–0.80%. This finding suggests that the share of the euro area in world exports declined in the analysed period (1992–2006). The deviation of export elasticity from the unit in relation to foreign demand was the least when export prices were used as an indicator of competitiveness.

Böing and Stadtmann (2016) empirically assess the impact of competitiveness, measured through unit labour costs, on the euro-area current account. They estimate a panel of annual data for 2000–2013. They find that higher unit cost increases lead to a reduction in the current account balance. Splitting the growth of unit costs into wage growth and productivity growth, these authors find that wage growth has a negative impact on the current account, while productivity growth has a positive impact. They consider that wage cuts are relatively ineffective in dealing with a current account deficit, as productivity growth triggers wage growth.

Staehr and Vermeulen (2019) analyse the impact of competitiveness on the macroeconomic performance of 11 euro-area countries. The VAR models for individual countries are estimated using quarterly data for the period 1995Q4 to 2013Q4. In addition to unit labour costs as a competitiveness indicator, the model includes GDP, current account, and domestic credits. Empirical analysis shows that unit labour cost changes do not have the power to explain current account balance or domestic credit in most countries. In addition, the effects of unit labour costs vary greatly between euro-area countries. On the basis of the obtained results the authors conclude that it is not possible to formulate a general policy measure for current account correction, but country-specific characteristics must be taken into account.

Baumann and di Mauro (2007) estimate that the globalisation of the economy has a significant impact on the adjustment in euro-area trade. They find a positive impact of the increasing euro-area specialisation in some medium–high and high-tech sectors, such as the pharmaceutical industry, where strong demand and dynamic productivity growth have been observed, while a decline in specializsation has been observed in lower-tech sectors such as textiles. The authors also find that euro-area imports of semi-finished goods from low-cost countries are increasing in order to reduce production costs and to focus on the higher value added stages of the production chain.

Allard, Catalan, Everaert, and Sgherri (2005) find that the characteristics of the external sector varied considerably between the four largest euro-area countries in the period 2001–2004. The paper econometrically assesses the contribution of domestic and foreign demand and cost and price competitiveness to the evolution of trade volumes (exports and imports) during the observed period. Although it has been established that these factors have a long-term impact on the differences between countries, significant unexplained residuals remain. On the export side, all countries benefitted from the growth of global demand, with Spain profiting the most and France the least. All countries were burdened by the appreciation of the real exchange rate, with Italy suffering the most and Germany the least.

Eltető (2018) comes to the conclusion that the fall in domestic demand due to the international crisis forced companies to export to foreign markets. This has increased the importance of exports, which has contributed to increasing countries' openness. The paper aims to analyse trends in the previous decade in order to determine whether the long-term structural and regional changes in exports have been realised. The analysis focuses on Iberian, Baltic, and Visegrád countries. The results show that the redirection of trade towards non-EU areas was temporary, while the production structure of exports remains largely similar to that before the crisis. The author demonstrates that the share of high-tech products in exports depends on the activities of foreign multinational companies and not on domestic innovations and R&D developments.

Tressel and Wang (2014) analyse the results of external and internal rebalancing in indebted euro-area countries. These authors find clear evidence of relative price and current account adjustments, but limited evidence of internal

reallocation of production from non-tradable to tradable sectors. In addition, they find that export performance improvement depends significantly on external demand, including demand from within the euro area. The prolonged weakness of demand in the euro area has contributed significantly to the slowdown in the export growth of countries such as Italy and Portugal, which are more dependent on intra-euro-area demand. The authors also conclude that current account adjustment is partly influenced by cyclical factors.

3. DATA AND METHODOLOGY

3.1. Data

In this paper the empirical analysis of eurozone members' merchandise exports was carried out using the annual panel time series for 19 euro-area members. The data used is from the EUROSTAT and UNCTAD databases for the period 1999–2018. The text below presents the basic variables of the model.

Merchandise exports (EXPVOL). The data for euro-area merchandise exports are chain-linked volumes, index 2010=100. We focused on merchandise exports to look for opportunities to increase export competitiveness. The export volume indices respond directly to changes in price competitiveness. The data are taken from Eurostat.

Real Effective Exchange Rate (REER). The paper uses three panel time series for REER. The first, REERCPI, is the real effective exchange rate when the consumer price indices relative to a panel of 42 leading eurozone trading partners from the industrial country group are used as the deflator [9] (double export weights are used to calculate REERs, reflecting not only competition in the home markets of the various competitors, but also competition in export markets elsewhere). The data are expressed as an index with base year 2010. The country's price competitiveness relative to its main competitors in foreign markets is estimated based on REER movement. An increase in the REER index above 100 indicates a loss in export competitiveness. The data are downloaded from Eurostat.

[9] The panel of 42 countries includes EU-28 Member States and 14 other industrial countries: Australia, Canada, United States, Japan, Norway, New Zealand, Mexico, Switzerland, Turkey, Russia, China, Brazil, South Korea, and Hong Kong.

The second indicator of real effective exchange rate, REERULC, represents REER based on unit labour cost in the total economy (ULCT).[10] The country's cost competitiveness relative to its principal competitors in international markets is assessed based on the movement of REERULC. An increase in this REER index above 100 also indicates a loss in export competitiveness, while a decrease in REER (depreciation) means gains in cost competitiveness. The data for this variable were downloaded from Eurostat.

The price competitiveness index variable RELATIVEPRICE is equivalent to the real effective exchange rate that is calculated using export prices. It is calculated by dividing the unit value of each eurozone member's exports by the unit value of world exports, indices 2010 = 100. This is a kind of overflow index and shows the price competitiveness of exports. A negative sign is expected in front of this indicator. The data are downloaded from the UNCTADStat database.

Foreign demand (WORLDGDP). This variable uses world GDP data, indices 2010 = 100, constant prices (the parameter β2 in the export equation is expected to be positive, indicating that exports rise as world income increases). Data are downloaded from the UNCTADStat database.

Internal demand (FINALDEM). This variable represents internal demand as the volume of final consumption expenditure, 2010 = 100. The sign in front of this variable is expected to be negative, as the growth of internal demand keeps goods in the domestic market. Data for this variable are from EUROSTAT.

[10] This indicator for REER is calculated as a weighted average for 37 eurozone trading partners (IC37 = EU28 + 9 other industrial countries (Australia, Canada, United States, Japan, Norway, New Zealand, Mexico, Switzerland, and Turkey). The unit labour costs of the total economy include the costs of producing non-tradable goods. They need to be taken into account because changes in their prices also affect decisions about redirecting production to the export sector. The limitation of this performance indicator is that it does not include other costs such as distribution costs, taxes, etc.

Share of ICT products in total merchandise exports of euro-area countries (ICTEXPORT). These shares are converted into indexes, base 2010 = 100, and transformed in logarithms.[11] The data are taken from UNCTATstat.

Dummy variable (DUMMY). As the financial crisis since 2008 has significantly worsened the eurozone's economic performance, the dummy variable in our export equation equals 1 after the year 2008, and 0 otherwise.

3.2. Methodology

The purpose of this section is to determine which factors affect the exports of euro-area countries, using panel data regression (annual data for the 19 euro-area countries in the period 1999–2018). The applied methodology follows the approach developed by Goldstein and Khan (1985) and Bayoumi, Harmsen, and Turunen (2011). Our aim is to assess the importance of the structural component of merchandise exports in euro-area countries as a non-price competitiveness factor.

3.2.1. Regression specification

The assessment of the export equation in our study provides an insight into the impact of the selected explanatory variables on euro-area merchandise export volumes. The volumes of exported merchandise are the dependent variable. The explanatory variable are three sets of data for the real effective exchange rate, and indicators which represent world export demand for euro-area goods, the internal demand of each euro-area member, and the share of high technology products in the merchandise exports of euro-area members. The impact of the 2008 crisis on euro-area merchandise exports is included in our model through the DUMMY variable. The time series of merchandise exports has a structural break in 2009; therefore, we estimate the coefficients of the regression model for two subperiods, 1999–2008 and 2009–2018. All variables in the model except the dummy variable are shown in the indexes 2010 = 100 and have been transformed into logarithms. The paper uses panel analysis. The estimated coefficients in the model are the elasticity coefficients. We used the dependent variable in our model

[11] According to OECD methodology, 93 products at the 6-digit level of the harmonised system code, 2012 revision, have been classified in the ICT sector. See: http://unctad.org/en/PublicationsLibrary/tn_unctad_ict4d02_en.pdf Retrieved 12.03.2019.

as an explanatory variable with one lag,[12] while the independent variables are used without lags. The model was constructed according to Comunale and Hessel (2014). The lagged dependent variable enables the process dynamics to be controlled. A similar approach to constructiong the model can be found in recent work (e.g., Bayoumi, Hansen, and Turunen 2011). Like most economic phenomena, exports are a dynamic category in which its previous values affect the current value. Therefore, to empirically analyse export performance in the euro-area countries we use a dynamic panel model, expressed by the following equation:

$$logEXPVOL_{i,t} = \alpha_i + \delta_i logEXPVOL_{i,t-1} + \beta_1 logREER_{i,t} + \beta_2 logWORLDGDP_{i,t} + \beta_3 logFINALDEM_{i,t} + \beta_4 logICTEXPORT_{i,t} + \beta_5 DAMMY_{i,t} + \varepsilon_{it}$$
$$i=1,..., N, t=1,..., T \quad (1)$$

where N represents the number of euro area countries; T is the number of periods; $EXPVOL_{i,t}$ is the value of the dependent variable (in our case euro-area merchandise exports) of country *i* in period *t*; parameter α is a constant;

$EXPVOL_{i,t-1}$ is a one-year lagged dependent variable; δ is the export parameter; REER, WORLDGDP, FINALDEM, and ICTEXPORT are independent variables;

β_1, β_2, ..., β_5 are parameters of the exogenous variables; and ε is an error term. It is assumed that all independent variables are strictly exogenous and uncorrelated with any one ε_{it}.

3.2.2. Estimation strategy

Before we estimated a regression model we checked the stationarity of the panel time series. As the literature (e.g., Bayoumi, Harmsen, and Turunen 2011) suggests that panels with aggregate trade data are non-stationary, we examined whether the conditions for applying cointegration in our panel had been met.

[12] The Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) are applied to select a lag order. Several different lag combinations were applied in the export equation, and the difference between the estimated coefficients is not significant. Accordingly we decided to show the estimated variables with one lag.

3.2.3. Panel unit root tests

In order to check the stationarity of the panel time series we performed the following unit root tests: (1) Levin-Lin-Chu test (LLC) (2002), (2) Im-Pesaran-Shin test (IPS) (2003), (3) Breitung test (2000), (4) Fisher-ADF and Fisher-PP tests (see Maddala and Wu 1999 and Choi 2001), and (5) Hadri test (2000). It is necessary to emphasize that the LLC, Breitung, and Hadri tests assume a common unit process, while the IPS, Fisher-ADF, and Fisher-PP tests assume an individual unit root process. Depending on whether these unit root tests revealed that the panel time series had a unit root, we checked for the existence of co-integration.

3.2.4. Cointegration tests and regression model estimation

In our study we applied several cointegration tests: Pedroni (2004), Kao (1999), and the Johansen-Fisher Panel Cointegration Test (see Maddala and Wu 1999). There are two versions of the Pedroni residual cointegration test, which differ from each other according to alternative hypotheses. One hypothesis is that there is a homogeneous cointegration in the panel (a unique equilibrium for all panel units), while the other hypothesis claims that there are different equilibrium relations across countries (heterogeneous cointegration). Both variants of the test have the ability to use individual effects or individual effects and trends as a deterministic component in the cointegration equation. Using the Pedroni test, 11 test statistics were used to test the null hypothesis that claims that there are no cointegration links among the variables in the model.

The Pedroni test statistics were divided into two groups: 'group' and 'panel' statistics. The 'group statistics' category contained three test statistics, representing the average values of the autoregressive coefficients, which were estimated individually for each country in the panel. Hence, these statistics are also referred to as 'between-dimension' statistics. These are Group rho-Statistic, Group PP-Statistic, and Group ADF-Statistic. Unlike group statistics, the panel statistics are 'within-dimension' statistics, where a common autoregressive coefficient is estimated. These are Panel v-Statistic, Panel-PP statistic, Panel rho-Statistic, and Panel ADF-Statistic. The Kao Cointegration test and Johansen Fisher Panel Cointegration test were applied as supplemental tests to check the robustness of the findings. The Pedroni and Kao tests are based on Engle-Granger (1987) two-step (residual-based) cointegration tests. The Fisher test is a

combined Johansen test. In order to estimate the cointegration equation we used FMOLS and DOLS estimators (see Phillips and Hansen 1990).

The impact of the explanatory variables on euro-area merchandise exports was also estimated using quantile regression. The advantage of this approach is that it is possible to estimate the impact of the explanatory variables at different points of the conditional distribution of merchandise exports. In this way it is possible to see the potential heterogeneous effect of the selected determinants on merchandise exports across different quantiles. In this study we used the quantile regression model based on Koenker (2005). Our quantile regression model is estimated with econometric software package EViews 11, and the setting and theoretical overview of the quantile function in the next section of the paper is presented according to the Eviews 11 Background for Quantile regression (http://www.eviews.com/help/helpintro.html#page/content%2Fquantreg-Background.html%23). In order to estimate coefficients for this model, the least absolute deviations (LAD) estimator was included, which allows fitting the conditional median of the response variable.

3.2.5. The quantile function

The Quantile regression model (Koenker 2005) assumes that Y is a random variable with probability distribution function

$$F_y = Prob\left(Y \leq y\right) \tag{2}$$

so $0<\tau<1$, where the τ-th quantile of Y can be defined as the lowest value of y that meets the condition $F_y \geq \tau$:

$$Q_r = inf\left\{y : F_{(y)} \geq \tau\right\} \tag{3}$$

Assuming that there is a set of n observations for Y, the traditional empirical distribution function is given as:

$$F_n\left(y\right) = n^{-1}\sum_{i=1}^{n} I\left(Y_i \leq y\right) \tag{4}$$

that is

$$F_n(y) = \sum_k 1(Y_i \le y) \tag{5}$$

where 1(z) is a function indicator that takes the value of 1 if the argument z is true, and 0 otherwise. The empirical quantile is given by:

$$Q_n(\tau) = inf\{y : F_n(y) \ge \tau\} \tag{6}$$

or equivalently, in the form of a simple optimisation problem:

$$Q_n(\tau) = argmin_\xi \left\{ \sum_{i:Y_i \ge \xi} \tau |Y_i - \xi| + \sum_{i:Y_i < \xi} (1-\tau)|Y_i - \xi| \right\} = argmin_\xi \{\sum_i \rho_\tau (Y_i - \xi)\} \tag{7}$$

where $\rho_\tau(u) = u(\tau - 1(u<0))$ is a so-called check function which weighs positive and negative values asymmetrically.

The quantile regression extends this simple formulation to the regressor *X*. A linear specification for the conditional quantile of dependent variable *Y* is given values for the p-vector of the explanatory variables *X*:

$$Q(\tau | X_i, \beta(\tau)) = X_i' \beta(\tau) \tag{8}$$

where $\beta(\tau)$ is a vector of the coefficient that relates to the τ quantile. An analog to the above unconditioned quantile minimization is the conditional quantile regression estimator.

$$\hat{\beta}_n(\tau) = argmin_{\beta(\tau)} \{\sum_i \rho_\tau (Y_i - X_i' \beta(\tau))\} \tag{9}$$

The quality of the quantile regression model can be assessed using goodness-of-fit criteria. The Koenker and Machado (1999) definition of goodness-of-fit statistics for quantitative regression is analogous to R^2 from conventional regression analysis. Starting from the linear quantile specification $Q(\tau | X_i, \beta(\tau)) = X_i' \beta(\tau)$ we accept the assumption that we can split data and coefficient vector as

$X_i = \left(1, X_{i1}^{'}\right)'$ and $\beta(\tau) = \left(\beta_0(\tau), \beta_1(\tau)'\right)'$, so that

$$Q\left(\tau \middle| X_i, \beta(\tau)\right) = \left(\beta_0(\tau)\right) + X_{i1}^{'}\beta_1(\tau). \tag{10}$$

Then we can define:

$\hat{V}(\tau) = min_{\beta(\tau)} \sum_i \rho_\tau (Y_i - \beta_0(\tau) - X_{i1}^{'}\beta_1(\tau))$, that is

$$\hat{V}(\tau) = min_{\beta_0(\tau)} \sum_i \rho_\tau (Y_i - \beta_0(\tau)) \tag{11}$$

the minimized objective functions. The Koenker and Machado goodness-of-fit criterion is given by:

$$R^1(\tau) = 1 - \hat{V}(\tau) / V(\tau) \tag{12}$$

This statistic is an obvious substitute for conventional

$R^2 . R^1(\tau)$ is located between 0 and 1, and shows the relative success of the model in fitting the data for the $\tau -$ th quantile.

Koenker and Bassett (1982) propose testing whether the slopes between quantiles are the same as a robust test of heteroskedasticity. The null hypothesis is defined as:

$$H_0 : \beta_1(\tau_1) = \beta_1(\tau_2) = \ldots = \beta_1(\tau_K) \tag{13}$$

which imposes $(p-1)(K-1)$ restrictions on the coefficients. Based on this, corresponding Wald statistics, distributed as $\chi^2_{(p-1)(K-1)}$, can be obtained .

Newey and Powell (1987) constructed a symmetry test, which can be applied to the quantile regression. The assumption of this test is that if the distribution of *Y* for the given *X* is symmetric, then:

$$\frac{\beta(\tau)+\beta(1-\tau)}{2}=\beta\left(\frac{1}{2}\right). \tag{14}$$

This restriction can be evaluated using the Wald test on the quantile process. Suppose that there is an odd number, *K,* of sets of estimated coefficients ordered by τ_k.

It is assumed that the mean value $\tau_{(K+1)/2}$ is equal to 0.5, and that the remaining τ are symmetric around 0.5, with $\tau_j = 1-\tau_{K-j+1}$, for j = 1, ..., (K-1)/2. Then the null hypothesis can be set up as:

$$H_0 : \frac{\beta(\tau_j)+\beta(\tau_{K-j-1})}{2}=\beta\left(\frac{1}{2}\right) \tag{15}$$

for j = 1, ..., (K-1)/2.

The Wald test defined for this null hypothesis is equal to zero under the null hypothesis of symmetry. The null has p(K-1)/2 restrictions, so the Wald statistics are distributed as $\chi^2_{p(K-1)/2}$. Newey and Powell point out that if it is known in advance that the errors are independent and identically distributed but possibly asymmetric, it is possible to restrict the null to apply the restriction for the intercept only. This restrictive assumption imposes only (K-1)/2 constraints on the process coefficients.

We expect that the applied quantile approach will give a more complete explanation of the impact of the selected determinants on euro-area real merchandise exports.

4. EMPIRICAL RESULTS AND DISCUSSION

In order to check the stationarity of the panel time series we applied the following unit root tests: LLC, IPS, ADF-Fisher Chi-square, PP-Fisher Chi-square, and the Hadri test. It was useful to apply several different unit root tests because of the short time series. Testing was performed at the level of the time series and their

first differential, and in the test equations two options were used, constant and constant with trend. The results of the unit root tests are given in Table I.

The results of the unit root tests show that most variables are not stationary at level, where the statistical significance is 5%. However, the first differential test showed all variables to be stationary, both with a constant and with a constant and trend. Thus, the model variables are integrated of order 1 ((Xt~I (1)). Only the Hadri test did not confirm the stationarity of the first difference series in every case. This was to be expected because this test often rejects the null hypothesis of stationarity.

Since the test results confirme that the panel time series are integrated of order 1, the next step was to determine whether there was cointegration between exports as the dependent variable and the explanatory variables. To check the existence of cointegration we used the following tests: Pedroni residual cointegration test, Kao residual cointegration test, and the Johansen Fisher panel cointegration test. We used three indicators of price competitiveness (LREERULC, LREERCPI, and LRELATIVEPRICE).[13] For each of these we will show separate cointegration tests with other variables that are common to all three cointegrating equations.

Table 1 gives the results of 11 Pedroni statistics, systematised in two groups. The first group contains three test statistics, which belong to the option of heterogeneous cointegration. The other tests belong to the category of homogeneous cointegration. In the Pedroni test we used intercept and trend as a deterministic component. In Table 1, LREERULC is used as an indicator of price competitiveness.

Based on 6 out of 11 Pedroni test statistics, the null hypothesis of no cointegration was rejected at a standard 5% significance level. Although a large number of Pedroni test statistics confirm the existence of cointegration, the other tests need to be applied in order to check the robustness of this assessment. Therefore, the results of the Kao Residual Cointegration Test and the Johansen Fisher Panel Cointegration Test are given in Table 1. Although the Kao test does not confirm the existence of cointegration, the Johansen Fisher cointegration test confirms the existence of cointegration at a statistical significance level of 1%, according to

[13] The first letter L in the name of each variable is a substitute for Log.

Trace and Maximum Eigenvalue statistics. Bearing in mind that most of the applied cointegration tests confirmed the presence of cointegration in the given combination of macroeconomic variables, the conditions for estimating the specified cointegration equation were met. However, before this assessment we checked for cointegration in the remaining two specifications.

Table 1: Panel Cointegration Tests

Pedroni Residual Cointegration Test Series: *LEXPVOL LREERULC LWORLDGDP LFINALDEM LICTEXPORT* *(The first letter (L) in the series labels means log data)* Null Hypothesis: No cointegration Trend assumption: Deterministic intercept and trend				
Alternative hypothesis: common AR coefs. (within-dimension)				
	Statistic	**Prob.**	**Weighted Statistic**	**Prob.**
Panel v-Stat.	0.694578	0.2437	0.857558	0.1956
Panel rho-Stat.	3.240170	0.9994	2.891053	0.9981
Panel PP-Stat.	–2.209156	0.0136	–3.804713	0.0001
Panel ADF-Stat.	–3.552880	0.0002	–4.767459	0.0000
Alternative hypothesis: individual AR coefs. (between-dimension)				
	Statistic	**Prob.**		
Group rho-Statistic	4.233365	1.0000		
Group PP-Statistic	–5.771874	0.0000		
Group ADF-Statistic	–5.383473	0.0000		

Kao Residual Cointegration Test Series: *LEXPVOL LREERULC LWORLDGDP LFINALDEM LICTEXPORT* Null Hypothesis: No cointegration Trend assumption: No deterministic trend		
ADF	t-Statistic	Prob.
	–0.646134	0.2591

Johansen Fisher Panel Cointegration Test Series: *LEXPVOL LREERULC LWORLDGDP LFINALDEM LICTEXPORT* Null Hypothesis: No cointegration Trend assumption: Linear deterministic trend Lags interval (in first differences): 11				
Hypothesized No. of CE(s)	**Fisher Stat.* (from trace test)**	**Prob.**	**Fisher Stat.* (from max-eigen test)**	**Prob.**
None	690.0**	0.0000	449.8**	0.0000
At most 1	361.5**	0.0000	229.1**	0.0000
At most 2	174.5**	0.0000	117.5**	0.0000
At most 3	96.34**	0.0000	88.00**	0.0000
At most 4	55.04***	0.0363	55.04***	0.0363

Note: * Probabilities are computed using asymptotic Chi-square distribution. ** Test statistics are significant at the 1% level. *** Test statistics are significant at the 5% level. Automatic lag length selection based on SIC with a max lag of 2. Newey-West automatic bandwidth selection and Bartlett kernel.
Source: Author's calculation.

The variable LREERCPI is used as an indicator of price competitiveness in Table 2. The existence of cointegration with other macroeconomic variables was checked.

Table 2: The Panel Cointegration Tests

Pedroni Residual Cointegration Test Series: *LEXPVOL LREERCPI LWORLDGDP LFINALDEM LICTEXPORT* Null Hypothesis: No cointegration Trend assumption: Deterministic intercept and trend				
Alternative hypothesis: common AR coefs. (within-dimension)				
	Statistic	**Prob.**	**Weighted Statistic**	**Prob.**
Panel ν-Stat.	0.252583	0.4003	0.192495	0.4237
Panel rho-Stat.	3.736720	0.9999	3.500357	0.9998
Panel PP-Stat.	0.268766	0.6059	–2.937141	0.0017
Panel ADF-Stat.	–0.529324	0.2983	–4.159706	0.0000
Alternative hypothesis: individual AR coefs. (between-dimension)				
	Statistic	**Prob.**		
Group rho-Statistic	4.573796	1.0000		
Group PP-Statistic	–6.00584	0.0000		
Group ADF-Statistic	–5.63157	0.0000		

Kao Residual Cointegration Test Series: *LEXPVOL LREERCPI LWORLDGDP LFINALDEM LICTEXPORT* Null Hypothesis: No cointegration Trend assumption: No deterministic trend		
ADF	t-Statistic	Prob.
	–0.59063	0.2774

Johansen Fisher Panel Cointegration Test Series: *LEXPVOL LREERCPI LWORLDGDP LFINALDEM LICTEXPORT* Null Hypothesis: No cointegration Trend assumption: Linear deterministic trend Lags interval (in first differences): 11				
Hypothesized No. of CE(s)	**Fisher Stat.* (from trace test)**	**Prob.**	**Fisher Stat.* (from max-eigen test)**	**Prob.**
None	693.6**	0.0000	430.2**	0.0000
At most 1	366.2**	0.0000	229.8**	0.0000
At most 2	179.6**	0.0000	121.5**	0.0000
At most 3	98.78**	0.0000	87.95**	0.0000
At most 4	62.26**	0.0078	62.26**	0.0078

Note: * Probabilities are computed using asymptotic Chi-square distribution. ** Test statistics are significant at the 1% level. Automatic lag length selection based on SIC with a max lag of 2. Newey-West automatic bandwidth selection and Bartlett kernel.
Source: Author's calculation.

According to 4 of the 11 Pedroni test statistics, the null hypothesis of no cointegration among the observed panel time-series is rejected at the standard level of 5% significance. The Kao Residual Cointegration Test does not confirm cointegration, but the Johansen Fisher Panel Cointegration Test rejects the null hypothesis of no cointegration among the observed variables, with a statistical significance of 1%. Since most tests confirm the presence of cointegration among the observed panel time series, a cointegration vector can be estimated.

The third indicator of price competitiveness in this paper is the LRELATIVEPRICE variable. In order to check whether cointegration between this and other variables exists, we ran the same cointegration tests as in the previous two cases. The results are given in Table 3.

Tabel 3: Panel Cointegration Tests

Pedroni Residual Cointegration Test Series: *LEXPVOL LRELATIVEPRICE LWORLDGDP LFINALDEM LICTEXPORT* Null Hypothesis: No cointegration Trend assumption: Deterministic intercept and trend				
Alternative hypothesis: common AR coefs. (within-dimension)				
	Statistic	**Prob.**	**Weighted Statistic**	**Prob.**
Panel v-Stat.	0.395507	0.3462	1.621133	0.0525
Panel rho-Stat.	3.935694	1.0000	3.353359	0.9996
Panel PP-Stat.	0.873267	0.8087	–3.036286	0.0012
Panel ADF-Stat.	–0.787708	0.2154	–4.105030	0.0000
Alternative hypothesis: individual AR coefs. (between-dimension)				
	Statistic	**Prob.**		
Group rho-Statistic	4.364813	1.0000		
Group PP-Statistic	–8.12922	0.0000		
Group ADF-Statistic	–6.47853	0.0000		

Kao Residual Cointegration Test Series: *LEXPVOL LRELATIVEPRICE LWORLDGDP LFINALDEM LICTEXPORT* Null Hypothesis: No cointegration Trend assumption: No deterministic trend		
ADF	t-Statistic	Prob.
	–0.857543	0.1956

Johansen Fisher Panel Cointegration Test Series: *LEXPVOL LRELATIVEPRICE LWORLDGDP LFINALDEM LICTEXPORT* Null Hypothesis: No cointegration Trend assumption: Linear deterministic trend Lags interval (in first differences): 11				
Hypothesized No. of CE(s)	**Fisher Stat.* (from trace test)**	**Prob.**	**Fisher Stat.* (from max-eigen test)**	**Prob.**
None	734.5**	0.0000	455.3**	0.0000
At most 1	415.3**	0.0000	255.7**	0.0000
At most 2	208.8**	0.0000	158.4**	0.0000
At most 3	93.21**	0.0000	79.80**	0.0000
At most 4	65.31**	0.0038	65.31**	0.0038

Note: * Probabilities are computed using asymptotic Chi-square distribution. ** Test statistics are significant at the 1% level. Automatic lag length selection based on SIC with a max lag of 2. Newey-West automatic bandwidth selection and Bartlett kernel.
Source: Author's calculation.

As in the first two specifications, the results in Table 3 show that several Pedroni cointegration tests rejected the null hypothesis of no cointegration, the Kao test does not confirm cointegration, but the Johansen Fisher test confirmed the existence of cointegration with a statistical significance of 1%.

Since most of the tests confirmed the presence of cointegration, the conditions for estimating the cointegration vector have been met. The long-term relationship between the macroeconomic variables in the starting model for all three specifications was assessed using FMOLS and DOLS estimators. The deep recession in the eurozone in 2009 caused the appearance of structural breaks in the time series of the macroeconomic variables, so we estimated the starting export equation for two subperiods, 1999–2008 and 2009–2018, and for the full 1999–2018 period. The results are given in Table 4.

Table 4: Export equation of euro area (dependent variable: log of merchandise export volume) – FMOLS and DOLS estimates

Subperiod 1999–2008						
	ULC		**CPI**		**RELATIVEPRICE**	
	FMOLS	**DOLS**	**FMOLS**	**DOLS**	**FMOLS**	**DOLS**
LEXPVOL(–1)	0.63(0.00)	0.66(0.00)	0.63(0.00)	0.66(0.00)	0.64(0.00)	0.67(0.00)
LREER	–0.13(0.00)	–0.14(0.28)	–0.03(0.32)	–0.04(0.78)	0.07(0.00)	0.09(0.48)
LWORLDGDP	0.58(0.00)	0.54(0.00)	0.58(0.00)	0.54(0.00)	0.57(0.00)	0.51(0.00)
LFINALDEM	0.40(0.00)	0.40(0.00)	0.31(0.00)	0.32(0.01)	0.29(0.00)	0.29(0.02)
LICTEXPORT	0.11(0.00)	0.11(0.00)	0.11(0.00)	0.11(0.00)	0.11(0.00)	0.11(0.00)
R-squared	0.953	0.959	0.953	0.959	0.953	0.959
Subperiod 2009–2018						
	ULC		**CPI**		**RELATIVEPRICE**	
	FMOLS	**DOLS**	**FMOLS**	**DOLS**	**FMOLS**	**DOLS**
LEXPVOL(–1)	0.79(0.00)	0.78(0.00)	0.78(0.00)	0.78(0.00)	0.77(0.00)	0.77(0.00)
LREER	–0.37(0.00)	–0.37(0.00)	–1.01(0.00)	–1.04(0.00)	–0.49(0.00)	–0.51(0.00)
LWORLDGDP	0.50(0.00)	0.53(0.00)	0.44(0.00)	0.45(0.00)	0.53(0.00)	0.53(0.00)
LFINALDEM	–0.17(0.00)	–0.18(0.20)	–0.13(0.00)	–0.15(0.26)	–0.29(0.00)	–0.31(0.02)
LICTEXPORT	0.01(0.15)	0.01(0.76)	0.03(0.00)	0.02(0.47)	0.02(0.07)	0.01(0.66)
R-squared	0.895	0.895	0.900	0.900	0.894	0.894
Full 1999–2018 period						
	ULC		**CPI**		**RELATIVEPRICE**	
	FMOLS	**DOLS**	**FMOLS**	**DOLS**	**FMOLS**	**DOLS**
LEXPVOL(–1)	0.88(0.00)	0.87(0.00)	0.90(0.00)	0.87(0.00)	0.89(0.00)	0.86(0.00)
LREER	–0.25(0.00)	–0.23(0.00)	–0.27(0.00)	–0.21(0.03)	–0.07(0.13)	–0.04(0.65)
LWORLDGDP	0.36(0.00)	0.41(0.00)	0.39(0.00)	0.45(0.00)	0.41(0.00)	0.47(0.00)
LFINALDEM	0.09(0.03)	0.14(0.09)	–0.01(0.78)	0.04(0.64)	–0.09(0.01)	–0.03(0.69)
LICTEXPORT	0.05(0.00)	0.06(0.00)	0.05(0.00)	0.05(0.00)	0.04(0.00)	0.05(0.00)
DUMMY	–0.04(0.00)	–0.06(0.00)	–0.05(0.00)	–0.06(0.00)	–0.06(0.00)	–0.07(0.00)
R-squared	0.932	0.939	0.930	0.938	0.929	0.937

Note: Panel method: Pooled estimation; Cointegration equation deterministics: Constant (C); Coefficient covariance computed using default method; Long-run covariance estimates (Bartlett kernel, Newey-West fixed bandwidth) used for coefficient covariances; First-stage residuals use heterogeneous long-run coefficients (FMOLS); Trend is additional regressor in FMOLS; p-values are given in brackets.
Source: Author's calculation.

Most of the estimated coefficients of the export equation in Table 4 have the expected sign and are statistically significant at the level of 1%. Since the equation has a logarithmic form, the estimated coefficients represent the elasticity.

Table 4 shows that the lagged dependent variable is statistically significant at the 1% level. The elimination of this variable would cause autocorrelation in the residuals.

The results of the estimation of the cointegration equation for the subperiod 19992008 show that ULC- and CPI-based REER are better indicators of price competitiveness than relative export prices (Table 4). The estimated coefficients of export elasticity in relation to the changes in the real effective exchange rate (ULC- and CPI-based REER) have similar values and the expected sign. On the basis of the estimated coefficient with ULC-based REER (FMOLS estimation), a real effective appreciation of 1% leads to a decrease in real goods exports by 0.13%, or by 0.14% according to DOLS estimation (the DOLS-estimated coefficient is not statistically significant at the standard level). However, the estimated coefficient for CPI-based REER is not statistically significant. Also, the export prices (DOLS estimation) are not statistically significant at the standard level, which is small in value and has the opposite sign to that predicted by the theory.[14] Therefore, it is an inferior indicator of price competitiveness than ULC- and CPI-based REER. When a country changes its merchandise export structure in the direction of high-technology products, the impact of price competitiveness on real exports is reduced. This is in line with the idea that price competitiveness is stronger in low-technology industries.[15]

In the period after 2009 the estimated coefficients of export elasticity for the three REER indicators are higher than in the 1999–2008 subperiod, and all are statistically significant at the 1% level. Also, all have the expected sign. The CPI-based price competitiveness indicator (FMOLS estimation) shows that an effective appreciation of the euro by 1% reduces real euro-area exports by about

[14] This indicator, as the ratio of unit values to exports, is affected by changes in the merchandise export structure and reflects the existence of pricing-to-market strategies.

[15] Wierts, van Kerkhoff, and de Haan (2011) have analysed the impact of the structure of merchandise exports on trade imbalances. Based on the regression analysis, they conclude that the elasticity of euro-area merchandise exports with respect to the real exchange rate decreased from –1 to –0.3 along the merchandise spectrum from low-tech to high-tech exports.

1%. The estimated price elasticity coefficients in Table 4 confirm that the overestimated value of REER negatively affects real goods exports, which is particularly evident in the peripheral euro-area members, which have experienced appreciation of the real effective exchange rate.

The foreign demand elasticity of exports is estimated at around 0.44 to 0.53 and appears to be highly significant. It shows the importance of rising foreign demand for euro-area merchandise exports. The importance of export demand is indicated by the fact that the global economic recovery after the 2008 financial crisis contributed significantly to the increase in real exports of goods in the euro area. The resurgence of protectionism in world trade slows down the growth of the world economy and can hurt the eurozone's merchandise exports.

The estimated domestic demand coefficients for the period 1999–2008 are statistically significant but do not have the expected sign. A positive sign is not in line with theoretical expectations, using either the FMOLS or the DOLS estimators. In this case the estimated coefficients are also small in size.

However, our results for internal demand in the 2009–2018 subperiod show that the estimated coefficients have the expected sign, but their statistical significance varies depending on which REER indicator is included in the regression equation. The small estimated coefficients value in all specifications in Table 4 indicates that the impact of this variable on real euro-area exports is modest. If we use CPI-based REER in the export equation specification we find an internal demand elasticity of –0.13 (FMOLS) and in the specification with relative export prices the elasticities are –0.29 and –0.31 (estimated by FMOLS and DOLS, respectively). These estimates are in line with the theoretical approach according to which an increase in internal demand diverts some potential exports to the domestic market. However, the small quantitative value of the estimated coefficients for the variables that represent internal demand indicates that this factor has no great impact on the slowdown in real merchandise exports, nor strongly affects any trade deficits of euro-area members. The specific characteristic of the estimated coefficients for the internal demand variable is high *p*-values of the obtained statistics for ULC- and CPI-based coefficients, which diminishes the statistical significance of the estimated coefficients. Generally, the stronger link between the three different REER indicators and the

volume of euro-area commodity exports after 2009 indicates an increase in price competitiveness for euro-area merchandise exports. This is particularly true for the periphery eurozone members that have taken measures to reduce the trade deficit by increasing exports.

In order to understand the significance of structural changes in exports for the increased share of higher technological intensity products, we estimated the elasticity coefficient of a variable that represents the share of information and communication technology (ICT) products in the total merchandise exports of the euro-area countries. The estimated coefficients for this variable have the expected positive sign and are statistically significant at the 1% level for the subperiod 1999–2008. However, the estimated coefficients for the subperiod 2009–2018 are small (0.01–0.03) and are not statisticaly significant.[16] Nevertheless, a positive sign indicates that countries with an increasing share of these products in their merchandise exports can realise an increase in total real goods exports. The bad news for the euro area is that the share of ICT declined from 10.3% of their merchandise exports in 2000 to 4.8% in 2017.[17]

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[16] The share of ICT products in the merchandise exports of the leading euro-area countries has been decreasing since 2000. This can be seen in the example of several countries: Germany (2000–8.4%, 2017–5.0%); France (2000–10.8%, 2017–3.9%); Italy (2000–4.4%, 2017–1.9%); Netherlands (2000–17.9%, 2017–11.0%). At the same time, the share of ICT products in the exports of several new euro area members has increased: Latvia (2000–0.9%, 2017–9.3%); Slovakia (2000–3.3%, 2017–16.3%). This data is taken from https://unctadstat.unctad.org/wds/TableViewer/tableView.aspx Retrieved 19.11.2019.

[17] UNCTADstat, accessed on 21 March 2019. Today, IT products account for aproximately 15% of world merchandise exports (WTO 2018, p.88). Product classification according to technological export intensity shows that high technology exports as a percentage of euro-area manufactured exports also fell, from 20% in 2000 to 13.9% in 2017. The decline of this share is registered not only in the core euro-area countries (Germany – a decline from 18.6% in 2000 to 13.7% in 2017; France,– a decline from 24.6% in 2000 to 23.5% in 2017) but also in the peripheral members (Italy – a decline from 8.0% in 2000 to 6.8% in 2017 ; Spain – a decline from 8.0% in 2000 to 7.0% in 2017). Data downloaded from: https://data.worldbank.org/indicator/TX.VAL.TECH.MF.ZS?locations=FR-IT-ES-CN Accessed 21.03.2019. The share of high-tech products in core euro-area merchandise exports is significantly higher than the share in peripheral members, which indicates that core countries are less sensitive to changes in the real effective exchange rate as an indicator of price competitiveness. The growth of their merchandise exports is influenced significantly by the structure of exports. On the other hand, the lower value of the technological intensity

In most cases, the estimated coefficients for the whole period from 1999 to 2018 are statistically significant and have the expected signs. The coefficient values vary between the estimated values for the two subperiods and confirm the robustness of the applied regression model.

In REER models that include the role of GVC and are based on the bilateral trade value-added weights, appreciation of the exchange rate against the currencies of the trading partners from which a country imports a large amount of intermediate products can enhance a country's competitiveness by reducing its manufacturing costs. By contrast, depreciation vis-à-vis such trading partners may be detrimental to a country's competitiveness, as it increases the cost of importing intermediate goods. Starting from the methodology developed by Bems and Johnson (2015), conventional euro-area REERs (based on gross value trade weights) and REERs involving the role of GVC were calculated in an ECB (2019) study for the euro area. A high correlation was found between these indicators. Given the small quantitative differences between these effective rates, they send consistent messages regarding eurozone competitiveness.

In most cases the R-squared value (Table 4) was above 0.9 (it was in the interval 0.894–0.959). This suggests that the equation regressors explain a large part of the variability of the dependent variable, while the remaining part is being influenced by unwritten factors. More recently the general opinion has been that non-price factors as determinants of export competitiveness should be included in the export equation, which could increase R^2.

In order to check the stationarity of the residuals from the estimated cointegration equation, the same tests were carried out as for unit roots. The results show that the residuals of regression are stationary.

The LLC, ADF Fisher, and PP Fisher tests confirmed the stationarity of the residuals in the estimated cointegration equation at 1% significance, as the effect

coefficient in the peripheral euro-area members, compared to the core countries, indicates that their merchandise exports are influenced by price competitiveness. The declining value of the effective exchange rate in this case can contribute to an increase in their merchandise exports. The difficulty is that the exchange rate can only be reduced if wages are reduced or if productivity in these countries increases.

of the constants was excluded (excluding the constants is the usual procedure when estimating the residual stationarity). The test results conclude that the panel time series are co-integrated. All three export equation specifications confirm that the selected variables have a significant impact on merchandise exports volume in euro-area countries.

The estimated coefficients for the 2009–2018 subperiod can also serve to assess the robustness of the estimated coefficients for the whole 1999–2018 period. This test confirms the robustness of the estimates for the whole sample period (1999–2018). We performed an additional robustness test by repeating the regressions in Table 4 several times, temporarily excluding one country from the sample. In some cases the negative values of the estimated coefficients for the real effective exchange rate were lower than in the full sample, confirming the robustness of estimates for the entire period. The sign of the estimated coefficients for the CPI-based REER variable changed in several cases when the sample changed.

The impact of the selected regressors along the conditional distribution of the euro-area export volumes as the dependent variable was estimated in all export equation specifications using the quantile regression method. Cointegration equations were estimated for the entire 1999–2018 period because the time series were short, so estimates of the impact of the relevant factors on the conditional distribution of euro-area export volumes were more reliable for the whole observed period (Table 5).

Table 5: Estimates of real merchandise exports with LEXPVOL as the dependent variable (Panel Least Squares and Quantile Regression Estimates), 1999–2018

MODEL 1

Independent Variable	Panel Least Squares estimate	Quantile Regression Estimates				
		0.10	0.25	0.50	0.75	0.90
	(1)	(2)	(3)	(4)	(5)	(6)
C	–0.766	–1.420	–0.413	–0.930	–0.548	–0.340
	(0.011)	(0.001)	(0.063)	(0.000)	(0.218)	(0.682)
LEXPVOL(–1)	0.916	0.918	1.000	0.953	0.841	0.835
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LREERULC	–0.148	–0.125	–0.043	–0.096	–0.136	–0.323
	(0.013)	(0.031)	(0.229)	(0.173)	(0.014)	(0.002)
LWORLDGDP	0.406	0.598	0.173	0.293	0.282	0.477
	(0.000)	(0.000)	(0.001)	(0.000)	(0.005)	(0.046)
LFINALDEM	–0.007	–0.105	–0.038	0.056	0.134	0.110
	(0.918)	(0.241)	(0.414)	(0.392)	(0.085)	(0.598)
LICTEXPORT	0.016	0.025	0.003	0.009	0.015	0.004
	(0.123)	(0.030)	(0.572)	(0.463)	(0.413)	(0.851)
DUMMY	–0.073	–0.130	–0.046	–0.068	–0.030	–0.025
	(0.000)	(0.000)	(0.008)	(0.001)	(0.171)	(0.334)
Number of cases	361	361	361	361	361	361
R-squared	0.927					
Pseudo R-squared		0.811	0.784	0.733	0.690	0.668

MODEL 2

Independent Variable	Panel Least Squares estimate	Quantile Regression Estimates				
		0.10	0.25	0.50	0.75	0.90
	(1)	(2)	(3)	(4)	(5)	(6)
C	–0.648	–1.289	–0.431	–0.952	–0.956	0.959
	(0.096)	(0.028)	(0.065)	(0.000)	(0.145)	(0.590)
LEXPVOL(–1)	0.915	0.922	0.996	0.969	0.848	0.879
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LREERCPI	–0.135	–0.144	–0.032	–0.028	–0.041	–0.346
	(0.100)	(0.433)	(0.418)	(0.661)	(0.755)	(0.161)
LWORLDGDP	0.432	0.606	0.181	0.275	0.319	0.228

	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.605)
LFINALDEM	–0.073	–0.136	–0.049	–0.005	0.079	0.075
	(0.244)	(0.273)	(0.278)	(0.917)	(0.245)	(0.759)
LICTEXPORT	0.017	0.035	0.003	0.008	0.021	–0.015
	(0.097)	(0.079)	(0.572)	(0.381)	(0.287)	(0.562)
DUMMY	–0.076	–0.125	–0.048	–0.065	–0.033	–0.025
	(0.000)	(0.000)	(0.004)	(0.000)	(0.150)	(0.557)
Number of cases	361	361	361	361	361	361
R-square	0.927					
Pseudo R-squared		0.811	0.784	0.731	0.686	0.664

MODEL 3

Independent Variable	Panel Least Squares estimate	Quantile Regression Estimates				
		0.10	0.25	0.50	0.75	0.90
	(1)	(2)	(3)	(4)	(5)	(6)
C	–1.022	–0.867	–0.433	–1.027	–1.475	–1.088
	(0.009)	(0.266)	(0.061)	(0.000)	(0.003)	(0.201)
LEXPVOL(–1)	0.904	0.926	0.984	0.967	0.858	0.848
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LRELATIVEPRICE	–0.021	–0.141	–0.031	–0.005	0.084	0.113
	(0.762)	(0.198)	(0.444)	(0.934)	(0.250)	(0.243)
LWORLDGDP	4.452	0.560	0.202	0.283	0.307	0.426
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.044)
LFINALDEM	–0.111	–0.166	–0.063	–0.019	0.067	–0.083
	(0.055)	(0.076)	(0.142)	(0.615)	(0.310)	(0.643)
LICTEXPORT	0.015	0.013	0.008	0.010	0.022	–0.034
	(0.138)	(0.144)	(0.193)	(0.299)	(0.252)	(0.142)
DUMMY	–0.0080	–0.131	–0.048	–0.065	–0.024	0.037
	(0.000)	(0.000)	(0.005)	(0.001)	(0.323)	(0.186)
Number of cases	361	361	361	361	361	361
R-square	0.926					
Pseudo R-squared		0.810	0.784	0.731	0.687	0.661

Notes: Prob-values reported in parenthesis; Quantile regression component: Huber Sandwich Standard Errors & Covariance; Bandwidth method: Hall-Sheather (bw=0.048592 for tau 0.1; 0.094502 for tau 0.25; 0.13645 for Median; 0.094502 for tau 0.75, and 0.048592 for tau 0.9); Sparsity method: Kernel (Epanechnikov) using residuals; Unique optimal solution identified.
Source: Author's calculation.

The estimates of quantile regression coefficients for five quantiles (0.10, 0.25, 0.50, 0.75, and 0.90) are given in Table 5. The estimates are presented in three models that differ from each other according to the price/cost variable for calculating the REER. The correlation between the volume of goods exports and the corresponding explanatory variables is estimated in each model. We used empirical results from the regression model, estimated by the Panel Least Squares (PLS) estimator, as a benchmark for comparison.[18] The results are given in column 1 of Table 5. The estimated coefficients are statistically significant, except the estimates for internal demand and the ICT export variable. The application of the PLS estimator implies that the estimated relationship between the dependent variable and the explanatory variables are the same regardless of which conditional distribution point is involved.

Unlike this rather rigid assumption, quantitative regression allows estimating the significance of selected determinants of merchandise exports at different points of the conditional distribution of the dependent variable. The quantile regression was estimated for the five quantiles, and the results are presented in columns 2–6 of Table 5. The values of the estimated coefficients vary across the five selected quantiles, as well as in statistical significance. The estimated coefficients of the time-lagged dependent variable are high, have the expected positive sign, are statistically significant at the 1% level, and gradually decrease from lower to upper quantiles. The signs in front of the coefficients with LREERULC are negative and their value varies across quantiles, as does the level of their statistical significance. The negative impact of this variable becomes stronger over higher quantiles of conditional distribution of merchandise exports. This indicates that the effect of real effective exchange rate appreciation on real merchandise exports gets stronger towards the higher quantiles of conditional distribution of merchandise exports, as the dependent variable in the export equation. Since the ULC represents the total labour costs, the estimated coefficients for the real effective

[18] We conducted a cross-sectional independence test to check whether the panel data model was cross-sectionally independent. Since T in our model is relatively small, we used the asymptotically standard normal Pesaran CD test (Pesaran 2004) for panel models 1, 2, and 3, described in Table 5. The null hypothesis of this test is no cross-section dependence (correlation) in residuals. The test statistics results of 25.193 (p-value of 0.000) for Model 1, 24.292 (p-value of 0.000) for Model 2, and 24.361 (p-value of 0.000) for Model 3 reported by the statistical test means that the Pesaran CD test strongly rejected the null at a significance level of 1%. According to these findings the panel data are cross-sectionally dependent.

exchange rate variable suggest that the growth of these costs leads to appreciation of the exchange rate and deterioration in euro area export competitiveness. Decreasing labour costs in some peripheral members after 2008 led to an increase in their price competitiveness, which encouraged an increase in merchandise exports and a reduction in their trade deficits.[19]

It is characteristic that the estimated coefficients with the internal demand variable have a negative sign in the lower quantiles, while in the upper quantiles they have a positive sign. Apart from changing signs, their statistical significance varies between quantiles. The greatest surprise is the transition of the modest positive impact of Information Technology Services (ITS) on the growth of exports, to the area of negative impact on higher quantiles of the conditional distribution of the dependent variable in Model 2 and Model 3. At the same time, the statistical significance of this coefficient for the upper quantiles is also reduced. The quantile process for all variables in Model 1 is shown in Chart 1 in the Annex.

Also in this paper we tested the hypothesis that the coefficients slope of the estimated model are equal across quantiles using quantile regression. The coefficients in Chart 1 suggest that the assumption of equality of slopes cannot be accepted. In order to arrive at a more precise conclusion we tested with a variant of the Wald test, formulated by Koenker and Bassett (1982). The null hypothesis that the slopes between quantiles are equals was tested (H_0: $\beta_1(0.25)=\beta_1(0.50)=\beta_1(0.75)=\beta_1(0.90)$). To save space, we only present the results on whether the slope is the same at the 0.9 quantile as at the median quantile. The test results are reported in Table 6.

[19] Greece, Portugal, Ireland, and Italy.

Table 6: Quantile Slope Equality Test and Symmetric Quantiles Test (Equation specification from Model 1, Table 5)

Quantile Slope Equality Test			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Wald Test	35.31498	6	0.0000
Symmetric Quantiles Test			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Wald Test	13.38980	7	0.0632

Note: Estimated equation quantile tau = 0.5; Test quantiles = 0.9; Test statistic compares all coefficients.
Source: Author's calculation.

Table 6 shows that the Wald test summary Chi-Sq. statistic value of 49.68559 is statistically significant at the 1% level, so the null hypothesis of slope equality across quantiles is rejected. This finding confirms the conclusion imposed by Chart 1 and serves as proof that the relationship between the explanatory variables and the dependent variable varies across quantile values. This is relevant because it shows that in cases when the research emphasis is on specific quantiles, linear models can lead to inadequate conclusions as to whether there is a link between the explanatory and dependent variables, and if a link exists these models may suggest a wrong conclusion about the strength of the link.

Table 6 also gives the results of the test for symmetry between quantiles. The null hypothesis of this test is that the distribution is symmetric. The test statistic is statistically significant at the 10% level, which shows significant asymmetry and rejects the hypothesis of null symmetry between quantiles. These findings confirm the heterogeneous impact of the explanatory variables on real euro-area merchandise exports.

5. CONCLUSION AND POLICY IMPLICATIONS

The empirical research in this paper explores the link between euro-area merchandise exports and selected explanatory variables. Variables representing the impact of price factors, external and internal demand, and the structure of merchandise exports were used as regressors. The starting export equations for

the two subperiods 1999–2008 and 2009–2018 and for the full 1999–2018 period were estimated.

The impact of price factors was assessed using several indicators of the real effective exchange rate. The ULC- and CPI-based REER estimates have similar numerical values for the subperiod 1999–2008, with the expected negative sign. The estimated coefficient of elasticity with ULC-based REER (FMOLS estimator) shows that a real effective appreciation of 1% will result in a 0.13% decline in the volume of merchandise exports, while this decline according to the DOLS estimator will be 0.14%. The results of the regression analysis confirm that real effective exchange rate appreciation diminishes the competitiveness of real merchandise exports.

The estimated export elasticity coefficients for REER variables in the 1999–2008 subperiod are smaller than the coefficients in the 2009–2018 subperiod. All estimated coefficients for the REER variable in the period 2009–2018 are statistically significant at the 1% level and have the expected sign. The CPI-based REER ranges between –1.01 (FMOLS estimation) and –1.04 (DOLS estimation). This means that real effective depreciation of the euro reduces euro-area merchandise exports by near 1%. This is particularly pronounced in the periphery euro-area members that face real effective exchange rate appreciation due to domestic wage growth and productivity decline. According to the estimated model, the impact of appreciation was stronger in the 2009–2018 subperiod than in the 1999–2008 subperiod.

The estimated regression coefficients for the real merchandise export equation for the euro area reveal that the impact of foreign demand on real merchandise exports was significantly stronger than the impact of price competitiveness. The recovery of the world economy in the years following the 2008 financial and economic crisis significantly affected the real growth of merchandise exports in euro-area countries. The growing sensitivity of exports to fluctuations in world demand is partly related to structural changes that were encouraged by the globalisation of the world economy due to vertical specialisation.

The estimated regression coefficients for the internal demand variable vary in value and by sign depending on the REER indicator used. However, the small numerical value of this coefficient in all specifications for the subperiod 2009–

2018 shows that domestic demand in the euro area does not have a significant impact on the merchandise exports of these countries.

An attempt to include the impact on real merchandise exports of the structure of merchandise exports by technological intensity was made in an empirically estimated export equation by introducing a variable that represents the share of ICT products in the total merchandise exports of the euro-area countries. In most export equation specifications for the subperiod 2009–2018 the estimated coefficients with this variable are not statistically significant at the standard level (an exception is the specification with CPI-based REER in which the estimated coefficient is statistically significant at the 0.01% level) and have a positive sign. However, their numerical value is negligible and ranges between 0.04 and 0.05. These values are indicative because they show that an increase in the share of technologically intensive products in merchandise exports affects the increase in real merchandise exports. However, the tendency of a reduction in the share of ITS products in euro-area merchandise exports from 10.3% in 2000 to 4.8% in 2017 is not encouraging news for this integration. The core eurozone members (Germany and France) face this tendency as well as the peripheral members.

The regression model was also estimated by quantile regression, thus testing the potential heterogeneity of the regressor's impact at various points on the conditional distribution of real merchandise exports as the dependent variable. The quantile regression coefficients were estimated for five quantiles (010, 025, 050, 075, and 0.90). The coefficient estimates for different quantiles vary in both size and level of statistical significance. The estimated coefficients with the export demand variable are statistically significant at the 1% level for lower quantiles and 5% level for upper quantiles, have the expected positive sign, and are characterised by a decreasing trend from lower to higher quantiles.

The signs of the estimated coefficients with ULC-based REER are negative and the value of the coefficients and the level of their statistical significance varies across quantiles. In this case the real effective exchange rate appreciation shows an increasing negative impact on real merchandise exports with upper quantiles.

Price competitiveness, represented in quantile regression with ULC-based REER, decreases from the lower to the higher quantiles of the conditional distribution of merchandise exports as the dependent variable. Practically, this means that the

effect of real effective exchange rate appreciation on real merchandise exports is higher for the upper quantiles of the conditional distribution of merchandise exports. Since the ULC represents total labour costs, it suggests that the growth of these costs in peripheral euro-area members may lead to an appreciation of the real effective exchange rate, with negative effects on real merchandise exports. Inelastic wages and low labour-market flexibility compromise the export competitiveness of peripheral euro-area members.

The models estimated in this paper indicate that euro-area merchandise exports were influenced by price and non-price competitiveness, and that these factors have contributed to peripheral eurozone members reducing current account imbalances.[20] Internal devaluation also works to increase merchandise exports and reduce external imbalances. The synchronisation of market-based reforms in the euro area can significantly reduce transition costs. Labour market reform leads to a reduction in real wages, and the ECB (2012, p.53) findings show that improving price competitiveness in deficit countries can lead to trade rebalancing in the euro area in the medium term.

Protectionist trade policies have decreased the growth of euro-area merchandise exports. The involvement of eurozone members in the GVC and the high openness of the economy also affect exports, as demand for intermediate products is declining. The increased integration in global supply chains has made the eurozone more vulnerable to the slowdown in world trade.

Countries with a public debt-to-GDP ratio of more than 80%[21] are expected to align their public debt and budget deficits with convergence criteria. Strong economic policy coordination is needed at the eurozone level to boost domestic demand and increase merchandise export growth rates. More dynamic growth in domestic demand can enhance the functioning of the euro area and make crisis management easier. The poor internal demand hinders rebalancing between

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[20] The models used in the ECB study (2012, p.36) suggest that improving the current account balance by 1% of GDP requires a temporary wage cut (relative to competitors) of about 5% to 10%.

[21] In 2018 the public debt to GDP of Greece, Italy, Portugal, Cyprus, Belgium, Spain, and France was greater than 80%:. The data is from https://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=sdg_17_40&plugin=1 Accessed 11.12.2019.

eurozone members. Economic growth based on investment in productive areas of the economy is an important prerequisite for maintaining competitiveness in the long run.

Coordination is also needed in the fiscal area. After many years of support from the ECB through the quantitative easing programme to sustain post-crisis economic growth, changes are needed in the fiscal area. Coordinated support for investment through fiscal stimulus could support the eurozone's economic growth and exports after monetary policy normalisation. Interest rates are at a historically low level, so a new stimulus is needed.

Peripheral eurozone members have significantly reduced merchandise deficits in the post-crisis period (Ireland has had a surplus since 1999, Italy switched to a surplus in 2012, and Greece, Spain, and Portugal have significantly reduced their deficit).[22] Improving the export competitiveness of peripheral eurozone members by reducing domestic prices entails greater costs than the devaluation of the national currency, a measure often taken before the introduction of the euro. However, this measure is no longer available to these countries because the euro-area has a single currency. The common monetary policy and the existence of a single currency are not an adequate solution for countries affected by asymmetric shocks. As a rule, the common exchange rate is overestimated for less competitive members and undervalued for more competitive countries. One member's competitiveness is only part of the eurozone's overall competitiveness, so the common exchange rate reflects the competitiveness of the monetary union as a whole. Restrictive fiscal policy in the peripheral eurozone countries has contributed to a decline in domestic demand in those countries, leading to sharp deceleration.

Although they have significantly reduced their current account deficits (Italy and Ireland are in surplus), the peripheral members of the euro area face the challenge of implementing structural changes in order to increase export competitiveness. Restructuring their exports with a greater share of higher value-added and high

[22] The peripheral eurozone members have faced a boom in demand from both private and public sources due to their entry into the eurozone, as well as a fall in interest rates and excess credit (Martin and Philippon 2017). This has led to a rise in unit labour costs and has deteriorated their competitiveness.

technological intensity products would reduce the sensitivity of their exports to price competition, thus avoiding the need for the socially painful measure of basic wage cuts. Also, wage cuts are more feasible in flexible labour markets. Although increasing cost-competitiveness can be useful for increasing merchandise exports it is difficult to sustain in a global market where competition from low-cost economies is increasing. A greater reliance on non-price competitiveness factors would allow peripheral eurozone members to improve export competitiveness by raising product quality rather than reducing prices.

Germany and several other eurozone members (Netherlands, Belgium, Ireland, Italy, Slovenia, and Slovakia)[23] achieved a trade surplus in 2018. These countries are more competitive in exports than the peripheral member countries, which generate a deficit. Thus, there is an imbalance in the eurozone, because some countries have trade deficits and others have surpluses. This shows that convergence is not yet complete and that trade deficit countries are the most vulnerable in crises and are exposed to pressure to make adjustments.

The limitation of this research and similar studies is the use of standard indicators of the real effective exchange rate. Our research, like many other studies, is also based on Armington's assumption (Armington 1969) of the substitutability of all products. In our case, the assumption of elastic substitution is partly justified, since a significant part of euro-area merchandise exports are realised in intra-euro-area trade. However, this assumption should be checked in a more detailed analysis of the merchandise trade where high-value-added exports are compared to low-value-added exports, or export of capital goods to export of consumer products.

Due to the increasing impact of non-tariff and tariff measures on international trade, further analysis of the effects of these measures on the competitiveness of euro-area exports is necessary.

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[23] According to EUROSTAT data, these countries achieved the following trade surpluses in 2018: Germany–233.3 billion euro, Netherlands–68.8, Ireland–48.3, Italy–39.3, Belgium–13.1, Slovenia–1.6, and Slovakia–0.4. https://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tet00047&plugin=1 Accessed 12.12.2019.

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APPENDIX

Table I. Results of the panel unit root tests of euro area countries for the period 2000–2018

Variable	Method		Determin. terms	Statist.	Prob.	Obs.	Non Stationary (NS) Stationary (S)
LEXPVOL	LLC	Level	Constant	–0.08	0.47	357	NS
			Constant and trend	–1.51	0.07	353	NS
		First Diff.	Constant	–14.42	0.00	339	S
			Constant and trend	–13.08	0.00	339	S
	IPS W-stat.	Level	Constant	2.56	0.99	357	NS
			Constant and trend	–0.70	0.24	353	NS
		First Diff.	Constant	–11.41	0.00	339	S
			Constant and trend	–8.97	0.00	339	S
	ADF-Fisher Chi-squared	Level	Constant	29.36	0.84	357	NS
			Constant and trend	47.20	0.15	353	NS
		First Diff.	Constant	185.36	0.00	339	S
			Constant and trend	137.33	0.00	339	S
	PP-Fisher Chi-squared	Level	Constant	23.42	0.97	361	NS
			Constant and trend	33.48	0.68	361	NS
		First Diff.	Constant	247.05	0.00	342	S
			Constant and trend	208.95	0.00	342	S
	Breitung t-stat.	Level	Constant	–	–	–	–
			Constant and trend	–1.11	0.13	334	NS
		First Diff.	Constant	–	–	–	–
			Constant and trend	–11.0	0.00	320	S
	Hadri Z-stat.	Level	Constant	11.85	0.00	380	NS
			Constant and trend	6.18	0.00	380	NS
		First Diff.	Constant	0.32	0.37	361	S
			Constant and trend	3.77	0.00	361	NS
LREERCPI	LLC	Level	Constant	–3.08	0.00	359	S
			Constant and trend	–0.13	0.45	354	NS

		First Diff.	Constant	–10.45	0.00	338	S
			Constant and trend	–7.61	0.00	333	S
	IPS W – stat.	Level	Constant	–1.90	0.03	359	S
			Constant and trend	–0.11	0.45	354	NS
		First Diff.	Constant	–11.94	0.00	338	S
			Constant and trend	–10.37	0.00	333	S
	ADF-Fisher Chi-squared	Level	Constant	52.81	0.06	359	NS
			Constant and trend	40.20	0.37	354	NS
		First Diff.	Constant	192.86	0.00	338	S
			Constant and trend	196.56	0.00	333	S
	PP-Fisher Chi-squared	Level	Constant	46.50	0.16	361	NS
			Constant and trend	27.88	0.86	361	NS
		First Diff.	Constant	193.32	0.00	342	S
			Constant and trend	159.75	0.00	342	S
	Breitung	Level	Constant	–	–	–	–
			Constant and trend	–0.56	0.28	335	NS
		First Diff.	Constant	–	–	–	–
			Constant and trend	–6.64	0.00	314	S
	Hadri Z-stat.	Level	Constant	9.14	0.00	380	NS
			Constant and trend	8.54	0.00	380	NS
		First Diff.	Constant	1.64	0.05	361	NS
			Constant and trend	2.04	0.02	361	NS
LREERULC	LLC	Level	Constant	–1.83	0.03	352	S
			Constant and trend	–1.04	0.15	354	NS
		First Diff.	Constant	–10.46	0.00	336	S
			Constant and trend	–6.54	0.00	327	S
	IPS W – stat.	Level	Constant	–0.07	0.47	352	NS
			Constant and trend	0.69	0.75	354	NS
		First Diff.	Constant	–11.13	0.00	336	S
			Constant and trend	–9.84	0.00	327	S
	ADF-Fisher Chi-squared	Level	Constant	33.92	0.67	352	NS
			Constant and trend	36.91	0.52	354	NS

		First Diff.	Constant	180.69	0.00	336	S
			Constant and trend	150.12	0.00	327	S
	PP-Fisher Chi-squared	Level	Constant	27.53	0.90	361	NS
			Constant and trend	37.35	0.50	361	NS
		First Diff.	Constant	247.11	0.00	342	S
			Constant and trend	212.23	0.00	342	S
	Breitung	Level	Constant	–	–	–	–
			Constant and trend	–0.81	0.21	335	NS
		First Diff.	Constant	–	–	–	–
			Constant and trend	–8.08	0.00	308	S
	Hadri Z-stat.	Level	Constant	8.67	0.00	380	NS
			Constant and trend	7.97	0.00	380	NS
		First Diff.	Constant	1.18	0.12	361	S
			Constant and trend	2.51	0.01	361	NS
LRELATIVEPRICE	LLC	Level	Constant	–1.33	0.08	358	NS
			Constant and trend	–1.48	0.07	356	NS
		First Diff.	Constant	–12.03	0.00	340	S
			Constant and trend	–9.96	0.00	340	S
	IPS W – stat.	Level	Constant	–0.98	0.16	358	NS
			Constant and trend	0.38	0.65	356	NS
		First Diff.	Constant	–10.76	0.00	340	S
			Constant and trend	–8.77	0.00	340	S
	ADF-Fisher Chi-squared	Level	Constant	40.68	0.35	358	NS
			Constant and trend	25.70	0.94	356	NS
		First Diff.	Constant	174.26	0.00	340	S
			Constant and trend	134.70	0.00	340	S
	PP-Fisher Chi-squared	Level	Constant	40.25	0.37	361	NS
			Constant and trend	24.81	0.95	361	NS
		First Diff.	Constant	169.72	0.00	342	S
			Constant and trend	131.63	0.00	342	S
	Breitung	Level	Constant	–	–	–	–
			Constant and trend	–0.93	0.18	337	NS

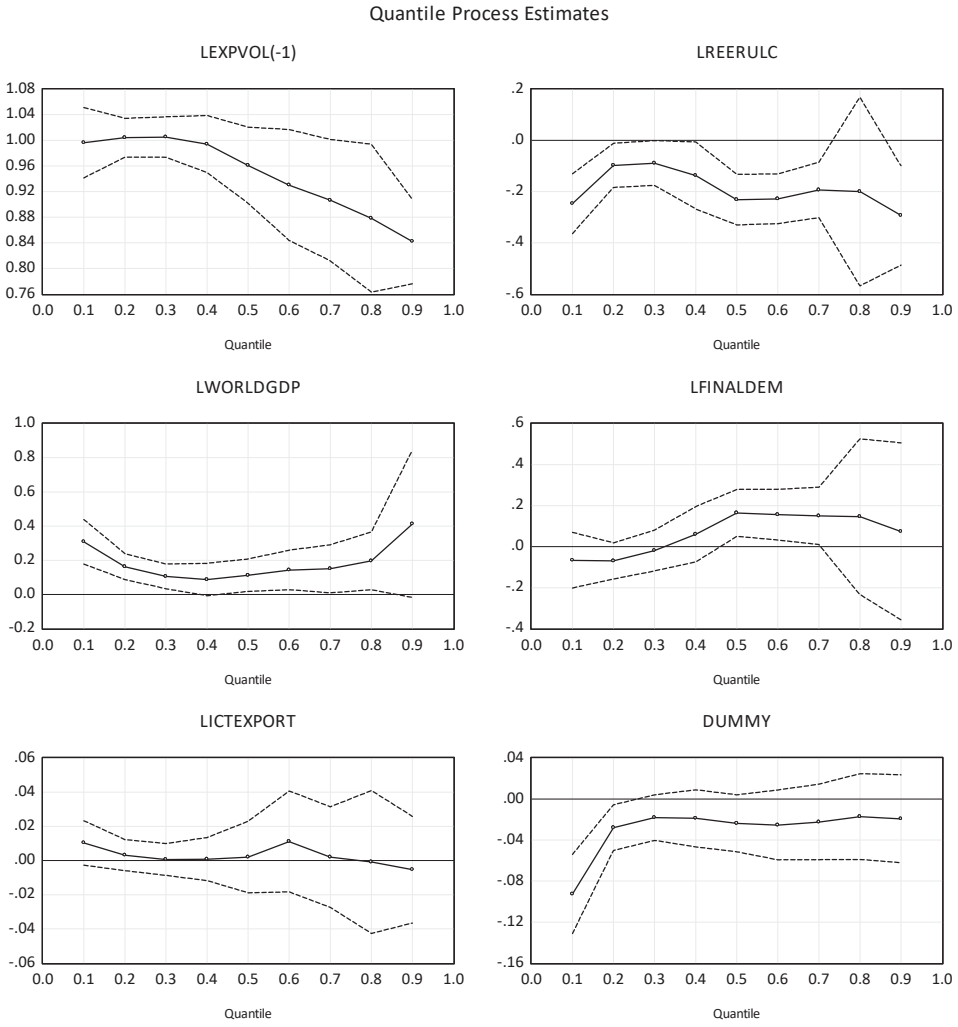
		First Diff.	Constant	–	–	–	–
			Constant and trend	–11.72	0.00	321	S
	Hadri Z-stat.	Level	Constant	6.27	0.00	380	NS
			Constant and trend	7.25	0.00	380	NS
		First Diff.	Constant	0.05	0.58	361	S
			Constant and trend	5.23	0.00	361	NS
LWORLDGDP	LLC	Level	Constant	–3.31	0.00	361	S
			Constant and trend	–3.03	0.00	361	S
		First Diff.	Constant	–15.58	0.00	342	S
			Constant and trend	–13.69	0.00	342	S
	IPS W – stat.	Level	Constant	3.29	0.99	361	NS
			Constant and trend	0.02	0.51	361	NS
		First Diff.	Constant	–11.27	0.00	342	S
			Constant and trend	–7.95	0.00	342	S
	ADF-Fisher Chi-squared	Level	Constant	8.91	1.00	361	NS
			Constant and trend	27.84	0.89	361	NS
		First Diff.	Constant	181.72	0.00	342	S
			Constant and trend	121.49	0.00	342	S
	PP-Fisher Chi-squared	Level	Constant	14.96	0.99	361	NS
			Constant and trend	32.36	0.73	361	NS
		First Diff.	Constant	186.60	0.00	342	S
			Constant and trend	123.46	0.00	342	S
	Breitung	Level	Constant	–	–	–	–
			Constant and trend	–4.55	0.00	342	S
		First Diff.	Constant	–	–	–	–
			Constant and trend	–11.31	0.00	323	S
	Hadri Z-stat.	Level	Constant	13.07	0.00	380	NS
			Constant and trend	5.99	0.00	380	NS
		First Diff.	Constant	–0.03	0.51	361	S
			Constant and trend	8.38	0.00	361	S
LFINALDEM	LLC	Level	Constant	–3.14	0.00	341	S
			Constant and trend	–1.58	0.06	344	NS

		First Diff.	Constant	–5.24	0.00	332	S
			Constant and trend	–5.31	0.00	334	S
	IPS W – stat.	Level	Constant	1.26	0.90	341	NS
			Constant and trend	0.56	0.71	344	NS
		First Diff.	Constant	–4.79	0.00	332	S
			Constant and trend	–3.53	0.00	334	S
	ADF-Fisher Chi-squared	Level	Constant	38.75	0.44	341	NS
			Constant and trend	32.87	0.71	344	NS
		First Diff.	Constant	88.53	0.00	332	S
			Constant and trend	70.50	0.00	334	S
	PP-Fisher Chi-squared	Level	Constant	49.63	0.10	360	NS
			Constant and trend	21.32	0.99	360	NS
		First Diff.	Constant	85.84	0.00	341	S
			Constant and trend	72.97	0.00	341	S
	Breitung	Level	Constant	–	–	–	–
			Constant and trend	–1.43	0.08	325	NS
		First Diff.	Constant	–	–	–	–
			Constant and trend	–3.99	0.00	315	S
	Hadri Z-stat.	Level	Constant	10.72	0.00	379	NS
			Constant and trend	7.22	0.00	379	NS
		First Diff.	Constant	1.64	0.05	360	NS
			Constant and trend	3.39	0.00	360	NS
LICTEXPORT	LLC	Level	Constant	–3.10	0.00	354	S
			Constant and trend	0.18	0.57	347	NS
		First Diff.	Constant	–9.82	0.00	339	S
			Constant and trend	–9.09	0.00	333	S
	IPS W – stat.	Level	Constant	–0.53	0.27	358	NS
			Constant and trend	1.61	0.95	347	NS
		First Diff.	Constant	–7.97	0.00	339	S
			Constant and trend	–6.87	0.00	333	S
	ADF-Fisher Chi-squared	Level	Constant	42.71	0.28	354	NS
			Constant and trend	25.66	0.94	347	NS

		First Diff.	Constant	129.41	0.00	339	S
			Constant and trend	109.04	0.00	333	S
	PP-Fisher Chi-squared	Level	Constant	31.10	0.78	361	NS
			Constant and trend	9.76	1.00	361	NS
		First Diff.	Constant	124.28	0.00	342	S
			Constant and trend	121.30	0.00	342	S
	Breitung	Level	Constant	–	–	–	–
			Constant and trend	0.12	0.55	328	NS
		First Diff.	Constant	–	–	–	–
			Constant and trend	–8.84	0.00	3.14	S
	Hadri Z-stat.	Level	Constant	10.10	0.00	380	NS
			Constant and trend	7.12	0.00	380	NS
		First Diff.	Constant	0.90	0.18	361	S
			Constant and trend	5.90	0.00	361	S

Note: The following abbreviations are used in the table: LLC – Levin-Lin-Chu test; IPS – Im-Pesaran-Shin test. S – Stationary; NS – Non-stationary. The null hypothesis for all tests (except the Hadri test) is a unit root exists. (For the Hadri test, H_0 means there is no unit root). The level of significance is 5%. We used the Schwarz information criterion with a maximum of two lags to decide the lag length. Individual effects and both individual effects and individual trends have been used as deterministic components. In this paper we used a balanced panel data set.
Source: Author's calculation.

Figure 1: Quantile process for Model 1



Note: Coefficients plot. The full lines represent the coefficients values over τ levels, while the dashed lines form the areas that are the associated 95% confidence intervals.
Source: Author's.

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THE IMPACT OF FISCAL CONSOLIDATION AND ECONOMIC GROWTH ON DEBT: EVIDENCE FROM INDIA

ABSTRACT: *This paper analyses the challenges debt reduction faces as a result of fiscal consolidation and the effect of growth on India's debt ratio. Simulations are conducted based on India's current revenue and debt levels and project different cases of fiscal tightening and their effect on changes in debt stock with respect to the change in GDP, i.e., changes in the debt ratio. The estimates for multipliers that are used in the Structural Vector Auto Regression (SVAR) model are obtained empirically by giving shocks to fiscal instruments such as expenditure and taxes. A non-technical approach to the SVAR methodology is used to analyse the dynamics of the studied framework by subjecting it to unexpected shocks. A more measured act of consolidation may be implemented in an attempt to normalise multiplier values in order to create an appropriate environment for reducing government spending. The drawbacks include the limitations of the SVAR methodology such as the orthogonality condition, which makes the entire analysis fairly restrictive. The framework used for the analysis is a modern approach towards understanding macroeconomic trends and variables in the context of the Indian economy and seeks to apply recently developed analytical tools.*

KEY WORDS: *Fiscal Tightening, Simulation, Debt/GDP ratio, Fiscal Sustainability*

JEL CLASSIFICATION: C23, F34, H63

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1. INTRODUCTION

India has always been a rather unique case when it comes to economic analysis and policy formulation. As the world's largest capitalist economy in terms of population, along with its status as an emerging market economy, India presents a fascinating opportunity for analysing the effects of different fiscal policies and their impact on debt-growth dynamics.

Recently, fiscal adjustment has become a focal point for developed economies, especially in European Union countries and similar fairly mature economies. Recent events across Europe and post-financial-crisis USA have demonstrated the need to look again at sustainable public debt levels and the impact government spending/fiscal stimulus can have in the trade-off to boost economic growth. Developing economies require a combination of debt, equity, and foreign direct investment to fuel growth at a consistently high level and correspondingly tend to have a higher associated cost of capital due to the additional risk premia attached to most investments. This explains the steady rise in the debt stock of emerging nations such as India, which has recorded significant growth over the past decade.

This paper examines the impact of fiscal consolidation on debt dynamics. We first analyse the size of short-term fiscal multipliers, which helps us to understand the relationship between growth, debt reduction, and the impact of changes in fiscal policy. Assuming, in line with the recent fiscal adjustment packages in developing countries, that two-thirds of the adjustment come from spending measures, a weighted average of spending and revenue multipliers in downturns yields an overall fiscal multiplier of about 1, which will be used to simulate the impact of fiscal consolidations (Eyraud and Weber 2013). The negative impacts of contractionary fiscal policy in a country like India may be due to a number of reasons including credit-constrained agents, a relatively closed economy, and limited flexibility in terms of impact of monetary policy (recently, inflation targeting has been a higher-priority issue than interest rate levels for the Reserve Bank of India).

With high initial fiscal multipliers, fiscal consolidation is expected to increase the debt ratio in India in the short run. Although the debt ratio eventually declines,

its slow response to fiscal adjustment could raise concerns, particularly if economic agents react adversely to the changes.

Section 2 of this paper details the literature that has helped to better understand the problem and to formalise an appropriate solution. Section 3 presents the data sources and the methodology used to arrive at our conclusions. Section 4 highlights the simulations conducted to arrive at our results, along with certain policy recommendations. Section 5 explains the empirical analysis conducted to support our results, while the conclusions and policy implications are presented in Section 6.

2. LITERATURE REVIEW

In this literature review we refer to a number of papers regarding the effects of fiscal multipliers on the economy and the multidimensional impact fiscal consolidation/tightening may have on debt growth and sustainability in a range of different economies. Debt dynamics have been a focus of research across the globe (e.g., Escolano 2010). Very few studies have specifically assessed the impact of fiscal policy on the debt ratio from the point of view of an emerging economy, since in emerging economies debt and fiscal consolidation often take a backseat to driving economic growth and expanding per capita GDP. The existence of an accounting relationship suggests that the relation between these variables is straightforward, which is why the problem would not have been of initial interest, especially in a non-Keynesian setting.

From a conceptual point of view, the framework developed by Gros (2011) is akin to ours. Gros (2011) shows that austerity can be self-defeating and increase the debt ratio in the short term. However, the sample used consists of relatively developed/mature European economies where interest rates are relatively low, leaving little room for monetary policy to make a significant impact. When coupled with high debt and lack of investment such an environment often leads to high multipliers, as only government spending can act as a stimulus for sustainable growth; barring which, in the event of ill-conceived fiscal austerity, the result may be a dip in consumer sentiment and spending, a negative stimulus to the economic system, and a potential structural economic recession. The persistence of short-term multipliers is omitted from the analysis, along with the

effects of repeated episodes of fiscal tightening, and how the two may end up in a vicious cycle of negative economic stimulus, lower growth, and higher debt.

Batini et al. (2014) have studied the size, persistence, determinants, and impact of fiscal multipliers in detail. They provide a framework for estimating the multipliers for countries that do not track data for calculating them. Emphasis is placed on the use of multipliers while running simulations related to the design of debt/fiscal policy, highlighting that policies formulated without taking into account their potential impact may lead down unsustainable paths and structurally hamper a country's long-term growth and economic progress. The authors also highlight the pitfalls of incorporating multipliers into any given study, emphasizing the difficulty in isolating the direct impact of fiscal measures on GDP because of the two-way relationship between the different variables involved in the model.

Sen et al. (2007) explain that debt overhang may impede a country's investment and growth. The debt overhang hypothesis holds empirically true in tests performed in this study and this direct correlation with growth explains an economy's inability to bounce back after a one-off fiscal tightening, which can have severe negative implications for an economy's debt aggregation. Krugman (1988) examines the trade-offs that creditors face in countries where the debt is so large that they cannot attract voluntary new lending. He points out that creditors face a double-edged sword when a country cannot service its debt payments: they can still finance the country with an expected loss in the hope of recovering the money later or bringing the debt back to a useful level. Krugman (1988) discusses the choice between financing and forgiveness when focusing on a country's historical debt ratio and the implications of changes in fiscal policy that are made for the purpose of self-correction.

As of now, little research has been done to determine the fiscal multipliers of emerging market economies or low income countries. It is not clear where the exact range should be, especially when compared to advanced economies. Factors that increase multipliers in these countries include liquidity constraints that impact consumption patterns, less efficient monetary policy, lower automatic stabilisers, and lower public debt. Factors that contribute to lower multipliers include higher interest margins, smaller and more open economies, and

inefficiencies in the administration of public funds. Some studies even conclude that the multipliers are negative, especially in the long term (Tanner and Samake 2008) and when public debt is high (Ghosh and Rahman 2008).

Structural factors affecting fiscal multipliers include:

- *Trade openness*: Countries with higher imports or more open trading patterns have lower fiscal multipliers due to demand leakage through imports (Barrell et al. 2012; Ilzetzki et al. 2013; Tanner and Samake 2008).
- *Labour market rigidity*: Countries with more rigid labour laws or stronger trade unions tend to have less flexible responses to demand/supply shocks and hence have higher fiscal multipliers (Cole and Ohanian 2004; Auerbach, and Gorodnichenko 2012).
- *Exchange rate regime*: Flexible exchange rate regimes allow for greater flexibility of monetary policy, which results in lower multipliers due to their ability to offset discretionary fiscal policy or other fiscal shocks to the system (Born et al. 2013; Ilzetzki et al. 2013).
- *Debt level*: High-debt countries generally have lower multipliers, as fiscal consolidation (or stimulus) is likely to have positive (or negative) credibility and confidence effects on private demand and the interest rate risk premium (Ilzetzki et al. 2013, Kirchner et al. 2010).

Keeping all the above factors in mind, we have formulated values for the fiscal multiplier that we feel are appropriate for the successful simulation and empirical analysis of the problem in hand. We believe India to be a combination of unique factors, where trade openness has increased at an exponential rate post-liberalisation (1993), along with more recent foreign investment stimuli such as changes in Foreign Direct Investment Regulations, tax breaks/incentives for foreign manufacturing, and increased accessibility to capital markets.

3. DATA AND METHODOLOGY

PART 1

Data for the simulations and empirical analysis was obtained from past records of the Union Budget of India. For the purpose of the study we used the past 50 years' worth of data to identify trends and to form a basis for the forecasts that

are used in the simulations and analysis. As the government's budgetary records lack consistency in terms of the accounting techniques used when recording the data and there are a number of reconciliation errors and restatements in the earlier records, we relied on a novel and comprehensive modelling approach to designing a dataset that accurately captures the significant macroeconomic trends over the studied time period and serves as suitable template for performing our simulations. We observed the trends followed by the different input variables in our models over the last 50 years, and modelled all those trends as a function of GDP to arrive at a suitable and uniform dataset. We assumed the trends to be linear for simplicity of calculation, while factoring in structural breaks and jumps for the impact of events such as liberalisation in 1993 and the financial crises of the late 1990s and 2008. The final data set consists of over 200 observations, taken on a quarterly basis over the considered time period. The text below highlights the assumptions/facts behind the data modelling:

1. Tax Revenue grew linearly from 12% of GDP in 1965 to 18% of GDP in 2015: the tax base expanded gradually as the government slowly implemented policies to bring more of the economy into the organised sector.
2. Revenue from Non-Tax Items increased from 20% of total revenues in 1965 to 14.2% of total revenues in 2015 as more of the economy became part of the tax base, while most non-tax items remained the same.
3. Government Expenditure grew from 21% of GDP in 1965 to 30% of GDP in 2015.
4. Net Interest Payments have been relatively constant at 5% of GDP, except during financial stress/volatility such as the Asian financial crisis and the global financial crisis in 2008.
5. Total Public Debt declined significantly from approximately 42% in 1960 to 23% in 1980. It increased sharply post-1990 as significant foreign capital (in the form of debt and equity) was invested after the liberalisation of the economy. Public debt rose from 39% in 1990 to close to 66% in 2014.
6. Primary Deficit remained at an average of 3.75% over the time horizon considered, except during times of fiscal stress or increased spending to boost development, such as the post-1995 period and the early 2000s; a lower tax base in the earlier years (1965-1980) also contributed to this.

The simulations are conducted using the equations described below (taken from Eyraud and Weber 2013) and the forecasted values, bearing in mind factors such as the sustainability of debt levels and the feedback effect of factors such as automatic stabilisers.

$$\underline{\Delta}\left(\frac{debt(N)}{Y(N)}\right)*1=-N+Debt\,ratio(N)*mult(N)+rev\,ratio*\sum mult(i;1\le i\le n) \quad (1)$$

where rev ratio is the revenue ratio and mult(N) is the multiplier. A permanent tightening of 1% of GDP should reduce the debt ratio by N per cent of GDP after N periods if there is no fiscal multiplier. In the right hand side of the above equation, –N refers to the direct effect, whereas the rest of the terms sum up to the mitigating effect.

Equation (1) is the core of the simulation process. We have made a number of assumptions regarding the simulation process:

- We have assumed a 1% fiscal tightening as a % of GDP
- The elasticity of revenue with respect to GDP is 1, and the change in the revenue ratio remains zero.

The simulation process is elaborated in a subsequent section using the above equation.

PART 2

We estimate the model using a Vector Auto Regression approach, including the ratio of debt in gross public debt terms to GDP as the exogenous variable and modelling its dynamics using a separate accounting identity.

$$Y(t)=\sum C(i;1\le i\le k)Y(t-i;1\le i\le k)+\sum\gamma(i;1\le i\le k)d(t-i;1\le)+u(t) \quad (2)$$

The identity is quite robust, consisting of the average cost of servicing debt; the real GDP term in log normalized format; the inflation in percentage terms; and the primary deficit, also as a percentage of GDP.

$$d_t = \frac{1+i_t}{(1+\Delta p_t)(1+\Delta y_t)} d_{t-1} + pd_t \quad (3)$$

In Equations (2) and (3), Y(t) denotes a vector of endogenous variables, including real GDP (yt, in logarithms), it, is the average cost of servicing debt (in per cent), Δpt is inflation (in per cent), dt is gross public debt to GDP, and pdt is the primary deficit as a percentage of GDP. Our analysis uses yearly data for India, with inflation defined as the change in the logarithm of the GDP deflator. Traditionally, the average cost of servicing debt is defined as the ratio of net interest payments to total gross public debt. The intention of the model is to establish a clear understanding of the effects fiscal consolidation can have on the debt ratio. Inclusion of other variables such as expenditure or revenue in the model separately would mean that the variables are related endogenously to one another, which could cause autocorrelation bias.

4. SIMULATION

Using Equations (1), (2), and (3), we simulate the case of a one-off fiscal tightening in the Indian economy and its effects on debt stock and GDP over a five-year period. The simulation is based on the economic data available for the year 2014. We take into account the debt stock, debt ratio, revenue ratio, GDP, and GDP growth rate as recorded in the year 2014.

We begin the simulation by calculating the fall in GDP post the cut in fiscal spending. Assuming the base case multiplier to be 1, we assume a fall in GDP equivalent to the fall in government spending by 1% of total GDP. We assume a decline in multiplier levels over the 5-year time frame, consistent with theory, with the multiplier effectively becoming zero from year 5 onwards (Eyraud and Weber 2013). Different sets of scenario analyses may be performed for different time frames and different rates of multiplier depreciation to assess the impact of a one-off tightening. To arrive at a qualitative assessment we have restricted ourselves to a fiscal tightening of 1% of GDP over a 5-year horizon and a linear decline in fiscal multiplier values. The change in the debt ratio over a 5-year period is calculated using the formulae provided in Equation (1), based on a permanent one-time cut in fiscal spending.

Table I: Summary of Assumptions used

Variable	Base Value
Base Revenue Ratio	0.325
Base Debt Ratio	0.667
Average Fiscal Multiplier over 10 years	0.86
Fiscal Multiplier in base year	1

We assume two cases for the fiscal multipliers. In the first case, we assume an initial rise in the fiscal multiplier due to a delay in the transmission mechanism for the impact of a cut in fiscal spending, taking into account the lack of efficient policy implementation infrastructure and a delay in the reaction of other market agents due to the presence of significant information asymmetry in the country. A combination of market uncertainty and short-term consumer sentiment may result in a temporary rise in the immediate multiplier before its effect begins to reduce. In the second case we assume a linear decrease in the multiplier without any immediate or near-term increase.

From the graphs showing the change in the debt ratio to analysis time frame, it can be inferred that the change in the debt ratio increases initially due to a sharp increase in the fiscal multiplier due to the shock provided by fiscal tightening in the first year. The change in the debt ratio follows an inverted U-shaped pattern. For ease of simulation we assume a linear decrease to zero, bearing in mind the assumption that the effects of the fiscal multiplier on the change in the debt ratio dissipate by the end of the five years.

Over a prolonged period, we can observe that under the assumption of a multiplier of 1, the debt ratio initially increases before falling back to a lower equilibrium value beyond a period of five years, when the impact of a one-off tightening dissipates. In India's case, the debt and revenue ratios are currently at manageable levels, and with the increasing levels of economic development and inflow of foreign as well as domestic investor capital, reliance on government spending is reduced, leading to lower multipliers. In such an environment, fiscal cuts even greater than 1% of GDP are manageable without inflating debt to unsustainable levels in the short term.

Table 2: Debt Ratio projections assuming an initial fiscal multiplier of 1 and a subsequent rise in the following year (stabilization lag)

Time	Fiscal Multiplier	Delta Debt Ratio	Total Debt Ratio
T	1	0.02%	0.66
t+1	1.3	0.61%	0.67
t+2	0.875	0.31%	0.68
t+3	0.65	–0.03%	0.67
t+4	0.325	–0.35%	0.66
t+5	0	–0.66%	0.65

In the case of the fiscal multiplier as assumed in the base year, fiscal tightening does lead to sustainable debt during the shock period, followed by a steady levelling off of debt with respect to GDP. It takes roughly 10 years before the debt ratio begins to reduce significantly.

Table 3: Debt Ratio projections assuming an initial fiscal multiplier of 1 (Base Year multiple) without a subsequent rise in multiplier

Time	Fiscal Multiplier	Delta Debt Ratio	Total Debt Ratio
t	1	0.02%	0.66
t+1	0.8	1.1%	0.67
t+2	0.6	1.2%	0.68
t+3	0.4	2.1%	0.70
t+4	0.2	1.4%	0.72
t+5	0	–0.8%	0.71

The scenario where fiscal tightening would lead to near-term unsustainable debt levels involves developing an environment where multipliers are at inflated levels due to stress in certain parts of the economy (conditions similar to those in Greece or Portugal), coupled with high levels of the baseline/initial debt ratio (approximately 80% of GDP and above). Our model tells us that in these situations (where multiplier values may be as high as 5 and may go even higher), fiscal tightening may counter-intuitively prove to be disastrous when managing debt levels in the country.

5. EMPIRICAL ANALYSIS

While empirical literature suggests that high levels of debt are not necessarily the reason for subpar growth over the immediate horizon, there is some correlation between high levels of debt and volatility in the levels of GDP. This has been traditionally attributed to the fiscal or monetary policy consolidation associated with high levels of debt. We used an econometric estimation model to further confirm the results of the simulation. A structural vector autoregression approach was used to study the impact of the actions taken by the government to meet its inter-temporal budget constraints, such as fiscal tightening. The end result of the analysis will help us understand the effect of fiscal shocks on various macroeconomic variables, with an understanding of the debt dynamics that are local to our model. In the Indian context it can be seen that an increase in fiscal consolidation has a direct correlation with the debt ratio.

Our VAR approach is similar to that of Favero and Giavazzi (2009), in the sense that VAR estimates have traditionally been shown to be biased when the feedback effect of the debt-to-GDP ratio is omitted. We consider that VAR analysis of fiscal policy requires the inclusion of debt-to-GDP ratio, as taxes and spending are directly related to the debt level (Bohn 1998). This can also be better understood by the fact that the analysis would include residuals that contain the response of the considered macroeconomic variables to a change in debt level. The regressors would then be correlated with the error terms, making the regressors endogenous.

Two possible solutions suggested by Eyraud and Weber (2013) are the inclusion of the debt variable as an endogenous variable in the VAR analysis, and the complete omission of the debt variable. However, both of these methods may result in appropriate results, due to the intricacies in the relationship between the debt variable and variables such as taxes, government spending, output, inflation, and the prevailing interest rates. The accounting identity used to include the debt variable as an exogenous variable in our estimation can be found in the methodology section.

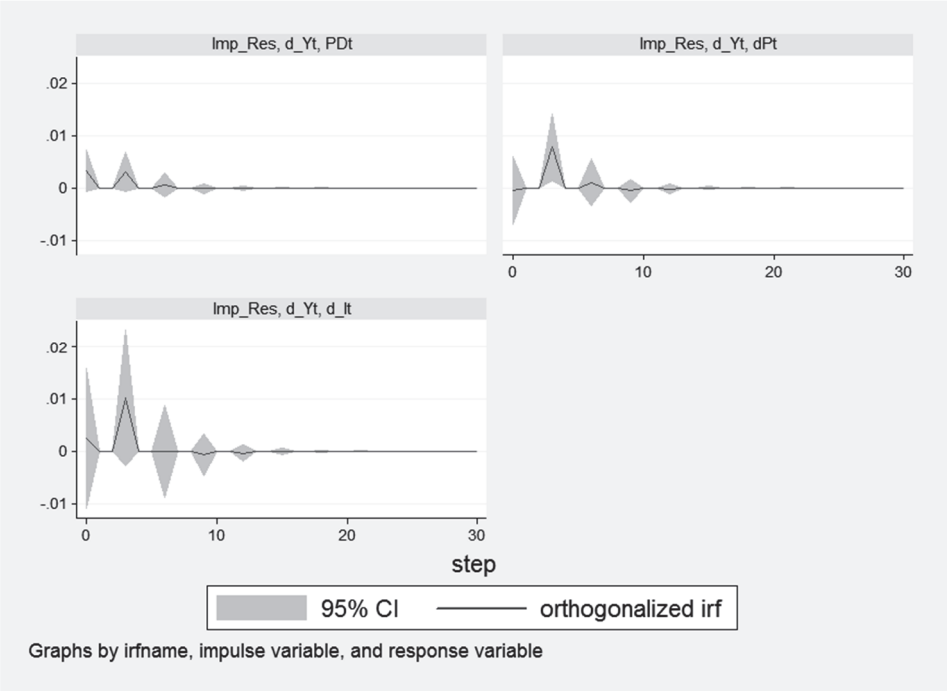
Table 4: Stationarity test (Augmented Dickey Fuller) results

Dickey-Fuller test for Unit Root			**Observations:**		238
		Interpolated Dickey-Fuller Critical Value			
		Test Statistic	**1%**	**5%**	**10%**
It	**Z(t)**	–1.261	–4.372	–3.996	–3.262
	MacKinnon approximate p-value for Z(t) :		0.6218		
D.It	**Z(t)**	–3.443	–4.372	–3.996	–3.262
	MacKinnon approximate p-value for Z(t) :		0.0023		
Dt	**Z(t)**	12.871	–4.372	–3.996	–3.262
	MacKinnon approximate p-value for Z(t) :		1		
log_Dt	**Z(t)**	–1.422	–4.372	–3.996	–3.262
	MacKinnon approximate p-value for Z(t) :		0.5542		
d_log_Dt	**Z(t)**	–2.759	–4.372	–3.996	–3.262
	MacKinnon approximate p-value for Z(t) :		0.2078		
d_log_Dt, trend lags (2)	**Z(t)**	–3.586	–4.569	–3.851	–3.262
	MacKinnon approximate p-value for Z(t) :		0.0397		
Yt	**Z(t)**	1.883	–3.831	–3.199	–2.83
	MacKinnon approximate p-value for Z(t) :		0.9918		
D.Yt	**Z(t)**	–4.003	–3.591	–2.996	–2.618
	MacKinnon approximate p-value for Z(t) :		0.0017		
dPt	**Z(t)**	–2.869	–3.148	–2.898	–2.452
	MacKinnon approximate p-value for Z(t) :		0.0289		
PDt	**Z(t)**	–3.008	–3.293	–2.697	–2.439
	MacKinnon approximate p-value for Z(t) :		0.0129		

The variables involved in the model have to be checked for stationarity. Augmented Dickey Fuller tests were used to establish this at differenced, natural logarithmic, and lagged stages. The results of these tests can be seen in Table 4. The VAR is then estimated using the equation 2 specified in the methodology

section, where vector Yt is a vector of endogenous variables and the debt ratio obtained using the identity is modelled as an endogenous variable. The optimum lag levels are obtained based on the Schwartz information criterion. Table 1 in Appendix B shows that the optimum lag order is three.

Figure 1: Impulse Response Functions



Sourced from Stata Output of the simulation, eliciting the response of endogenous variables to an impulse.

The transformation matrices used in the estimation method are found using the Blanchard and Perotti (1999) model. The residuals from the autoregression approach are used to find the structural fiscal shocks caused. Exclusion restrictions for exact identification of the model force us to consider basic economic theory. For example, we assume that any shock or deviation in the interest rates has a negligible effect on the primary deficit variable. The elements in the transformation matrix are effectively the semi-elasticity values for variables such as budget-deficit-to-output and budget-deficit-to-inflation. Information is publicly available for the former, while Martin et al. (2009) have studied the latter.

The semi-elasticity of the budget deficit with respect to output is provided by the OECD (2009) and Girouard et al. (2006), and is estimated at -0.37, and the elasticity of the budget deficit with respect to inflation is experimentally shown to be significantly negative.

The impulse response function shows us the impact of a percentage point of fiscal tightening (Yt) and the effect it has on inflation (It), primary deficit (Pt), and the cost of servicing debt (PDt). Fiscal tightening of one percentage point has the most impact on inflation at more than 0.02%, followed by impact on primary deficit (more than 0.01%) and cost of servicing debt (less than 0.01%). In each case, the impact dies down after roughly ten years. The Impulse Response Functions (IRFs) also clearly show that the shock caused by the tightening dies down with the time step. Table 5 presents the post-estimation test for the VAR model.

Table 5: Diagnostic tests

Test	**Test statistic**
Ramsey RESET (2)	0.0038
Ramsey RESET (3)	1.0914
Ramsey RESET (4)	1.4566
Jarque-Bera Normality Test	4.2283
Glejser Heteroskedasticity Test	9.9987
Residual Correlation LM Test	2.9349

Note: The null hypothesis for each test is not rejected at the 5% level of significance.

As reported in the table above, a number of conventional diagnostic test statistics indicate the robustness of the adopted model: the model passes the LM residual correlation test, test of heteroskedasticity, and the normality test. The Ramsey RESET misspecification test suggests that the model does not have misspecification problem.

In their paper, Eyraud and Weber (2013) clearly divide this result into two possible effects. The first effect is the flow effect, where a decrease in the real output and inflation offsets the decrease in the primary deficit as a percentage of GDP. The stock effect explains the increase in debt ratio due to a decrease in the output, as the variables in the denominator decrease.

India is a unique case when it comes to examining the effects of fiscal policy on growth. We apply this method to India and estimate the impact of fiscal policy on the gross debt-to-GDP ratio. The primary consideration for choosing India is that it is a comparatively closed economy with relatively little commercial activity and foreign investment, coupled with a rigid currency regime and relatively low interest rates. Also, the debt stock of India has been significantly reduced in the recent past. Our simulation results indicate that in the presence of a certain set of multipliers, contractionary fiscal policy may lead to unsustainable debt levels in the short term due to the high multipliers present. If multiplier values reduce or normalise as the country grows and develops, the response of the debt ratio and growth to any fiscal tightening may be more moderate, and may even be positive in the long run.

6. CONCLUSION AND POLICY IMPLICATIONS

The findings represent a constrained link between debt stock accumulation and the growth scenario in India, in the context of fiscal sustainability. This kind of study is especially important when it comes to taking decisions regarding government borrowing and debt sustainability in the long term. In the context of debt growth dynamics, fundamental fiscal reforms that target budget credibility are particularly important. Debt and fiscal sustainability are closely linked to national productivity and economic growth, with the rise in recent variables having a positive effect on fiscal sustainability. Debt ratios are not meant to influence short-term fiscal policy but are more relevant as medium-term indicators.

An economy enters into certain agreements or pacts that ensure fiscal discipline is maintained and enforced. However, it is important to evaluate how the level of fiscal sustainability is evaluated in this scenario. There is plenty of economic analysis that underlines the importance of the sustainability of the debt/GDP ratio in this regard. However, policy decisions are primarily taken paying special

attention to deficit/GDP ratios. As a consequence, the debt stock level often ceases to be a factor in the implementation of policies intended to be fiscally prudent, and the interrelationship between debt level and the government meeting the deficit is often ignored. It is not advisable to overlook the fact that the fiscal sustainability of the government is dictated by its solvency or the extent to which it can repay its debts. The level of public debt in India could be affected in different ways, depending on the compensatory action that the government chooses to take.

In the light of these constraints, all of the following require quick and effective implementation: a continuous reformatory system that focuses on improving the efficiency of collecting revenue and disbursing it for the purposes of administration, regulation, and the maintenance of various bureaucratic bodies; transparency in recording the flow of money right from it being sanctioned to the materialisation of its final purpose; reviewing methods of levying tax on the basis of incidence; and establishing a reliable framework for debt management.

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APPENDIX

Table 1

Lag-order selection statistic for VAR								
varsoc	D.Yt, dPt, d_It, PDt	**maxlag**	3	**exogenous variable**	d_log_Dt			
Selection Order criteria								
Sample:	1955–2014	**Observations:**	238					
Lag	**LL**	**LR**	**df**	**p**	**FPE**	**AIC**	**HQIC**	**SBIC**
0	218.67	–	–	–	1.88E-14	–21.4839	–21.3422	–20.9813
1	234.269	31.946	16	0.003	1.62E-14	–21.7929	–21.5692	–20.2106
2	248.303	65.334	16	0	6.37E-15	–22.4989	–22.1183	–20.5391
3	295.228	61.197*	16	0	2.993e–15*	–23.8292*	–23.1092*	–21.1937*
Endogenous:	D.Yt, dPt, d_It, PDt							
Exogenous:	d_log_Dt, _constant							

Table 2: Eigenvalue stability condition

Eigenvalue	**Modulus**
–0.7351107	0.735111
0.3675554 + 0.6366264i	0.735111
0.3675554 + 0.6366264i	0.735111
–.0.5514138 + 0.4149095i	0.690078
–.0.5514138 + 0.4149095i	0.690078
0.6350291 + 0.2700836i	0.690078
0.6350291 + 0.2700836i	0.690078
–0.08361532 + 0.6849931i	0.690078
–0.08361532 + 0.6849931i	0.690078
–0.2600566	0.260057
0.1300283 + 0.2252156i	0.260057
0.1300283 + 0.2252156i	0.260057

All the eigenvalues lie inside the unit circle. VAR satisfies stability condition

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HOW TO INCREASE JOB SATISFACTION AND ORGANISATIONAL COMMITMENT IN THE ICT SECTOR THROUGH JOB DESIGN

ABSTRACT: *The paper investigates the relationship between job design and work-related attitudes (job satisfaction and organisational commitment) in the Information and Communication Technology (ICT) sector. We use data collected via an online questionnaire (using the Google Forms platform) from 97 employees working in the ICT sector in Serbia. The data was collected between February and June 2019. The analysis shows that job design is a predictor of both job satisfaction and organisational commitment. Of the five investigated job dimensions (Skill variety, Task identity, Task significance, Autonomy, Feedback from job), 'Autonomy' was the most positively associated with job satisfaction (r=0.629) but was only moderately associated with organisational commitment (r=0.4). The other job dimensions were found to be weakly correlated with the investigated work attitudes, although the relationships were positive. Furthermore, the results indicate that work engagement mediates both investigated relationships, providing a deeper insight into how job design is translated into positive work-related attitudes. We discuss the possible managerial implications of the 'Autonomy' dimension and the interventions in work engagement required to positively influence work-related attitude formation and management in the ICT sector, and we distinguish between 'bottom-up' and 'top-down' interventions.*

KEY WORDS: *job design, job satisfaction, organisational commitment, work engagement*

JEL CLASSIFICATION: M54, J28, J40

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1. INTRODUCTION

The ICT sector is a key driver of innovation that accounts for one-third of patent applications in the world (OECD 2017) and is one of the most influential factors in the changing economic, social, and political environment. The explosive growth of the ICT sector and its increasing importance for economic development and advancement has created a globally significant increase in demand for highly skilled ICT expertise and in the number of IT-related jobs. Employees in the ICT sector are required to have a wide variety of skills to help clients understand their businesses and develop desired systems, especially in the service delivery phase. However, the supply of such employees is insufficient, thus further increasing the number of job vacancies and increasing competition between employers in recruiting and maintaining ICT specialists, who have extremely high turnover rates and prefer many career transitions from one company to another and from one country to another (El-Ayouti & Kamel, 2003, p. 207).

Even though the supply of ICT specialists has increased moderately in recent years, demand for ICT specialists is expected to grow at a fast pace (OECD 2017) and 41% of businesses in the European Union that opt for specialized ICT workers report having difficulties filling vacancies (OECD 2017). When there is such a discrepancy between the ICT workforce and the labour market, businesses struggle not only to fill vacancies but also to motivate employees to remain in their organisation and not leave for more attractive working conditions and benefits.

Businesses' efforts to attract and retain their workforce are taking on a new shape, based on carefully forming and managing employees' attitudes to work. Basing our study on the argument that job satisfaction and organisational commitment are negatively related to employee absenteeism (Eby, Freeman, Rush & Lance, 1999) and turnover intention (Reichers, 1985; Mathieu & Zajac, 1990; Zournatzi, Tsiggilis, Koystelios & Pintzopoulou, 2006), our aim is to examine which factors influence the formation and reinforcement of these work-related attitudes.

Drawing on the work of Hackman and Oldham (1974, 1980) and their Job Characteristics Theory we investigate the effect of job resources on the formation of work-related attitudes (job satisfaction and organisational

commitment). Furthermore, leaning on the Job Demands–Resources Theory (Demerouti, Bakker, Nachreiner and Schaufeli, 2001), we examine the effect that work engagement has on job satisfaction and organisational commitment. The aim of this paper is to provide a deeper understanding of the relationship between job design, work engagement, and work-related attitudes and to propose potential managerial interventions concerning job design that can be applied in order to enhance job satisfaction and organisational commitment, thus contributing to more effective employee retention in companies in the ICT sector.

The paper is divided into five sections. Section 2 describes the research context, i.e., the characteristics of the ICT sector in Serbia. The theoretical framework of the analysis and the proposed hypotheses are set out in Section 3. Section 4 describes the research methodology – the sample and variables. The results and the discussion of their implications are presented in Section 5. Finally, in Section 6 we provide conclusions, discuss the limitations of the study, and highlight possible directions for future research.

2. RESEARCH CONTEXT: THE ICT SECTOR IN SERBIA

By the ICT sector we understand, in line with the OECD definition, industries that manufacture or offer services that capture, transmit, or display data and information electronically.[1] In this study we are guided by the industry classification, which encompasses two sub-sectors, telecommunications and information technologies (IT), which are further segmented into hardware production, software production, and services. The industry encompasses many distinct jobs and its explosive growth during the last decade has resulted in the appearance of an entirely new set of job positions, such as Knowledge Management Consultant, Software QA/test analyst, Game Developer, IT System Auditor, e-Business Manager, Robotics Specialist, ERP (SAP/Oracle/etc.) Consultant, Business Intelligence Consultant, Information Auditing and

[1] Source: https://stats.oecd.org/glossary/detail.asp?ID=6274, accessed 10 June 2019.

Compliance Specialist, Chief Information Officer (CIO), Business Applications Integrator, Net-centric Developer, and many others.[2]

As is the case globally, the Serbian national strategy for information society development also recognises ICT as an important driver of the economy, which is projected to yield revenue of over five billion euros in 2020.[3] The strategic interventions to achieve this growth include infrastructure investment; legislative adjustment; the development and strengthening of cooperation between public, private, and civil sectors; and the strategic development of ICT skills and education by developing the role of ICT in the education system[4] in order to provide a solid source of specialized ICT workers for future sector needs. Data from 2016 (SITO 2017) shows that the Serbian IT industry numbered 2,046 companies employing 21,514 workers and yielding a revenue of 1.83 billion euros, while the more mature Telephone Company industry employed 18,842 workers in around 250 companies and had revenues of 2.20 billion euros.

The Serbian ICT workforce is estimated at 50,000 ICT specialists (ICT Vojvodina Cluster 2018). The current training and educational capacity is insufficient to feed the sector's workforce demand, and 85% of companies report difficulties in filling vacancies, due to either an insufficient supply of qualified specialists or to a lack of specialized and applicable knowledge (ICT Vojvodina Cluster 2018). Despite the fact that the ICT workforce is quite a modest proportion of the country's total workforce, attracting specialized ICT workers is a growing challenge as qualified employees have a competitive advantage in a market that is no longer local but global.

To successfully cope with the fierce competition for qualified ICT workers, companies need to redefine their approach to attracting new talent and retaining existing employees. New job candidates have mainly been attracted through offers of competitive salaries and attractive non-financial benefits. However, this

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2 For additional career opportunities in the ICT sector see https://www.researchgate.net/publication/281550372_ICT_Graduate_Career_Awareness [accessed 30 May 2019].

3 Strategija razvoja informacionog društva u Republici Srbiji do 2020. godine, "Službeni glasnik RS" 51/2010.

4 Ibid.

study emphasises the formation of work-related attitudes and management as effective methods for retaining existing high-quality employees.

3. THEORETICAL FRAMEWORK

3.1. Work-related attitudes: Job satisfaction and organisational commitment

Attitudes are defined as evaluative responses toward a certain object that are characterized by some degree of favourability or unfavourability (Eagly & Chaiken, 1993) and are comprised of emotional, cognitive, and behavioural components (Breckler, 1984) that guide individuals' emotional, thinking, and acting reactions. In a work-related context, job satisfaction and organisational commitment predict individual effectiveness (Zhao, Wayne, Glibkowski & Bravo, 2007) and can constitute invaluable information about employees, since a positive overall work attitude comprised of job satisfaction and commitment to the organisation triggers employees' motivation to contribute positively rather than withdraw positive behaviours (Harrison, Newman & Roth, 2006). Because job satisfaction and organisational commitment predict work behaviour, measuring and managing them become important Human Resource Management (HRM) tools.

Job satisfaction is defined as a "pleasurable or positive emotional state resulting from the appraisal of one's job or job experiences" (Locke, 1976, p.1304) and is comprised of an individual's affective experiences and belief structures connected to their job (Weiss & Cropanzano, 1996). The level of job satisfaction is generally influenced by the following groups of factors (Greenberg & Baron, 1995; George & Jones, 2002): 1) personality and personal traits (predicting whether thoughts and feelings about a job will be positive or negative), 2) personal values (reflecting an individual's beliefs about desired results and how to behave on the job), 3) working context characteristics (job design, interpersonal relations, working conditions, compensation, etc.), and 4) social influence (colleagues, family, trade unions, culture, etc.). Job satisfaction is associated with productivity, worker absenteeism, and staff mobility, and depends on the work content (Koustelios & Kousteliou, 2001; Halepota & Shah, 2011). It is also associated with the reduction of errors in the workplace, the intention of employees to leave their jobs (Zournatzi et al., 2006), and motivation (Ayub & Rafif, 2011). Other factors that contribute to job satisfaction are workplace climate (Shuck, Reio & Rocco, 2011),

economic incentives (Stringer, Didham & Shantapriyan, 2011), and achievement and interpersonal relationships (Halepota & Shah, 2011). Some authors claim that job satisfaction is only moderately correlated with motivation, job involvement, organisation affiliation, and turnover and correlates strongly with perceived job stress and organisational commitment (Kreitner & Kinicki, 2002, p.196; Scott & Taylor, 1985).

Organisational commitment mirrors an individual's feelings about personal working experience in the organisation and is defined as the collection of feelings and emotions that a person has about the organisation (Steers, 1977; Porter, Steers, Mowday & Boulian, 1974), their psychological attachment to the organisation and its goals and their role in relation to this (O'Reilly & Chatman, 1986), and attachment to the organisation for its own sake rather than for its strictly instrumental value (Cook & Wall, 1980, p.40). Many studies confirm the positive effects of organisational commitment on both individuals and the organisation (O'Driscoll, Pierce & Coghlan, 2006; Riketta & Van Dick, 2005; Meyer, Stanley, Herscovitch & Topolnytsky, 2002; Mathieu & Zajac, 1990). At the organisational level, organisational commitment positively influences organisational performance (McElroy, 2001) and organisation competitiveness (Bergmann et al., 2000), reflects leadership quality (Stum, 1999), and positively contributes to the transfer and dissemination of knowledge within the organisation (Alvesson, 2001). At the individual level, many studies show that organisational commitment positively influences employee attitudes, behaviours, motivation, and job satisfaction (Mowday, Porter & Steers, 1982; Allen & Meyer, 1996; Meyer et al., 2002; Cooper-Hakim & Viswesvaran, 2005; Chughtai & Zafar, 2006; Markovits, Davis & Vandrick, 2007), increases employees' affiliation to their organisation (Meyer et al., 2002; Riketta, 2002), and is negatively related to absenteeism (Eby et al., 1999) and employees' intention to move to other employment (Reichers, 1985; Mathieu & Zajac, 1990; Cooper-Hakim & Viswesvaran, 2005; Chughtai & Zafar, 2006).

3.2. Influence of job design on work-related attitudes

Job design (JD) is the process of linking specific goals to specific jobs and making decisions about which techniques, equipment, and procedures are used to attain those goals (George & Jones, 2002). Job design shows how teams and individuals do things in organisations and what the organisational roles of individuals are

(Armstrong & Taylor, 2017, p. 162). Job design is concerned less with job purpose and more with what duties the job entails (Taylor, 2014, p.128). Oldham (1996) believes that few topics in the field of organisational psychology and behaviour have attracted as much research as work design, probably due to the fact that it can have an enormous impact on organisational success and individual well-being (Morgeson & Campion, 2003). There have been numerous approaches to job design in the relevant literature and in practice, especially during the 20th century. Many argue that the notion of job design emerged as early as 1776 when Adam Smith presented his idea of the division of labour. Frederick Taylor introduced the scientific management approach much later, in 1911, suggesting principles for the most efficient ways to design a job: task simplification, worker specialisation, and workers' motions on the job should follow strictly defined procedures to finish a task in the shortest possible time. 'Taylorism' also proposed removing responsibility from employees to engineers and managers. In 1914 'Fordism' further enhanced and promoted the idea of simplifying tasks and introduced the moving assembly line. During the 1940s and 1950s a somewhat new approach to job design emerged: 'job enlargement' was a way to decrease the degree of employees' horizontal specialisation by expanding the number of tasks associated with a job (Griffin, 1982), thus reducing some of the monotony associated with doing the same thing every single day. During the 1960s, as a response to the limited motivational effects of job enlargement, Herzberg (1968) introduced the idea of job enrichment as 'vertical job loading' (p. 83), increasing employee responsibilities for scheduling a job and the way in which the job is carried out.

Following the job enlargement and job enrichment approaches, Hackman and Oldham (1974, 1980) introduced their Job Characteristics Model, proposing that job satisfaction, motivation, and effectiveness occur when any job contains the following five characteristics.

1. Skill variety (SV) – the degree to which performing a job effectively requires the job-holder to possess and utilise their different skills, abilities, and talents.
2. Task identity (TI) – the degree to which a job involves completing an identifiable piece of work from start to finish with a visible outcome.

3. Task significance (TS) – the degree to which a job impacts the lives of others inside and/or outside the organisation, enabling employees to experience their work as more meaningful.
4. Autonomy (AU) – the degree to which a job provides the worker with freedom, independence, and discretion in scheduling work, decision-making, and work methods, enabling them to feel a stronger responsibility for their job outcomes.
5. Feedback (FB) – the degree to which the job provides the worker with direct information about their performance and personal effectiveness.

According to the Job Characteristics Model, the presence of these five core job dimensions leads employees to experience three psychological states: 1) viewing their work as meaningful, 2) feeling responsible for outcomes, and 3) acquiring knowledge of results. These three psychological states are in turn related to positive outcomes such as overall job satisfaction, internal motivation, high performance, and low absenteeism and turnover (Renn & Vandenberg, 1995; Brass, 1985; Johns, Xie & Fang, 1992; Humphrey, Nahrgang & Morgeson, 2007).

According to Hackman and Oldham (1975), autonomy and feedback are more important elements in creating the motivation potential score (MPS) than skill variety, task identity, or task significance. Thus, if a job completely lacks autonomy (or feedback), regardless of the levels of task variety, identity, and significance the MPS will be very low. However, more recently Greg Oldham (2012) confirmed the validity of MPS in the contemporary workplace and added some application outcomes such as creativity (especially in relation to autonomy), altruism as a lack of selfishness in dealing with counterparts, willingness of employees to learn new skills and demonstrate resilience at difficult times, and a higher quality of family life. He has also suggested a sixth dimension to be considered in the job characteristics model – social interaction, leading to high levels of performance.

Research has found that job design can have a profound impact on employee attitudes and behaviour (Campion, Mumford, Morgeson & Nahrgang, 2005) at both the individual and organisational level (Fried & Ferris, 1987; Humphrey et al., 2007). It is an important determinant of employees' affective commitment (Dunham, Grube & Castañeda, 1994; Raharjo, Solimun & Fernandes, 2018), job

satisfaction (Lawler, 1969; Hackman & Oldham, 1974, 1980; Brass, 1985; Bhuidan & Buklend, 2002; Glisson & Durick, 1988; Fahr, 2011), higher employee motivation (Hackman & Oldham 1974, 1980; Campion & Thayer, 1987; Humphrey et al., 2007; Cheng & Lu, 2012), increased job performance (Lawler, 1969; Hackman & Oldham, 1974, 1980; Brass, 1985; Campion & Thayer, 1987), career incentives (Kaarboe & Olsen, 2006), greater involvement and lower absenteeism (Campion & Thayer, 1987; Hackman & Oldham, 1974, 1980), lower turnover (Hackman & Oldham, 1974, 1980), higher engagement and performance ratings, and enacting more organisational citizenship behaviours and engaging in fewer deviant behaviours (Shantz, Alfes, Truss & Soane, 2013). However, Parker, Wall and Corderly (2001) propose that the collective effects of the core job characteristics on affective responses (satisfaction and motivation) are largely supported in the relevant research, but those for behaviour (i.e., work performance, turnover, and absence) less consistently so.

3.3. Influence of work engagement on job satisfaction and organisational commitment

Schaufeli et al. (2002) define engagement as "a positive, fulfilling, work-related state of mind that is characterized by vigour, dedication, and absorption", stating that it represents a "pervasive affective-cognitive state that is not focused on any particular object, event, individual, or behaviour" (p. 74), but rather remains related to the individual's work experience. Even though it does show fluctuating levels over time, the general levels of engagement can be measured, and it is important to see whether these levels can be enhanced by human resource practices (Bakker & Albrecht, 2018).

Work engagement as a concept gained popularity because it proved to be a good predictor of employee, team, and organisational outcomes (Bakker & Albrecht, 2018), with the ability to influence a range of motivational outcomes. Engaged employees demonstrate openness to new experiences and a tendency to explore their environment more freely, which boosts their creativity; they are more open to learning and tend to transform their thoughts into actions more easily; and engaged employees report better health and more active and positive emotions (Bakker, Demerouti & Sanz-Vergel, 2014). Work engagement is found to influence numerous job-related outcomes: the formation of positive attitudes towards work and the organisation (Schaufeli, 2014, p.30; Bakker & Schaufeli, 2014), and a positive relation with organisational citizenship behaviour and in-

role and contextual performance (Christian, Garza & Slaughter, 2011; Breckler, 1984). Interestingly, the transference of work engagement between people in a group is often described as "contagious" (Bakker & Schaufeli, 2017).

Kahn (1990) argues that when working, people can be more or less psychologically present and can use varying degrees of their physical, cognitive, and emotional presence to suit the role they are performing (Kahn, 1990). Pursuing the identity of those factors that explain the process of individual selves' investment in their in-role experience, Kahn (1990) coined the concept of personal engagement, describing it as a situation where "people employ and express themselves physically, cognitively, and emotionally during role performances" (p. 694). He identifies three psychological conditions that trigger personal engagement: meaningfulness, safety, and availability. Meaningfulness, corresponding to the feeling of being rightfully reciprocated for personal investment, is influenced by the nature of the job (task and role characteristics); psychological safety depends on social environment (interpersonal, group, and managerial relations, and social norms); whereas availability is connected to the personal resources for investment which the individual has at their disposal (Schaufeli, 2014, p. 25).

In line with Kahn's (1990) view on engagement, Schaufeli et al. (2002) argue that engagement can be viewed as a three-component structure encompassing three fundamental qualities: vigour, dedication, and absorption. Vigour is described as a high-level energy state, the willingness to invest effort and to persist despite any work difficulties, and as mental resilience during work; dedication refers to a deep involvement in work and experiencing inspiration, pride, challenges, and significance from work; whereas absorption refers to a full and deep concentration that emerges during work, when time passes unnoticed and when it becomes hard to detach oneself from work (Schaufeli et al., 2002; Bakker & Schaufeli, 2017).

According to the job demands–resources model (JD–R) (Demerouti et al., 2001; Bakker et al., 2014), work engagement is influenced by job resources, since a well-designed job can advance employee well-being and engagement (Bakker & Demerouti, 2014; Hackman & Oldham, 1980; Parker & Wall, 1998). This model suggests that employee well-being can be attributed to the characteristics of the

work environment, which can be classified in one of two general categories, regardless of the differences between different organisations: job demands and job resources (Bakker et al., 2014). Job demands are those aspects of the organisational environment associated with an individual's psychological or physical investment, which therefore require substantial effort in order to be handled (Xanthopoulou, Bakker, Demerouti & Schaufeli, 2007; Bakker, 2014). On the other hand, job resources are "physical, social or organizational apects of the job that are: (a) functional in achieving work-related goals, (b) reduce job demands that are associated with physiological and psychological costs, and (c) stimulate personal growth and development" (Xanthopoulou et al., 2007, p. 122). These two types of organisational aspect, which differ in nature, trigger different psychological processes which affect employee well-being; thus job demands correlate with exhaustion and burnout, whereas job resources trigger motivational processes and the work engagement connected to them (Bakker & Schaufeli, 2017; Demerouti et al., 2001; Xanthopoulou et al., 2007; Bakker et al., 2014).

According to Hackman and Oldham (1980), job resources can be viewed as several distinct job characteristics (autonomy, task variety, task significance, task identity, and feedback) that may foster work engagement and subsequently work-related attitudes such as job satisfaction and organisational commitment (Christian et al., 2011).

3.4. The hypotheses

In line with the above, we propose the following:

H1: There is a strong positive relationship between Job Design (JD) and Work Engagement (WE).

H2: There is a strong positive relationship between Job Design (JD) and Job Satisfaction (JS).

H3: There is a strong positive relationship between Job Design (JD) and Organisational Commitment (OC).

H4: Work Engagement (WE) mediates the relationship between Job Design (JD) and Job Satisfaction (JS).

H5: Work Engagement (WE) mediates the relationship between Job Design (JD) and Organisational Commitment (OC).

4. RESEARCH METHODOLOGY

This study explores the influence of job design on work-related attitudes related to job satisfaction and organisational commitment. Drawing lines according to the JD–R model, we hypothesise that job design, comprised of autonomy, task significance, task variety, task identity, and feedback, takes the form of job resources that influence the formation of job-related attitudes, so that work engagement is a mediator in this relationship.

The hypotheses were tested on a sample of 97 employees working in the ICT sector in Serbia. Data was collected via an online questionnaire, using the Google Forms platform, in the period February–June 2019. The questionnaire was distributed with the help of various ICT organisations – ICT clusters and companies that were contacted with a request to further disseminate the questionnaire. Participation in the questionnaire was voluntary and anonymous.

4.1. Sample

The majority of respondents (59.8%) reported that their company worked in software development, 45.3% that their company offered IT services, and 28.8% and 6.1% of respondents reported that their company worked in telecommunication and hardware production respectively. 61.9% of companies were domestic, while 38.1% of respondents worked in a company whose headquarters were abroad. 6.2% of respondents worked in micro companies (less than 10 people), 23.7% in small companies, 25.8% in middle-sized companies, and 44.3% in companies with more than 250 employees. Most businesses were privately owned (80.4%), and the rest were state-owned.

The demographic structure of the respondents was 51.5% male and 47.4% female. The distribution by age and education level is presented in Table 1, and the distribution by work experience and tenure is shown in Table 2.

Table 1: Distribution of employees by age and education level

Age	**N**	**%**		**Education level**	**N**	**%**
Less than 26	28	28.9		High school diploma	11	11.3
26 – 35	37	38.1		Higher specialised studies	8	8.2
36 – 45	20	20.6		Bachelor Degree	34	35.1
46 – 55	7	7.2		Masters Degree	39	40.2
Over 55	5	5.2		PhD	2	2.1
Total	97	100		Other	3	3.1
				Total	97	100

Table 2: Distribution of employees by length of work experience and tenure in the company

Length of work experience	N	%		Employees' tenure in organisation	N	%
< 2 years	21	21.6		< 2 years	55	56.7
2 – 3	13	13.4		2 – 3	11	11.3
3 – 5	12	12.4		3 – 5	13	13.4
5 – 10	21	21.6		5 – 10	3	3.1
10 – 20	16	16.5		10 – 20	5	5.2
20 – 30	10	10.3		20 – 30	6	6.2
> 30 years	4	4.1		> 30 years	4	4.1
Total	97	100		Total	97	100

What stands out is the fact that the majority of respondents reported having been employed in their current organisation for less than 2 years (56.7%), which can be considered a short-term tenure. This cannot be totally explained by first-time employment, as only 21.6% of the respondents had less than two years' working experience. This leads to the conclusion that more than a quarter of the respondents had changed their company in the previous two years.

The majority of the respondents worked at operating-level positions (64.9%), while 24.7% were middle-level management and 9.3% were in higher or top-level management positions.

4.2. Measures

To measure the variables Job Design (JD), Work Engagement (WE), Job Satisfaction (JS), and Organisational Commitment (OC) we used instruments which had yielded high internal consistency in previous research. The scales we used were translated from English to Serbian following the double translation method. The Work Engagement scale used was officially translated to Serbian by its authors (Schaufeli & Bakker, 2004).

Job Design (JD). In accordance with Hackman and Oldham (1975), we viewed job design as complex variable consisting of five different dimensions: autonomy, task variety, task significance, task identity, and feedback. To measure each dimension we used a shortened Morgeson and Humphrey (2006) Work Design Questionnaire (WDQ). Answers were given on a five-point scale from *I strongly disagree* to *I strongly agree*. Some sample statements are: *The job allows me to make decisions about what methods I use to complete my work* (Autonomy); *The job involves performing a variety of tasks* (Task variety); *The job itself is very significant and important in the broader scheme of things* (Task significance); *The job provides me the chance to completely finish the pieces of work I begin* (Task identity); *The job itself provides me with information about my performance* (Feedback). The Job Design variable was computed as the mean of all five dimensions with a theoretical range from 1 to 5.

Work Engagement (WE). To measure work engagement, we used Schaufeli and Bakker's (2004) short UWES 9 scale, which measures engagement as a composite measure of its three dimensions: vigour, dedication, and absorption. Answers were given on a seven-point scale (from 0 to 6) depicting the frequency of times an individual agreed with the statements, i.e., *At my work, I am bursting with energy* (vigour); *I am enthusiastic about my job* (dedication); *I get carried away when I am working* (absorption).

Job Satisfaction (JS). We measured job satisfaction as a general feeling about one's job that is composed of a constellation of attitudes related to various facets

of the work (Spector, 1997). It was measured on a 15-item scale developed by Warr, Cook and Wall (1979), with answers ranging from 1 (completely unsatisfied) to 5 (completely satisfied). Respondents answered how satisfied they were with their immediate boss, their colleagues, the amount of responsibility they were given, etc. The scale has shown high internal consistency in previous studies (α=0.85, α=0.88) (Warr et al., 1979).

Organisational Commitment (OC). To measure affective (attitudinal) commitment toward the organisation we used Meyer et al.'s (1993) 6-item scale to measure items such as *This organisation has a great deal of personal meaning for me* and *I do not feel 'emotionally attached' to this organisation* (reverse coded). Answers were given on a 7-point scale ranging from 1, *I completely disagree*, to 7, *I agree completely*. Previous studies have found the scale to have high internal consistency (Meyer et al., 1993).

5. RESEARCH FINDINGS

Reliability analysis examining the internal consistency of the scales showed satisfactory levels: α=0.821 for job design, α=0.917 for work engagement, α=0.937 for job satisfaction, and α=0.861 for organisational commitment.

5.1. Descriptive statistics

In the first step of analysis we performed descriptive statistics of the variables Job Design (JD), Work Engagement (WE), Job Satisfaction (JS), and Organisational Commitment (OC). The results are presented in Table 3.

Table 3: Descriptive statistics

		JD	WE	JS	OC
N	Valid	97	97	97	97
	Missing	0	0	0	0
Mean		3.764	4.601	3.679	4.751
Median		3.9	5	3.8	4.833
Mode		4.2	5	3.8	4.833
Std. Deviation		0.628	1.133	0.852	1.398
Skewness		–0.773	–1.18	–0.487	–0.458
Std. Error of Skewness		0.245	0.245	0.245	0.245
Kurtosis		0.297	0.692	–0.517	–0.275
Std. Error of Kurtosis		0.485	0.485	0.485	0.485
Minimum		2.133	1.444	1.4	1
Maximum		4.933	6	5	7
Theoretical range		1–5	0–6	1–5	1–7

JD = Job Design; WE = Work Engagement; JS = Job Satisfaction; OC = Organisational Commitment

Despite being slightly negatively skewed the variables show acceptable levels of skewness and kurtosis. All variables scored higher measured means than their theoretical means would suggest – μ (JS) = 3.764; μ(OC) = 4.751; μ (WE) = 4.601 – indicating that the employees in the sample were relatively satisfied with their jobs; demonstrated relatively high levels of organisational commitment; declared higher levels of engagement than its theoretical mean would predict; and reported relatively high levels of autonomy, task variety, task significance, task identity, and job performance/results feedback, as the measured mean for the variable Job Design has shifted to the right of its theoretical mean.

5.2. Hypotheses testing

To test hypotheses H1–H3 we conducted Pearson's correlation test, which yielded the results presented in Table 4.

Table 4: Correlation analysis

	Variable	1	2	3	4	5	6	7	8
1	Autonomy	1							
2	Task Sign.	.199	1						
3	Task Var.	.330**	.387**	1					
4	Task Ident.	.475**	.253*	.353**	1				
5	Feedback	.422**	.131	.387**	.540**	1			
6	Job Design	.687**	.584**	.696**	.758**	.729**	1		
7	Work Eng.	.365**	.270**	.344**	.269**	.360**	.465**	1	
8	Job Sat.	.629**	.181	.358**	.319**	.365**	.527**	.446**	1
9	Org. Com.	.400**	.290**	.327**	.240*	.371**	.471**	.575**	.397**

** Correlation is significant at the 0.01% level (2-tailed).

* Correlation is significant at the 0.05% level (2-tailed).

Job design and work engagement. The results indicate that job design (comprised of five job characteristics) is positively related to work engagement (r=0.465), as predicted by Hypothesis 1. As this relationship is still in the domain of moderate coefficient level, we can only state that Hypothesis 1 is partially confirmed. However, work engagement would be increased if any of the job characteristics were enhanced. This is especially the case with autonomy at work and job feedback as these correlation scores are the highest of all (r (autonomy) = 0.365; r (feedback) = 0.360).

Engagement can be increased when factors with motivational potential (Humphrey et al. 2007), such as the five job characteristics, are carefully managed. This is in line with Christian et al.'s (2011) meta-analysis confirming the positive correlation between engagement and focal job characteristics.

Job design and job satisfaction. The research findings reveal that job design is positively related to job satisfaction (r=0.527), indicating that an increase/decrease in certain job dimension scores is associated with some increase/decrease in job satisfaction scores. The correlation coefficients for the relationship between individual job dimensions and job satisfaction suggest that 'autonomy' is most strongly correlated with job satisfaction (r=0.629), indicating that employees who are allowed high autonomy will feel that the results of their jobs are determined by their efforts, actions, and decisions, and so will feel more

satisfied. This finding supports previous research that finds a positive association between job autonomy and job satisfaction (DeCarlo & Agarwal, 1999; Liu, Spector & Jex, 2005; Nguyen et al., 2003; Thompson & Prottas, 2006). Other job dimensions such as 'feedback', 'task variety' and 'task identity' are weakly correlated with job satisfaction (r= 0.365, r=0.358, and r=0.319, respectively), yet the relationship is positive, whereas the correlation between 'task significance' and JS is shown to be insignificant. All in all, we conclude that Hypothesis 2 is partially supported, as the results confirm the direction but not the strength of the relationship.

Job design and organisational commitment. The results indicate that job design is positively related to organisational commitment (r=0.471). Therefore Hypothesis 3 is partially confirmed, as the direction of the relationship between the variables is positive, as we predicted. However, the results show a rather moderate relationship. The correlation coefficients obtained for the relationship between individual job dimensions and organisational commitment suggest that it correlates most strongly with 'autonomy' (r=0.400), followed by 'feedback' from the job (r=0.371).

In order to test Hypothesis 4 we confirmed that all conditions for the existence of mediation were fulfilled: the independent variable predicts the dependent variable and mediator; and the mediating variable is a significant predictor of the dependent variable (Baron & Kenny, 1986). Job design is a positive predictor of work engagement (β=0.465) with 20.8% of variance explained by the regression model (see Table 5).

Table 5: Job design as a predictor of work engagement

Model		β	t	P	
1	Constant		2.307	.023	R =.465, $adj.R^2$=.208,
	Job Design	.465	5.113	.000	F=26.139, p=.000

Furthermore, the model where work engagement mediates the relationship between job design and job satisfaction proved to have better predictive potential (adj. R^2=.315) (see Table 6, Model 2) than when the model includes only the relationship between job design and job satisfaction (adj. R^2=.270) (see Table 6, Model 1).

Table 6: Work engagement as the mediating variable in the relationship between job design and job satisfaction

Model		β	t	P	
1	Constant		2.185	.031	R =.527, $adj.R^2$=.270, F=36.546 p=.000
	Job Design	.527	6.045	.000	
2	Constant		1.576	.118	R =.574, $adj.R^2$=.315, F= 23.093 p=.000
	Job Design	.408	4.277	.000	
	Work Engagement	.257	2.691	.008	

In the first step of analysis we examined the relationship between job design (as the independent variable) and job satisfaction (dependent variable) (see Table 6, Model 1). Job design is positively and significantly related to job satisfaction (β=0.527). When we included work engagement (see Table 6, Model 2) the model was still significant. The direct effect of job design on job satisfaction was reduced to β=0.408, indicating that work engagement yields a partial mediation effect (β=0.257). We used the Sobel test to test the mediation model, which proved that mediation existed (z=2.382, p=.017). The mediation effect was calculated by the bootstrapping method, indicating that 22.62% of the relationship between job design and job satisfaction is achieved through the mediating variable, i.e., work engagement. Therefore, we conclude that Hypothesis 4 is supported.

In order to test the mediation of work engagement in the relationship between job design and organisational commitment, we confirmed the existence of all conditions for the mediation model to be fulfilled (independent variable predicts dependent variable – β=.471, p=.000 (see Table 7); independent variable predicts mediator – β=.465, p=.000 (see Table 5); and mediator predicts dependent variable – β=.454, p=.000 (see Table 7). When work engagement is included in Model 2 (see Table 7) the predictive potential of the model increases from adjR^2=0.213 (when only job design is used to explain organisational commitment) to adjR^2=0.370 (when work engagement is included).

When including 'work engagement' in the regression model the direct effect of job design on organisational commitment is reduced from β=0.471 to β=0.260, indicating that there is partial and significant mediation of work engagement in

the relationship between job design and organisational commitment, giving β=0.454.

Table 7: Mediating role of work engagement in the relationship between job design and organisational commitment

Model		β	t	p	
1	Constant		1.045	.299	*R =.471 adj.R^2=.213*
	Job Design	.471	5.201	.000	*F=27.053, p=.000*
2	Constant		–.008	.994	
	Job Design	.260	2.840	.006	*R =.619 adj.R2=.370*
	Work Engagement	.454	4.969	.000	*F=29.245, p=.000*

To test this mediation we conducted the Sobel test, which proved mediation to be significant (z=3.563, p=.000). Bootstrapping analysis indicates that 44.8% of the relationship between job design and organisational commitment is achieved through the mediating variable, i.e., work engagement.

Taking everything into consideration, we have sufficient evidence to support Hypothesis 5.

6. DISCUSSION: MANAGERIAL IMPLICATIONS AND INTERVENTIONS

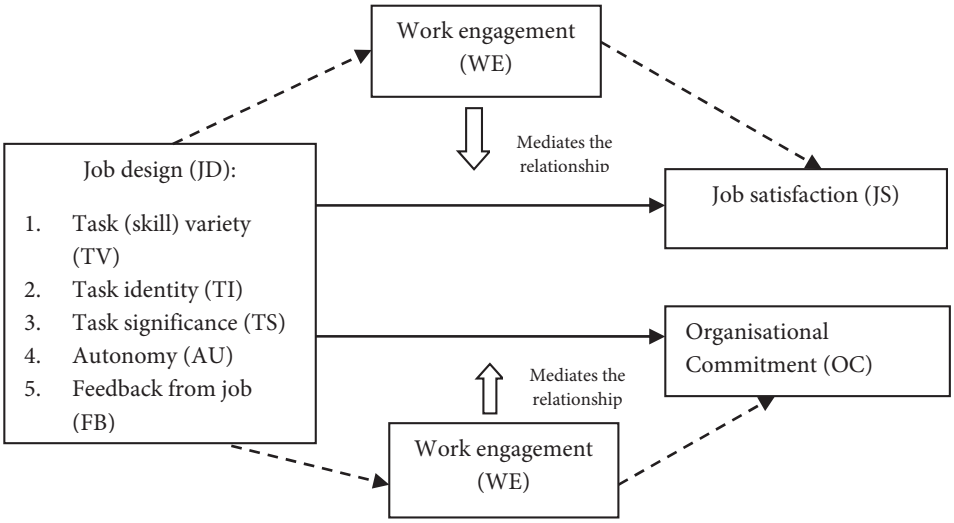
This study aims to expand our understanding of the relationship between job design and positive work outcomes such as job satisfaction and organisational commitment. The results only partially support the hypotheses of a strong positive relationship between job design (JD) and job satisfaction (JS) on the one hand, and job design and organisational commitment (OC) on the other; rather they indicate that these correlations are moderate (r=0.527 and r=0.471, respectively). Of the five investigated job dimensions, 'autonomy' seems to be the dimension that is most strongly and positively associated with job satisfaction (r=0.629), indicating that variation (increase/decrease) in this dimension's score is very much associated with variation in the 'job satisfaction' score (increase/decrease). The results also indicate only a moderate positive correlation of the autonomy dimension with organisational commitment (r=0.4). Other job dimensions are weakly correlated with the investigated work attitudes, although

the relationships are shown to be positive. Finally, regression analysis demonstrated that work engagement (WE) mediates both relationships.

These results have a number of implications. First, they add to our understanding of the job dimensions that are important for ICT sector employees to get more satisfaction from their jobs. Previous research has mainly focused on the impact of ICT technology on job satisfaction among different occupational groups and the factors that contribute positively to job satisfaction among employees in healthcare, teaching, and banking services, and less on the job dimensions that positively influence job satisfaction and organisational commitment specifically among ICT employees. By investigating the relationship between the five job dimensions and work-related attitudes, we have shown that the 'autonomy' dimension is the most important when designing jobs with positive organisational outcomes in the ICT sector. This result could contribute to ICT sector management attracting and retaining high-achieving and productive employees by designing a working environment where job autonomy is highly valued and promoted, thus allowing employees' role expectations and working environment to match, as suggested by Morgeson and Dierdorff (2011).

Second, the finding that work engagement mediates the relationship between job design and job satisfaction and between job design and organisational commitment shows how job design translates into a positive work attitude (see Figure 1). The predictive potential of job design is greater when work engagement is included in the model. This helps to better understand the process by which the causal effect of job design is transmitted to important organisational outcomes such as job satisfaction and organisational commitment. Fostering work engagement among employees is shown to be important for increasing the positive effect of job design on the process of work attitude formation and management in the ICT sector.

Figure 1: Proposed model of relationship between job design, work engagement, and work-related attitudes in the ICT sector



The research findings in the 'autonomy' dimension and work engagement have implications for management in the ICT sector and require interventions in order to positively influence the formation of work-related attitudes. In the following sections we distinguish between 'bottom-up' and 'top-down' interventions.

6.1. Bottom-up interventions: job crafting

In the late 1970s, role theory suggested that although an individual`s behaviour is context-specific, individuals in the same job perform in slightly different ways, making changes to their work roles as active job "crafters" or "sculptors" (Morgeson, Delaney-Klinger & Hemingway, 2005). Wrzesniewski and Dutton (2001) proposed the concept of job crafting, which assumes that individuals actively modify the task characteristics, social work environment, and cognitive boundaries of their job. Task modification leads to relational and cognitive crafting; relational and cognitive crafting increases employees' fit with the organisation, which is positively associated with job satisfaction (Kim, Im, and Qu, 2018). The JD-R model offers a somewhat different approach to job crafting. In this view, job crafting refers to proactively increasing structural (e.g., autonomy and variety) and social (e.g., asking for coaching or feedback) job resources, increasing challenging job demands (e.g., asking for new projects

and/or responsibilities), and decreasing demands that hinder work (e.g., cognitive and emotional demands; Tims & Bakker, 2010; Tims, Bakker & Derks, 2012).

The underlying assumption behind the concept is that employees are increasingly expected to be active agents who craft their jobs, rather than passive participants in changes at work (Wrzesniewski & Dutton, 2001; Tims et al., 2012). As the result of an individual initiative on the part of the employee (Tims & Bakker, 2014, p.141), job crafting assumes that employees autonomously change the meaning of their work to increase their well-being (Tims, Bakker & Derks, 2013), specifically their job satisfaction (Beer, Tims & Bakker, 2016; Villajos, García-Ael & Topa, 2019), organisational commitment (Kim & Lee, 2016), and work engagement (Tims et al., 2012, 2013; Petrou, Demerouti, Peeters, Schaufeli & Hetland, 2012). On the whole, employee behaviours that extend beyond formal job requirements are a good predictor of effective organisational functioning (Barnard, 1938; Katz & Kahn, 1978).

Thus, as "a model of individual job redesign" (Tims & Bakker, 2010), job crafting can be an effective bottom-up strategy for increasing job autonomy and work engagement that has a positive effect on the formation and management of work-related attitudes in the ICT sector. To be successful, job crafting should be promoted and aligned with organisational goals through managers communicating the individual and organisational outcomes that they desire, and by welcoming the application of a job-crafting strategy among employees (Tims & Bakker, 2014) and encouraging a proactive attitude that allows job crafting to occur (Kim & Lee, 2016, p. 86). Previous research has also investigated the profile of individuals engaging in extra role behaviours and suggests that autonomy, cognitive ability, and job-related skills will incrementally predict role breadth (Morgeson et al., 2005), indicating that any organisation aiming at fostering job crafting should focus its recruitment and selection efforts on such individuals and direct its training practices at the improvement of job-related skills.

6.2. Top-down interventions: job resources and work engagement

Interventions in job resources. As mentioned above, research suggests that autonomy, as one of the core task characteristics in the job characteristics model, is the most strongly correlated with the formation of positive work attitudes,

specifically job satisfaction of employees in the ICT sector. Therefore, major top-down interventions should focus on increasing job autonomy, although actions that focus on other job dimensions may also produce an increase in positive work attitude scores.

Job autonomy refers to viewing a context of accountability, authority, and responsibility (Mrayyan, 2006) as structural empowerment (Kanter, 1993, 1997) through access to information, support, resources, and growth opportunities that directly affect workers' level of control. Therefore, increasing job autonomy may include the following interventions:

- Changing 'on the job' experiences of employees in the ICT sector either through 'job enrichment', by removing some controls and granting additional authority to employees while retaining and even increasing their accountability for their work (Herzberg, 1968), or through job rotation, in order to learn and experience different and potentially more autonomous jobs in the same or different organisational units.
- Empowering ICT employees by delegating responsibility for tasks down the hierarchy so as to give workers increased decision-making authority in the execution of their primary work tasks (Leach, Wall & Jackson, 2003, p. 28), which will encourage individual autonomy and create a deeper sense of responsibility among all employees. Granting employees' autonomy in their individual tasks may further increase their ability to respond effectively to their clients' requirements.
- Encouraging managers to delegate responsibility for tasks to employees through human resource management, information sharing, purposely designed training practices aimed at building trust in the working environment and management learning how to delegate tasks, and less reliance on direct supervision as a main coordinating mechanism.
- Increasing employees' fit with the organisation through recruitment of individuals with higher levels of autonomy, ability, and job-related skills who will achieve better performance, engage in job crafting, and be able to perform additional tasks, as suggested by Morgeson et al. (2005).
- Developing self-managing teams, autonomous and self-regulating work groups that operate largely without supervision; decide on work methods, planning, scheduling, and control; distribute tasks among their members;

monitor their own performance; and take corrective action when required (Armstrong & Taylor, 2017, p. 171).
- Creating more growth and career opportunities and choices for employees within the boundaries of the organisation to allow individuals to make career transitions to different and more autonomous jobs.
- Providing the majority of employees permanent working status instead of temporary arrangements, as previous research focusing on healthcare workers (e.g., nurses) suggests that permanent staff have and seek more job autonomy (Cawley & McNamara, 2011; Han, Moon & Yun, 2009).

Increasing job autonomy in the ICT sector may achieve additional positive outcomes including higher intrinsic motivation and quality of performance and lower absenteeism and turnover (Hackman & Oldman, 1975), and greater job involvement and general health and well-being (Demerouti, Bakker, Nachreiner & Schaufeli, 2000; Thompson & Prottas, 2006). Increased autonomy will probably lead to increased task variability, which may further influence job design in the direction of empowering employees in the ICT sector.

Interventions in work engagement. Research finding that work engagement mediates the relationship between job design and positive work-related attitudes suggests that appropriate interventions in work engagement may further positively influence job satisfaction and the organisational commitment of employees in the ICT sector. Such interventions may include the following:

- Systematically fostering the main drivers of work engagement such as job and personal resources (Bakker, 2009) to create working conditions and provide resources for employees that enhance positive work experiences (Bakker Demerouti & Schaufeli, 2005) through increased social support, autonomy, teamwork, performance feedback, and supervisory coaching opportunities for learning and development.
- Promoting transformational leadership through adequate HR development and training practices, as previous research (summarised by Tims & Bakker, 2014) suggests that a) transformational leaders may be effective in fostering employees' personal and job resources, thus enhancing their work engagement, b) managers' perceptions that their executives are acting and behaving as transformational leaders are positively correlated with the

managers' own engagement, and c) leaders can be trained to be transformational in a relatively short period of time.

- Valuing and promoting a socially engaging environment where values and information are shared, employees feel socially embedded, and there are many opportunities for open discussion and expression of ideas (Soane, 2014).
- Changing personal resources through selection practices aimed at hiring a particular profile of individuals, as engaged employees differ from other employees in terms of personal characteristics, scoring higher on extraversion and conscientiousness and lower on neuroticism, are more optimistic, have more self-efficacy, self-esteem, and resilience, and have an active copying style (Bakker, 2009).
- Measuring work engagement by establishing some type of work engagement monitor (Bakker, 2009) to assess engagement levels and working context factors that may be related to engagement in order to identify the interventions needed to improve work engagement in the organisation (Gruman & Saks, 2011).
- Increasing employees' daily engagement (a) through the allocation of sufficient job resources (e.g., feedback, coaching) and (b) by enhancing employees' positive self-belief regarding self-efficacy and optimism (Xanthopoulou et al., 2008, 2009a, 2009b).
- Facilitating the crossover (transmission) of work engagement from one employee or group of employees in the organisation to another, i.e., the process that occurs when the psychological well-being experienced by one person affects the level of well-being of another (Westman, 2001). Previous research suggests that work engagement crosses over when employees communicate frequently with an engaged colleague on a daily basis (Bakker & Xanthopoulou, 2009), because engaged employees have a positive impact on others with whom they collaborate.

7. CONCLUSION

Given that companies are having difficulty filling vacancies for highly skilled ICT workers, we investigated which interventions could be used to help companies attract and retain their workforce. As ICT labour demand exceeds supply (and there are indications that this gap will grow in the future), companies are

competing for skilled workers through various financial and non-financial incentives. However, we argue that careful managerial and leadership governance with regard to employee job satisfaction and organisational commitment could solve much of this problem. In the battle for highly skilled employees, job attitudes can be a new weapon and important tool to attract and retain current employees. Furthermore, in respect of the implications of the JD–R model, we included the effect of work engagement, which lately has been getting increasing attention in the literature.

We conducted our research on a sample of ICT sector employees in Serbia (N=97) and confirmed that job resources, in the form of five job characteristics (autonomy, task variety, task significance, task identity, feedback), are positively related to engagement, work-related attitudes, job satisfaction, and organisational commitment. Furthermore, when mediating the relationship between job design and work attitudes, with work engagement as the mediating variable, the predictive capacity of the models was increased and remained significant. This implies that partial mediation through engagement exists and that job satisfaction and organisational commitment can be influenced through interventions that tackle job crafting and that foster job resources, and through interventions that enhance work engagement. As the mediation of work engagement in the relationship between job design and job attitudes has been little investigated in previous research, we believe this study to be insightful in regard to the impact of work engagement on the formation of work attitudes.

To our knowledge, there is no similar research on the Serbian ICT workforce. As it is still a young sector in its development phase, researchers have paid scant attention to organisational behaviour in companies in this sector. Therefore, we view this study as valuable input for HRM practitioners in ICT companies and invite fellow colleagues to further examine the relationship between job design and work-related outcomes. Our study involved a relatively small sample size (N=97) so this paper should be viewed as a preliminary study rather than as ground-breaking research. Further research based on a bigger employee sample could shed more light on organisational behaviour issues in the sector.

The main limitation of this study is the sampling method used. Employees in the sector were sent an open invitation through various platforms (ICT organisations

and clusters) to participate in the research. Therefore, future research should aim to use more careful and thorough sampling.

Furthermore, when investigating the model of the relationship between job design and work-related attitudes the only motivational resources that we included were the five job characteristics. We knowingly omitted social and contextual factors that may affect this relationship and which should be included in future, more encompassing research; e.g., social support, leader–member exchange, and work conditions.

Another limitation that concerns incomplete variable modelling is the nature of work engagement, which we used as the mediating variable. In order to fully understand the nature of this phenomenon we suggest that future research include personal resources, which may affect the formation of engagement.

One way to tackle this problem would be to use interviewing techniques that get more detailed information about organisational behaviour in the sector. We used closed questions and scales developed by researchers from the field of industrial psychology, but we suggest that future researchers interview ICT employees in order to discover if specific cultural dimensions yield other factors that influence either engagement or attitude formation.

In order to better understand the relationship between job design and job satisfaction, and organisational commitment in the ICT sector, future studies should expand existing knowledge by considering job design not only as an independent variable but also as a dependent variable in order to investigate how job design is influenced and shaped at the higher level (global, international, national, and occupational influences), the lower level (work-group influences), and by individual factors, as well as by the complex interactions within this multilevel system of job design (Parker, Van den Broeck & Holman, 2017).

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A STRATEGIC APPROACH TO ORGANISATIONAL ENTREPRENEURSHIP: EMPLOYEES' AWARENESS OF ENTREPRENEURIAL STRATEGY

ABSTRACT: *The purpose of the paper is to explore employees' awareness of the entrepreneurial strategy in an organisation. We argue that employee awareness of the clarity and flexibility of entrepreneurial strategy differs depending on gender, age, seniority, education, and working experience. We provide a theoretical overview explaining the interaction between performance-oriented strategic management and entrepreneurship, based on organisational innovation. Our study delineates the specifics of a strategic approach to organisational-level entrepreneurship, explaining in depth the integration of entrepreneurship and strategy. The data was collected from a total of 39 managers and 50 employees holding non-managerial positions in 19 Serbian companies. The results of the analysis show a statistically significant difference in employees' awareness of the clarity and flexibility of entrepreneurial strategy, depending on gender, level of education, and seniority. The research presents empirically and theoretically substantiated evidence regarding the necessity to make entrepreneurial strategy an integral part of corporate strategy and to make employees aware of the relevance of strategy in achieving long-term competitive advantage. Based on these considerations the results are critically evaluated their implications and limitations are discussed, and avenues for further research are recommended.*

KEY WORDS: *Entrepreneurship, management, organisation, strategy, employees, behaviour*

JEL CLASSIFICATION: L26, M10, O30, L10

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1. INTRODUCTION

Businesses are constantly implementing a wide range of activities to increase sales, decrease costs, and improve quality by focusing on growth and development, but in most cases they do not have a clearly specified strategy. Innovative activities are mainly ad hoc, tactical, and reactive. Entrepreneurship is much more than an individual initiative and it has the potential to provide a strategic direction for the organisation. It is necessary to develop a strategy capable of guiding entrepreneurial activity by clearly defining how entrepreneurial the organisation wants to be, and, equally importantly, making employees, as the agents of change, aware of the strategy and willing to act accordingly.

There has been a considerable amount of research on entrepreneurial behaviour in organisations that aims to shed more light on this unique concept (Pryor, Webb, Ireland, and Ketchen 2015; Narayanan, Yang, and Zahra 2009; Morris, Kuratko, and Covin 2008; Baden-Fuller 1995), but considerable ambiguities remain (Hornsby, Kuratko, Shepherd, and Bott 2009; Dess, Ireland, Zahra, Floyd, Janney, and Lane 2003). Researchers have analysed how the internal organisational context affects entrepreneurial behaviour (Zahra, Jennings, and Kuratko 1999). However, in previous empirical studies the theoretical and conceptual foundation has been insufficient, and this deficiency is the fundamental motivation for conducting this study. We research whether employees are aware of entrepreneurial strategy and how they perceive it, according to their individual characteristics and position in the organisation.

The main research goal is to investigate the importance of taking a strategic approach to formulating and implementing entrepreneurial activity in a business and to identify how aware employees are of these efforts. First, we investigate the interdependence of entrepreneurship and strategic management. Entrepreneurship promotes a constant quest for new sources of competitiveness, while strategic management strives to create and maintain competitive advantage in a given context. Second, we elaborate a new conceptual framework of strategic entrepreneurship or undertaking entrepreneurial activities in an organisation from a strategic perspective. The purpose of linking strategic management and entrepreneurship is to have a more thorough insight into how the new value creation process develops in an organisational context. Third, we shed new light

on the relevance of adopting a strategic perspective when managing entrepreneurial initiatives in an organisation. Finally, the implementation of a entrepreneurial strategy depends on the employees' personal characteristics, cognitive abilities, and position in the organisational hierarchy. Our research investigates and clarifies the key factors influencing employees' perceptions that entrepreneurial strategy management must consider when building an entrepreneurial business. The research goal is to analyse employees' gender, age, seniority, education, and working experience to identify how these variables affect the way employees perceive the clarity and flexibility of entrepreneurial strategy.

The paper is structured as follows. The first section provides a review of the literature on theoretical considerations related to the interaction of strategic management and entrepreneurial behaviour. The second section outlines and elaborates the relevance of a strategic approach to organisational entrepreneurship which integrates entrepreneurship and strategy. The third section analyses the key aspects of employees' awareness of entrepreneurial strategy and the fourth presents the methodology and results of the empirical research. Finally, the findings are critically evaluated and their implications, research limitations, and further research directions are discussed.

2. THEORETICAL BACKGROUND AND HYPOTHESIS

2.1. Strategic management vs. entrepreneurial behaviour in organisations

Entrepreneurship and strategic management are dynamic processes that focus on improving overall business performance through discovering new methods of value creation. Strategic management and entrepreneurship interact constantly (Stivenson and Jarillo 1990) but in different domains (Ireland, Hitt, and Sirmon 2003). Each of them has its own intellectual platform and scope but these two independent domains interact and communicate. Strategic management strives to create and maintain competitive advantage in a given context, while entrepreneurship promotes a constant quest for new sources of competitiveness through products, processes, or market innovations (Kuratko and Audretsch 2009). Strategic management deals with factors affecting organisational performance, strategy, environment, and sustainable competitive position. The scope of strategic management includes all actions and decisions focused on new

business creation and innovation development: corporate and business strategy, implementation, leadership, planning, and teamwork (Day 1992). Entrepreneurship, on the other hand, is more closely focused on the innovation of products, processes, and markets (Daily, McDougall, Covin, and Dalton 2002; Sharma and Chrisman 1999; Lumpkin and Dess 1996), or the identification and exploitation of opportunities as the foundation for new value creation (Shane and Venkataraman 2000). Companies today are under constant pressure to continuously learn and innovate (Aleksić Mirić 2019). The main purpose of linking strategic management and entrepreneurship is to get a more thorough insight into how the process of new value creation is developed when a new business venture is established in an organisation (Erić Nielsen, Babić and Nikolić 2016).

The interaction between strategic management and entrepreneurship aims to connect the creative aspect of entrepreneurship with performance-oriented strategic management. Sandberg (1992) argues that the intersection between strategic management and entrepreneurship incorporates new business creation, innovation, identifying opportunities, and risk-taking. Schendel and Hofer (1979) argue that entrepreneurship is the essence of strategic management and distinguish between entrepreneurial strategy, which indicates the organisation's position in relation to the competitive environment, and integrative strategy, which manages the outcomes of entrepreneurial behaviour. Seen from this perspective, entrepreneurship is subordinate to the strategic management process.

Guth and Ginsberg (1990) analyse the factors driving innovativeness and how corporate entrepreneurship influences the strategic renewal of an organisation. This approach is flawed due to its excessive generality and a lack of clear distinction between cause and effect. Corporate entrepreneurship is not regarded as a possible strategy in itself but as an independent phenomenon existing separately from strategy. Floyd and Lane's (2000) more process-oriented model explains strategic renewal as new ventures undertaken within the organisation, with particular emphasis on management support. However, they analyse strategy separately from entrepreneurism, neglect the effect of entrepreneurial initiatives, and their analysis mainly focuses on the organisational units responsible for innovation. (Covin and Miles 1999) have an alternative approach;

their model describes how knowledge is created through various entrepreneurial activities: strategic renewal, sustainable regeneration, business domain redefinition, organisational rejuvenation, and business model restructuring. Corporate entrepreneurship strategy is not included in this model, either explicitly or implicitly. Hornsby, Naffziger, Kuratko, and Montagno's (1993) model of entrepreneurial behaviour determinants focuses on specific behaviours leading to the creation of new business ventures This model is of limited scope, analysing drivers of entrepreneurial behaviour at the individual level without taking strategy into consideration. A slightly different variation of this model was introduced by Kuratko, Ireland, Covin, and Hornsby (2005), who analyse the preconditions and outcomes of entrepreneurial tactical management. None of these models provide a clear definition of corporate entrepreneurship strategy.

2.2. A strategic approach to organisation-level entrepreneurship: integrating entrepreneurship and strategy

To maintain a sustainable competitive position, management needs to think and act strategically in terms of product/process innovation and development. Nevertheless, these aspects are often neglected and companies focus instead on the efficiency of daily operations. Many companies are involved in entrepreneurial activities without having formally described and envisioned a corporate strategy. An entrepreneurial strategy is as "a vision-directed, organisation-wide reliance on entrepreneurial behavior that purposefully and continuously rejuvenates the organization and shapes the scope of its operations through the recognition and exploitation of entrepreneurial opportunity" (Ireland, Covin, and Kuratko 2009). Recent studies focus not only on creating an effective strategy but also on the modelling, antecedents, and contingent effects of differentiation and integration (Lloret 2016; Burgers and Covin 2016; Baruah and Ward 2014; Shimizu 2012; Villiers-Scheepers 2012; Ireland et al. 2003; Venkataraman and Sarasvathy 2001).

The new conceptual framework of strategic entrepreneurship has been built by integrating the different aspects of entrepreneurship and strategic management. Strategic entrepreneurship involves the business undertaking entrepreneurial activities from a strategic perspective that involves risk and proactive behaviour. Strategic entrepreneurship encompasses looking for new concepts, ideas, and opportunities through entrepreneurial activity while at the same time exploring

potential sources of competitive advantage through a strategic management process. It is important to point out that both of those processes are necessary for value creation; neither of them is enough in itself. Strategic entrepreneurship is based on systematic innovation and involves formulating explicit goals and strategies, implementating them, and monitoring performance and adjustments based on identified deviations.

Companies with entrepreneurship deeply embedded in their corporate and business strategies have a better chance of outperforming competitors in the long run (Covin and Miles 2007). Corporate entrepreneurial strategy at the organisational level should result in enhanced competitiveness, new value creation, and strategic repositioning. This strategy indicates to what extent and how a business strives to become entrepreneurial. The key issues that the strategy should reflect are innovation intensity and frequency, preferred risk propensity, activities outside the core of competence, expectations from business/product units, how to handle new/existing products/services/markets in the future, where the innovation hub should be located, etc. The ultimate goal for the company is to gain external expertise from new ventures and incorporate it into strategically relevant organisational knowledge. The strategy development can be either emergent or deliberate, but it should be underpinned by a strong vision and sense of direciton. The vision should be ambitious but rooted in reality, and there must be a strong strategic intent if the vision in particularly challenging. Strategy comes from both the top and the bottom of the organisation, with the strong involvement of all levels of management (Burns 2013, 473–475).

There are two alternative, conventional approaches that entrepreneurship management can take to achieve a sustainable competitive position. The first relates to the fact that efficiency and productivity can be enhanced by incremental adjustments of processes and stimulated by management from the top all the way down to the bottom of the organisation (Burgelman 1984). 'Induced' behaviour involves taking advantage of the existing strategy and maintaining consistency with the current strategic context and planning system; for example, developing a new product within the current business. On the other hand, autonomous strategic behaviour is equivalent to entrepreneurship as it refers to the creation of new combinations of available resources that result in a foundation for radical innovation. It arises beyond the dominant logic and current strategic setting and

requires alignment, as when middle managers try to get support from top management to implement new ideas and projects, bypassing the prevailing context and questioning corporate strategy.

Entrepreneurial activity often occurs randomly and ad hoc; autonomous behaviour does not automatically imply the existence of a corporate entrepreneurship strategy (Ireland, Covin, and Kuratko 2009). Strategies that promote innovation and development are based on the entrepreneurial approach to competitive advantage, while strategies based on cost reduction and incremental improvements are focused on maintaining the current competitive position (Dess, Lumpkin, and McGee 1999). Entrepreneurial behaviour is more closely related to differentiation than to cost-management because differentiation requires creativity, engineering competence, marketing skills, and effective coordination, while cost leadership emphasises control, process skills, efficiency, and a structured set of organisational potentials. Companies promoting an entrepreneurial approach while pursuing a cost leadership strategy have below-average performance (Porter 1985). Zahra and Covin (1993) also claim that new products are more closely related to differentiation, while cost management is more focused on improving existing products.

Corporate entrepreneurial strategy should benefit the business in multiple ways. At the corporate level a major strategic imperative is to continue developing the entrepreneurial arhitecture, while at the business level the focus is on understanding the basis of competitive advantage and how customer value can be enhanced. Strategy is meant to encourage internal growth through innovation, new products and services, and entry into new markets. The purpose of a strategy is to encourage creativity but with a commercial overview, keeping marketing position and overall performance at the forefront of organisational goals. It should question existing marketing paradigms such as pricing, branding, and product life cycles while also disputing sectoral, performance, and customer conventions.

2.3. Employee awareness of entrepreneurial strategy

Entrepreneurial strategy must be known and clearly communicated to everyone in the organisation. The assumption that employees are fully aware and familiar with strategy and understand its potential implications is very risky. In the

context of entrepreneurial initiative, ambiguity or insufficient understanding of key strategic directions eventually leads to organisational disorder and employee passivity. Entrepreneurial organisational culture is oriented toward transferring and communicating a vision, based on continuous innovation and encouraging employees to put entrepreneurial spirit into action. In an entrepreneurial organisation one of the main aspects of corporate strategy is to formulate a strategic approach to entrepreneurship and to familiarise employees with long-term plans. The employee satisfaction level varies significantly in different organisational cultures according to the content of its values and norms (Janićijević, Nikčević, and Vasić 2018). They should be willing to personally initiate, participate in, and back up new ideas that enable the expansion of the core competence. Continuous improvement of business processes is a precondition for achieving an entrepreneurial vision. Failing to explicitly communicate strategy can irreversibly damage a company's ability to innovate. Management must be clear not only about strategy but also about what it means in terms of daily operations for the different organisational departments. Businesses need a strategic direction to overcome the challenges of a changing competitive arena, but this should be coupled with flexibility. Strategic flexibility refers to rethinking, reflecting, and aligning strategies, action plans, organisational culture, structure, and managerial systems. Because of the intensity and degree of environmental turbulence related to technology, regulation, and market trends, entrepreneurial strategy has to be adjustable. Management decides the company-preferred competitive position, but there are different ways to get there. It is necessary to have a good understanding of resources, to build dynamic core competencies, to focus on human capital development, to use new technologies effectively, to rethink strategy, and to align the organisation's structure and culture (Hitt, Keats, and DeMarie 1998). Recombining resources more efficiently implies that appropriate decisions have been made at the strategic level. Innovation and creative ideas inevitably change embedded patterns and methods, so it is crucial for strategy to be not only flexible but also essentially oriented to the future and to opportunities.

Employees are more or less willing to start a new venture depending on their personal priorities and values regarding life in general, which are heavily influenced by gender. Numerous studies have focused recently on gender differences in organisational entrepreneurship (Khyareh 2018; Kanze, Huang,

Conley, and Higgins 2018; Singh, Archer, and Madan 2018; Justo, DeTienne, and Sieger 2015; Wieland and Sarin 2012; Charness and Gneezy 2012; Boschini, Murena, and Persson 2012; Zhao, Seibert, and Lumpkin 2010; Fairlie and Robb 2009). Employees with dominant masculine values are ambitious, performance- and goal-oriented, and more self-confident, while employees with high feminine values cherish human relations and safety, are risk-averse, build strong social networks, strive for consensus, solidarity, and equality, are empathetic, genuinely care for others and about the quality of life outside the workspace, and do not admire standing out from the crowd (Hofstede 1980, 2001).

Hypothesis 1. *Employee awareness of the clarity and flexibility of entrepreneurial strategy varies depending on gender.*

Emloyee perceptions of the significance of entrepreneurship are positively related to age and increase up to a certain point in a career. Recent research (Baù, Sieger, Eddleston, and Chirico 2017) indicates that a failed entrepreneur's age is related to the likelihood of entrepreneurial reentry depending on career stage. The relationship is positive during the early and late career, but negative during the mid-career stage. Researchers have investigated the relationship between an individual's age and the likelihood of starting a new business (Baù, Sieger, Eddleston, and Chirico 2017; Langowitz and Minniti 2007; Ucbasaran, Wright, & Westhead 2003; Coate and Tennyson 1992). In our research we argue that employees' awareness of entrepreneurial strategy depends on their age.

Hypothesis 2. *Employee awareness of the clarity and flexibility of entrepreneurial strategy varies depending on age.*

Management is willing to embrace the latent tension in an organisation since ongoing activities ensure the maintenance of a competitive position, while entrepreneurial actions disturb embedded patterns and bring discomfort but aim to secure the market position in the long run. Top, middle, and operational management have different responsibilities and roles in initiating and implementing entrepreneurial activities (Floyd and Lane 2000). At the strategic level, managers try to identify effective ways to create new or redefine existing business. Middle management proposes and develops entrepreneurial ideas aimed at improving the organisation's competitive position. Middle managers' strategic roles have also been described as part of the process of corporate

entrepreneurship (Wooldridge, Schmid, and Floyd 2008; Hornsby, Kuratko, and Zahra 2002). Operational management focuses on how the organisation's core competence can be used to exploit opportunities. There is a substantial literature on operations management, which has been developed in the context of managing innovation within established firms (Shepherd and Patzelt 2017; Sun, Hong, and Hu 2014; Khazanchi, Lewis, and Boyer 2007; Tatikonda and Rosenthal 2000). Employees, on the other hand, receive subtle signals from management structure about preferred behaviour, so they know how to proceed, even though they might be unaware of the formal entrepreneurial strategy. Therefore, the awareness and perceptions of individuals regarding the importance of enhancing entrepreneurial behaviour changes depending on their position in the organisational hierarchy.

Hypothesis 3. *Employee awareness of the clarity and flexibility of entrepreneurial strategy varies depending on their position in the organisation's hierarchy.*

Being exposed to diverse educational backgrounds enriches the perspective of team members and facilitates creativity and adaptability (Zimmerman 2008). 'Educational level' refers to the extent of the training received by members of the entrepreneurial team (Ensley and Hmieleski 2005). Managers often prefer high levels of education when it comes to addressing complex situations; however, lower levels of education are associated with different skill sets that may complement each other in building a new venture. Likewise, high levels of education usually correspond to strong conceptual skills, whereas low levels are associated with strong practical skills (Foo, Wong, and Ong 2005). Hence, education is one of the key factors influencing employees' perception of the relevance and characteristics of an entrepreneurial strategy.

Hypothesis 4. *Employee awareness of the clarity and flexibility of entrepreneurial strategy varies depending on educational level.*

Employees with a proven record of previously gained, firm-specific expertise are more likely to demonstrate a higher awareness of entrepreneurial strategy. Managers with industry experience can benefit a firm, as they are able to introduce competitive trends and conditions, specific technologies, industry-specific regulatory issues, and goodwill regarding certain customers and suppliers (Kor 2003). Almus and Nerlinger (1999) reveal a negative influence on a firm's

growth during the start-up period of entrepreneurs without professional experience. Colombo and Grilli (2005) find that the founders' average years of work experience have a positive impact on employee growth, independent of the industry where the experience was gained (Maschke 2012).

Hypothesis 5. *Employee awareness of the clarity and flexibility of entrepreneurial strategy varies depending on work experience.*

3. RESEARCH DESIGN

3.1 Sample and method

The data presented in this paper was extracted from a more comprehensive field research study, comprising a random sample of 89 respondents from 19 companies operating in Central Serbia (15 in the production sector and 4 in the service sector). The companies in the sample operate in diverse industries including car manufacture, insurance, food processing and packaging solutions, and pharmaceutical/healthcare production. No single industry is represented in the sample with a proportion greater than 21%, which means no single activity dominates. Companies selected for the study were required to be at least two years old and to rely on product or service innovation for survival. Participating and non-participating companies showed no significant difference in terms of size, measured by the number of employees.

The author called the CEOs, introduced the objective and design of the study, and requested approval for the field investigation. The respondents were asked to fill in a questionnaire independently, according to their perceptions and best judgment. The respondents received the questionnaires with a cover letter delineating the research topic and guaranteeing anonymity. The questionnaire was pre-tested to find the average completion time. All respondents had been working with the superior they rated for at least one year. The response rate was 27.89%, which is comparable with similar studies.

We analysed the sample characteristics and classified respondents by gender, age, seniority, educational background, and working experience (Table 1). The sample is gendered as follows: men 63% (56 respondents), females 37% (33 respondents). The most numerous respondents are in the 36–45 age group (42%), followed by

26–35 years (32%), more than 45 years (20%), and less than 25 years (6%). The sample includes 39 managers: 8 senior managers (9%), 24 middle managers (27%), and 7 supervisors (8%). Fifty employees (56%) hold non-managerial positions. Most of the 51 respondents have a university degree, college, or a vocational education (57%), while the rest (38 – 43%) have a high school education or less. Fifty respondents have 5–25 years of work experience and they dominate the sample (56%). Twenty-six respondents (29%) have less than 5 years' work experience and 13 (15%) have more than 25 years.

Table 1. Sample characteristics

VARIABLE		Frequency	% of Total
Gender	Male	56	*63*
	Female	33	*37*
Age	18–25 years	5	*6*
	26–35 years	29	*32*
	36–45 years	37	*42*
	More than 45 years	18	*20*
Seniority	Senior managers	8	*9*
	Middle managers	24	*27*
	Operation managers	7	*8*
	Employees (non-managerial positions)	50	*56*
Education	University degree, vocational school	51	*57*
	High school degree	38	*43*
Work experience	Less than 5 years	26	*29*
	5–25 years	50	*56*
	More than 25 years	13	*15*
	Total	89	*100*

Source: Authors' calculation

3.2 Measures

Entrepreneurial strategy-making was measured using a modification of Hart's instrument (1991). The questionnaire, as the research method, is consistent with previous theoretical and empirical studies (Miller 1983; Miller and Friesen 1983; Morris and Sexton 1996; Hornsby et al. 2002; Ireland et al. 2006). The statistical software package SPSS was used for data analysis. Employee awareness of the

clarity and flexibility of entrepreneurial strategy were measured using subjective qualitative performance measures. All statements were grouped within the two independent variables, clarity of strategy and flexibility of strategy, and each variable was measured according to a set of five statements. A five-point Likert scale was implemented, with respondents ticking the fields to denote the extent they (dis)agreed with each affirmatively defined statement, with anchors ranging from "strongly disagree" (equalling 1) to "strongly agree" (equalling 5). Respondents were asked to assess entrepreneurial strategy in terms of clarity (for example, "Strategy is clearly defined and well known") and flexibility (for example, "Strategy relies on continuous improvement of business processes and activities"). The reliability of the scale was measured by Cronbach's Alpha coefficient (α=0.712). As the minimum threshold for this ratio is 0.7, the questionnaire is reliable as a measuring instrument and the variables used for measurement are internally consistent (Nunnally 1978).

4. RESEARCH RESULTS

In this section we first present the t-test for two, independent, sample research results. We run this test to compare respondents based on the gender variables (Table 2) and educational level (Table 3).

The results indicate that there is a statistically significant difference between male and female respondents for items 7 ($p=0.000<0.001$), 3 ($p=0.041<0.05$), and 5 ($p=0.024<0.05$). There is also a statistically significant difference between male and female respondents at probability level $p<0.1$ for items 4 ($p=0.052$), 6 ($p=0.056$), and 8 ($p=0.091$). In total, statistically significant differences were identified in 6 out of 10 observed aspects.

Table 2: Comparison of respondents' awareness according to gender (t-test for two independent samples)

Items	Males M (SD)	Females M (SD)	t	Sig.
1. There is a clear blueprint for this organisation's strategy that was set some time ago.	4.11(0.85)	3.94 (1.03)	0.833	0.407
2. Our organisation continually adapts by making appropriate changes in its strategy based on feedback from the marketplace.	4.00 (0.83)	3.88 (0.93)	0.636	0.526
3. Business planning in our organisation is ongoing, involving everyone in the process to some degree.	2.75 (1.25)	3.36 (1.50)	–2.074	0.041**
4. The strategic orientation of the company is mainly toward growth.	4.39 (0.76)	4.06 (0.79)	1.973	0.052*
5. The strategic goal of the company is maintaining a sustainable competitive position.	4.23 (0.84)	3.82 (0.95)	2.293	0.024**
6. People are encourged to experiment in this organisation so as to identify new, more innovative approaches or products.	3.98 (1.18)	3.48 (1.15)	1.936	0.056*
7. The strategy relies on constant improvement of business processes and methods.	4.32 (1.94)	3.48 (1.09)	3.824	0.000***
8. The way we do things in this organisation is well suited to the business we are in.	3.89 (0.76)	3.55 (1.00)	1.852	0.091*
9. Long-term potential is valued over short-term performance in this organisation.	3.18 (1.25)	2.79 (1.17)	1.458	0.148
10. People in this organisation are very dynamic and entrepreneurial.	3.84 (1.02)	3.88 (0.89)	–0.184	0.854

*probability level p< 0.1; **p<0.05; ***p < 0.01; M- Mean; SD-standard deviation*

Table 3: Comparison of respondents' awareness according to education level (t-test for two independent samples)

Item	University degree M (SD)	High school degree M (SD)	t	Sig.
1. There is a clear blueprint for this organisation's strategy that was set some time ago.	3.90 (1.06)	4.24 (0.63)	–1.851	0.068*
2. Our organisation continually adapts by making appropriate changes in its strategy based on feedback from the marketplace.	3.92 (0.84)	4.00 (0.90)	–0.421	0.675
3. Business planning in our organisation is ongoing, involving everyone in the process to some degree.	2.57 (1.27)	3.53 (1.33)	–3.450	0.001***
4. The strategic orientation of the company is mainly toward growth.	4.12 (0.89)	4.47 (0.56)	–2.175	0.032**
5. The strategic goal of the company is maintaining a sustainable competitive position.	4.10 (0.92)	4.05 (0.73)	0.250	0.803
6. People are encourged to experiment in this organisation so as to identify new, more innovative approaches or products.	3.88 (1.29)	3.68 (1.04)	0.776	0.440
7. The strategy relies on constant improvement of business processes and methods.	4.22 (1.14)	3.74 (0.92)	2.127	0.036**
8. The way we do things in this organisation is well suited to the business we are in.	3.86 (0.80)	3.63 (0.94)	1.220	0.227
9. Long-term potential is valued over short-term performance in this organisation.	3.29 (1.24)	2.68 (1.14)	2.376	0.020**
10. People in this organisation are very dynamic and entrepreneurial.	3.71 (1.08)	4.05 (0.77)	–1.766	0.081*

*probability level p< 0.1; **p<0.05; ***p < 0.01; M – Mean; SD – standard deviation*

There is a statistically significant difference between respondents depending on education level for items number 3 ($p=0.001<0.001$), 4 ($p=0.032<0.05$), 7 ($p=0.036<0.05$), and 9 ($p=0.020<0.05$). There is also a statistically significant difference between respondents depending on educational background at probability level $p<0.1$ for items 1 ($p=0.068$) and 10 ($p=0.081$). Again, statistically significant differences were identified in 6 out of 10 observed aspects.

In Table 4 we show the output of the ANOVA analysis. We tested whether there is a statistically significant difference between group means for three variables: age, seniority, and working experience.

Statistically significant differences were identified in 5 out of 10 observed aspects of seniority, i.e., managerial positions in the organisational hierarchy. The significance value is below 0.001 for item number 7 ($p=0.002$) and $p<0.05$ for items 5 ($p=0.017$), 6 ($p=0.031$), 10 ($p=0.026$), and 9 ($p=0.096<0.1$), which are statistically significant differences in the means. There was no statistically significant difference between group means for the variables 'age' and 'working experience', as determined by one-way ANOVA.

For seniority we performed a t-test for two independent samples (Table 5), developed depending on respondents' position in the organisational hierarchy. Thus, we compared managers with employees and identified statistically significant differences in 5 out of 10 observed aspects. The significance value is below 0.001 for item number 7 ($p=0.000$) and $p<0.05$ for items 5 ($p=0.023$), 6 ($p=0.046$), 8 ($p=0.042$), and 9 ($p=0.027$).

Table 4: ANOVA test – age, seniority, and working experience

Item	Age		Seniority		Working experience	
	F	Sig.	F	Sig.	F	Sig.
1. There is a clear blueprint for this organisation's strategy that was set some time ago.	0.127	0.944	0.363	0.780	1.443	0.242
2. Our organisation continually adapts by making appropriate changes in its strategy based on feedback from the marketplace.	0.579	0.631	0.266	0.849	1.917	0.153
3. Business planning in our organisation is ongoing, involving everyone in the process to some degree.	1.020	0.388	0.769	0.514	0.801	0.452
4. The strategic orientation of the company is mainly oriented toward growth.	1.315	0.275	1.225	0.306	1.877	0.159
5. The strategic goal of the company is maintaining a sustainable competitive position.	1.487	0.224	3.589	0.017**	0.353	0.704
6. People are encourged to experiment in this organisation so as to identify new, more innovative approaches or products.	0.319	0.812	3.096	0.031**	0.225	0.799
7. The strategy relies on constant improvement of business processes and methods.	0.186	0.906	5.549	0.002***	0.985	0.378
8. The way we do things in this organisation is well suited to the business we are in.	0.352	0.788	1.516	0.216	0.441	0.645
9. Long-term potential is valued over short-term performance in this organisation.	0.159	0.924	2.182	0.096*	2.246	0.112
10. People in this organisation are very dynamic and entrepreneurial.	1.684	0.177	3.243	0.026**	1.198	0.307

*probability level p< 0.1; **p<0.05; ***p < 0.01;

Table 5: Comparison of respondents' awareness according to position (t-test for two independent samples)

Item	Managers M (SD)	Employees M (SD)	t	Sig.
1. There is a clear blueprint for this organisation's strategy that was set some time ago.	3.97 (0.96)	4.10 (0.89)	–0.640	0.524
2. Our organisation continually adapts by making appropriate changes in its strategy based on feedback from the marketplace.	3.97 (0.84)	3.94 (0.89)	0.185	0.854
3. Business planning in our organisation is ongoing, involving everyone in the process to some degree.	2.77 (1.18)	3.14 (1.50)	–1.306	0.195
4. The strategic orientation of the company is mainly oriented toward growth.	4.28 (0.83)	4.26 (0.75)	0.132	0.896
5. The strategic goal of the company is maintaining sustainable competitive position.	4.31 (0.77)	3.90 (0.86)	2.321	0.023**
6. People are encourged to experiment in this organisation so as to identify new, more innovative approaches or products.	4.08 (1.08)	3.58 (1.23)	2.021	0.046**
7. The strategy relies on constant improvement of business processes and methods.	4.49 (0.88)	3.64 (1.06)	4.006	0.000***
8. The way we do things in this organisation is well suited to the business we are in.	3.97 (0.84)	3.60 (0.86)	2.060	0.042**
9. Long-term potential is valued over short-term performance in this organisation.	3.36 (1.135)	2.78 (1.07)	2.256	0.027**
10. People in this organisation are very dynamic and entrepreneurial.	3.67 (1.11)	4.00 (0.83)	–1.565	0.122

*probability level p< 0.1; **p<0.05; ***p < 0.01;

Finally, a post hoc analysis was performed in order to examine individual mean difference comparisons across all four levels of seniority, as this is the only variable to show an overall statistically significant difference in group means for

all ten items. Post hoc Tukey analysis (Table 5) identifies statistically significant differences between different hierarchy levels for items 5, 6, 7, and 10.

Table 6: Post Hoc Tukey test, seniority variable

Items	Intergroup comparisons	Means	Sig.
5. The strategic goal of the company is maintaining sustainable competitive position.	Group 2 – Group 4	4.50 – 3.90	0.019**
6. People are encouraged to experiment in this organisation so as to identify new, more innovative approaches or products.	Group 3 – Group 4	4.71 – 3.58	0.076***
7. The strategy relies on constant improvement of business processes and methods.	Group 2 – Group 4 Group 3 – Group 4	4.50 – 3.64 4.71 – 3.64	0.004* 0.044**
10. People in this organisation are very dynamic and entrepreneurial.	Group 2 – Group 3 Group 3 – Group 4	3.92 – 2.86 2.86 – 4.00	0.048** 0.017**

Group 1: senior managers; Group 2: middle managers; Group 3: operation managers; Group 4: employees (non-managerial positions)

*probability level $p < 0.1$; **$p<0.05$; ***$p < 0.01$;

There is a statistically significant difference between groups 2 and 4 (item 7, $p=0.004<0.001$; item 5 $p=0.019<0.05$), between groups 3 and 4 (item 10, $p=0.017<0.05$; item 7, $p=0.044<0.05$; item 6 $p=0.076<0.1$) and between groups 2 and 3 (item 10, $p=0.048<0.05$).

5. FINDINGS AND DISCUSSIONS

The research indicates that male respondents are more aware than female respondents that the focus of the organisation should be to maintain a competitive position in the long run by pursuing a growth strategy. Male respondents believe that the cornerstone for achieving growth is an unambiguous

strategic orientation to enhance entrepreneurial initiative, experimentation, and innovation. They stress to a higher extent than females the necessity of strategy adaptation and flexibility through continual development of products and processes. On the other hand, female respondents point out the importance of participation and involving everyone in the planning process to some degree. These results are consistent with previous research on the male and female values (Hofstede and Hofstede 2005) that form the basis for investigating if employees are aware of entrepreneurial strategic orientation at the organisational level. Accordingly, men are more prone to taking risks and taking the initiative and are more proactive and performance-oriented, while women are more focused on interpersonal relations and getting people together to implement entrepreneurial activities. Our results complement those reported by Croson and Gneezy (2009), who note that women are mostly less competitive than men. Based on an analysis of 15 different studies, Wieland and Sarin (2012) report that extremely robust results indicate that women are more risk-averse than men. Therefore, we conclude that Hypothesis H1 is confirmed; i.e., there is a statistically significant difference between women's and men's awareness of the clarity and flexibility of entrepreneurial strategy.

We found no evidence of statistically significant differences between respondents of different ages and therefore conclude that Hypothesis H2 is rejected**.** The latest research reveals that the average successful start-up founder is middle-aged (45 years old), thus refuting the conception that entrepreneurs are young (Azoulay, Jones, Kim, and Miranda 2018). In general, research results on the relevance of age are inconsistent (Levesque and Minniti 2006; Reynolds, Camp, and Hay 2002) and need further investigation.

Hypothesis 3 was formulated to investigate if employee awareness of the clarity and flexibility of entrepreneurial strategy differs by seniority in the management structure. We found differences in respondents' awareness of how strategy should adjust depending on business processes and improvement methods. Different organisational levels have varying perceptions regarding the organisation's strategic goal being to maintain a competitive position, long-term v. short-term orientation, and employees' willingness to innovate, experiment, and behave in a dynamic, entrepreneurial manner. Middle- and operational-level managers influence employees differently when it comes to raising awareness about the

flexibility of entrepreneurial strategy, depending on the improvement of business processes and methods. Middle-level managers predominantly focus on maintaining a sustainable competitive position, while operational managers and supervisors encourage employees to experiment and identify new, more innovative approaches and products. Our results are in line with those of Floyd and Wooldridge (2000), who describe the roles middle-level managers perform identifying opportunities, developing initiatives, and renewing organisational capabilities. Kuratko, Ireland, Covin, and Hornsby (2005) integrate research with corporate entrepreneurship and motivation theory to link organisational antecedents to middle-managers' entrepreneurial behaviour and individual and organisational outcomes. The results reported here also suggest that the middle and operational managerial levels in an organisation generally perceive employees as more dynamic and entrepreneurial than they see themselves. We identified certain differences between managers and employees regarding perception of strategic issues. Managers tend to be more convinced than employees that strategy relies on the constant improvement of business processes and methods. They also believe more strongly that the business model is adequately suited to market conditions, and perceive competitive position to be the most important strategic goal. Managers see themselves as supportive and willing to encourage innovative ideas, and prioritize long-term potential over short-term performance. On the other hand, employees are more sceptical about strategic issues and do not fully understand the long-term orientation of the organisation. Hence, we conclude that Hypothesis H3 is confirmed; i.e., there is a statistically significant difference in employees' awareness of the clarity and flexibility of entrepreneurial strategy depending on their hierarchical position in the organisation.

Hypothesis 4 was designed to test if employees' awareness of the clarity and flexibility of entrepreneurial strategy differs depending on their educational background. Our research indicates that highly educated respondents demonstrate to a greater extent the necessity to reflect on competitive position in the long run. They are more aware that the strategy of entrepreneurial activities should be flexible and result in significant improvements of processes and products to secure the market position. Respondents with a high school degree or less are, conversely, more oriented toward participation and getting clear directions through entrepreneurial strategy. They perceive themselves as

entrepreneurial and dynamic. Our study complements the results reported in other research (Vogel, Puhan, Shehuc, Kliger, and Beesee 2014; Foo et al. 2005). Thus, we found evidence of statistically significant differences between these two groups of respondents, confirming Hypothesis H4.

No significant differences were identified depending on respondents' working experience, so Hypothesis H5 is rejected. This result is consistent with the lack of statistical evidence for the relevance of employees' age. Our results complement those of Douglas and Shepherd (2000), who show that some individuals value independence more than others, regardless of their age, resulting in the different career choices of employed versus self-employed.

6. CONCLUSIONS AND IMPLICATIONS

This study makes several contributions to the literature on entrepreneurship. First, it enhances our understanding of the organisational entrepreneurship process and its relevance to maintaining a sustainable competitive advantage. The research results provide a basis for drawing theoretical conclusions about cause-and-effect relations and a roadmap for a deeper understanding of the strategic approach to entrepreneurship in an organisational setting. Second, it sheds light on the entrepreneurship phenomenon by reducing research ambiguities and expanding the knowledge base of this cutting-edge discipline. We provide reliable evidence of the relevance of defining a clear strategic approach to internal entrepreneurial activity, and offer a more fine-grained analysis of the individual characteristics determining employees' perceptions of preferred behaviour. Reinforcing internal abilities and strengths, using them efficiently, and dealing with internal weaknesses are some of the most reliable sources of growth. Third, the survey reveals new facts about the causality of employee awareness of an organisation's entrepreneurial strategy depending on their individual characteristics: respondents of different ages, education, and positions in the organisational hierarchy have a different understanding of the organisational setting and priorities in terms of product/process development and innovation.

Our study has important practical implications for managers and practitioners and recommendations as to how to proceed in everyday business practice. First, managers should be aware that employees differ depending on gender and they need to encourage women to be innovative, more willing to take risks, and more

proactive, and not to hesitate demonstrating their entrepreneurial skills. This can be done by designing incentives and motivation mechanisms, adjusting compensation systems, offering mentor support, highlighting role models, and providing enough time to work on personal projects. Consideration should be given to whether it is better to create entrepreneurial teams that benefit from both male and female values, or to encourage individual effort. Second, the results indicate the strong influence of education when it comes to employee perceptions about the entrepreneurial direction of the business. Managers should realize that university-educated employees are more long-term oriented and should make an additional effort to help the rest of the organisation to embrace this approach. Even though less-educated employees prefer entrepreneurial strategy to be clear and unambiguous, it is crucial to realize that strategy should be suited to the business the organisation is planning to step into, and hence it must be flexible and oriented towards the long term. Third, the study shows that managers should foster mutual cooperation and coordination between the different managerial levels and communicate a clear message to employees regarding the entrepreneurial strategic direction. It is important to maintain open vertical communication and to highlight entrepreneurial activities as a tool for maintaining competitive position. Fourth, the results of study show managers that employees perceive themselves as dynamic and entrepreneurial, so the main challenge is how to put that potential into practice. Managers should create an entrepreneurial organisational culture to communicate entrepreneurial vision and strategy, implement a transformational leadership style, and act as mediators of change. Management at all levels need to have a profound understanding of the business, which can be achieved by rotating or expanding the fields of expertise. While strategic management focuses on setting a new strategic direction, middle and operational managers should exploit organisational competencies through entrepreneurial actions. Operational managers have a particular responsibility to encourage innovation and to actively support experimenting with embedded routines and patterns on a daily basis. That can be done through internal development programmes that design jobs that empower and enrich employees. The essential practical contribution of this paper is that it provides theoretically and empirically substantiated evidence that the creation of preconditions for encouraging corporate entrepreneurship sustains the organisation's long-term competitive position.

It is important to briefly mention the paper's most important conceptual, methodological, and analytical challenges. The first limitation of this is that it is unable to keep track of organisational entrepreneurial activities over time. The effectiveness of corporate entrepreneurial activities must be studied using longitudinal studies (Zahra et al. 1999). The second limitation relates to sample size. The research presented in this paper is an empirical pilot study for a long-term, multi-level project investigating the relationship between employees' entrepreneurial behaviour and the appropriate organisational setting. The research sample comprises 19 medium and large Serbian companies, selected based on their position as innovation leaders. It makes sense to conduct a small-scale study to test assumptions, despite potential flaws in terms of precision and the reliability of conclusions. Gartner (1988) points out that research on entrepreneurship is extraordinarily complex. Critical scholarship on entrepreneurship will always be uncomfortable with complacent fixations on any particular positions, ideas, theories, or methods (Tedmanson, Deirdre, Verduyn, Karen, Essers, Caroline, and Gartner 2012). Third, the research is limited to Serbia and cannot be generalised to the rest of the world without additional data based on cross-cultural analysis. However, the findings suggest that future research should pursue employee motivation and the impact of organisational entrepreneurship on organisational culture.

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THE STRATEGIC CHOICES OF SERBIAN ENTREPRENEURS: ARE THEY ENTREPRENEURIALLY ORIENTED AND DO THEY DIFFER BY GENDER?

ABSTRACT: *This paper focuses on the strategic practice of Serbian entrepreneurs by addressing the issue of their entrepreneurial orientation. Based on a sample of 101 respondents (randomly drawn from the Serbian Business Registers Agency's database), the research tries to answer the question of whether Serbian entrepreneurs' strategic choices in the fields of growth, innovation, and marketing are entrepreneurially oriented. The paper also reports research on gender differences regarding these issues. The results suggest that Serbian entrepreneurs are entrepreneurially oriented when making decisions about growth, innovation, and marketing. Also, Serbian women entrepreneurs are less entrepreneurially oriented than men when choosing growth strategies, but more entrepreneurially oriented in certain aspects of market orientation. No statistically important gender differences were found regarding innovation strategies.*

KEY WORDS: *entrepreneurship, strategy, gender*

JEL CLASSIFICATION: L26, L10, J16, M13

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1. INTRODUCTION

Generally speaking, a firm's strategic choices specify its long-term objectives and determine the policies and actions to achieve them and the allocation of resources needed to support the chosen course of action (Campbell et al. 2002; Singh et al. 2008). Strategic decisions establish the basis for a firm's competitive position and determine its long-term performance. The ultimate goal is that strategy should lead to a business performance superior to that of rivals (Teeratansirikool et al. 2013). There is rich empirical evidence that a clear strategic orientation has a positive impact on business profitability and competitiveness (Powers & Hahn, 2004; O'Regan et al., 2006; Teeratansirikool et al., 2013). However, most research related to strategy development and content has been on large-scale, well-established businesses (Davis & Olson 2008; Singh et al. 2008; Parnell et al. 2015) rather than on small and medium enterprises (SME). The notion that entrepreneurs' business behaviour is mostly unplanned, informal, reactive, or opportunistic may be the reason for this research gap (Hagen et al. 2012; Löfving et al. 2014; Parnell et al. 2015). However, developing a competitive advantage is of equal – if not greater – importance for small enterprises as for large ones (Davis & Olson 2008). Empirical studies confirm the positive relationship between small and medium enterprises having a clear strategy and their competitive performance in domestic and global markets (Singh et al. 2008; Hagen et al. 2012).

A detailed and analytical approach to the formulation of an explicit and formal strategy is not suitable for most small businesses (Bhide 1994). Entrepreneurs' approach to the strategic management process is less sophisticated than the practice of large-scale corporations. Various empirical studies (for a review see Kraus et al. 2007) find that the type, formality, and intensity of strategic planning are associated with business size. Some of the reasons for not engaging in a formal strategic planning process are limited resources, lack of time, constant pressure to be flexible, and the limited experience and knowledge of the owner-manager (Carter & Jones-Evans 2006; Ates 2008; Davis & Olson 2008; Parnell et al. 2015). But, as Roffe (2007, p.217) accurately notes, "whatever the size, an enterprise is involved inevitably in strategy". Entrepreneurs decide on strategic issues such as the type of business to operate and the value offered, and how best to operate and compete in the long run. Thus, the fact that most entrepreneurial ventures do not have an explicit and formal strategy does not mean that they lack strategic vision (Bell et al. 2004). An entrepreneur does not necessarily have to have a formal or

written plan or strategy in order to be actively engaged in the process of shaping/controlling their business and environment (Brinckmann et al. 2018). On the other hand, as most empirical evidence on strategic management practice refers to larger businesses, perhaps the focus of research should be shifted to include the strategic issues facing small business entrepreneurs. Not only does research on the strategic management of small businesses need enriching (Reiche & Reschke 2006), but as most current research concerns large US and UK corporations, other national contexts beyond the USA and UK should be examined (Amonini & Ogunmokun 2015). The current study is an attempt to fill these gaps.

Part of the literature on entrepreneurship deals with differences between entrepreneurship and SME ownership, and between the form of entrepreneurship and its content. Carland et al. (1984) note that entrepreneurship exists outside small businesses, and that every small business owner is not necessarily an entrepreneur. Although the concepts overlap, entrepreneurship and the ownership of a small business venture are not the same. According to Mthanti and Ojah (2017), Schumpeterian entrepreneurship refers to risk-taking and innovativeness, while small businesses are associated with under-employment. That is why small business activity cannot be a proxy for entrepreneurship in the Schumpeterian sense. In a cross-country study, Henrekson and Sanandaji (2014) find that entrepreneurship understood as growing and innovative business is negatively correlated with small business ownership. Similarly, Hurst and Pugsley (2011) argue that most small businesses are not innovative and do not aim to grow.

Entrepreneurial firms can be of different sizes: what makes them entrepreneurial is their orientation towards innovation and growth. Morris (1998) goes even further, claiming that the process of starting a business is the only entrepreneurial activity of most small business owners. According to Lumpkin and Dess (1996), there is a difference between entrepreneurship and entrepreneurial orientation: entrepreneurship is the form and entrepreneurial orientation is the content. The form of entrepreneurship is starting a business, and as such is tied to both the individual and the company. On the other hand, entrepreneurial orientation refers to the way of doing business, to the decision-making process and practice. Entrepreneurial orientation is measured along three basic dimensions, risk-

taking, innovativeness, and proactivity (Miller 1983; Covin & Slevin 1989; Morris 1998; D'Angelo & Presutti 2019), which make the difference between firms that grow and are successful and those that are not (Hagen et al. 2012). In order to enhance business performance and grow faster than competitors, small businesses have to be entrepreneurially oriented; in other words, they have to be risk-taking, innovative, and proactive (Wiklund & Shephard 2003; Tang et al. 2007; Rajesh et al. 2008; Gurbuz & Aykol 2009; Eggers et al. 2013). Entrepreneurially oriented small businesses have greater international growth (D'Angelo & Presutti 2019). Entrepreneurial orientation is also important at the macroeconomic level. Covering 93 countries, Mthanti and Ojah (2017) find that entrepreneurial orientation measured along the three dimensions (risk-taking, innovativeness, and proactiveness) positively correlates with macroeconomic growth.

Gender has become an increasingly important field in research on entrepreneurship. Gender differences in business performance and other aspects of entrepreneurial practice are well documented in the literature (e.g. Watson 2002; Klapper & Parker 2010; Bardasi et al. 2011). Differences have been found between female and male entrepreneurs regarding personal features, business venture characteristics, and management practice (Babović 2012; Stošić 2015). Therefore, it seems reasonable to expect that gender-related differences exist in the entrepreneurial orientation of female and male entrepreneurs' strategic choices.

Taking all the above into account, the aim of this research is to explore the elements constituting entrepreneurial orientation in Serbian entrepreneurs' strategic choices, and to examine any gender differences. By exploring the features of Serbian entrepreneurs' strategic choices according to the three dimensions of risk level, innovativeness, and proactiveness, the current study adds to the literature on the difference between entrepreneurship and entrepreneurial orientation.

The paper is structured as follows. The second part presents the theoretical considerations behind the hypotheses and the hypotheses themselves. After the methodological third part, the fourth section presents the results and discusses the empirical study. The paper ends with concluding remarks.

2. THEORETICAL FRAMEWORK AND RESEARCH HYPOTHESES

It is clear that strategy is important for the success of entrepreneurial ventures. Whatever form of strategic management process entrepreneurs engage in, they inevitably make and implement strategic management decisions. The phenomenon of entrepreneurship as a process (Bygrave & Hofer 1991; Carton et al. 1998) implies a certain chronology in the strategic choices made by entrepreneurs. The process of selecting a business strategy involves three interconnected phases of strategic decision-making: deciding on how to start a business, the strategic direction of the established company, and how to quit a business. The core of the entrepreneurship process is the identification, evaluation, and exploitation of profitable business opportunities (Fayolle 2007). Strategic choices made after starting and before quitting the business concern performance and growth. Although in most cases the process of strategic management is not formalized, entrepreneurs are generally confronted with the same strategic choices as the managers of large-scale corporations. Selecting a growth strategy, determining sources of competitiveness, and setting a specific functional strategic direction are all parts of the business decision-making process of entrepreneurs.

Entrepreneurship is considered a riskier option than paid employment (Kanbur 1979; Kihlstrom & Laffont 1979; Parker 2009). Although exceptions exist in paid employment, risky and competitive situations are more characteristic of entrepreneurial activity (Bönte & Piegeler 2012). Accepting the tendency towards competition and risk is one of the main determinants of who chooses this employment option. The earliest attempts to define entrepreneurship consider entrepreneurs as those who accept the uncertainty of earnings (Cantillon 1959/1775). As entrepreneurs have selected a riskier employment option, their attitude towards risk can be expected to inform their business decisions. One of these decisions is their strategic growth orientation. Growth that is achieved even when it is not intended or planned – so-called passive growth – is less common than planned growth (Morris et al. 2006). Most successful entrepreneurial ventures grow because their owner-managers consciously plan for growth (Smallbone et al. 1995). Unlike passive growth, in the theory of planned behaviour, growth is the result of a rational, target-oriented process (Ajzen 2005): it is an explicitly or implicitly defined goal that is achieved by choosing a particular course of action and growth strategy.

Ansoff's matrix is by far the most commonly used generic framework for capturing the types of growth strategy. Ansoff (1957) analyses product–market alternatives and comes up with four different paths toward business growth: market penetration, market development, product development, and diversification. Market penetration achieves growth but without changing the current product–market relationship. Market development is when a firm enters new markets with existing products. Product development strategy develops new products to be offered in existing markets, and diversification refers to expansion by introducing new products to new markets. Different levels of risk are associated with these growth strategies (Campbell et al. 2002, p.177; Osterag et al. 2007, p.15; Cheverton 2008, pp.53–54). The risk level is correlated with the level of change, starting with market penetration, increasing through market and product development, and peaking with the strategy of diversification. Finally, though every strategic choice involves a certain level of risk, a strategy of stabilization is less risky than the growth strategies because it is about maintaining the status quo. Unlike Ansoff's growth strategies, this strategy does not imply sales growth, development of new products, or entering new markets.

Carland et al. (1984) suggest that a key goal of the entrepreneurial firm is to achieve profit and growth through innovative practice. The nature, subject, and timing of the innovation are strategic decisions, and the characteristics of these decisions determine the innovation strategy. The theoretical framework capturing the innovation process includes offensive, defensive, imitative, and dependent innovation strategies (Freeman & Soete 1997, pp.265–285). An offensive innovation strategy introduces new products and acquires market and technological competitive advantage. A defensive innovation strategy does not mean the absence of innovation but implies innovation of a different nature and timing: a lower level of innovativeness is introduced, most often after an innovative move by an offensive competitor. An imitative innovation strategy is when companies imitate the already existing innovations of either offensive or defensive innovators. Dependent innovators accept a satellite or even subordinate role in the innovation process without undertaking any initiative in this process, or by implementing innovations at the request of their larger partners in the supply chain. All innovation carries a certain level of risk. An offensive strategy is the most risky, and the risk declines progressively through the defensive,

imitative, and dependent innovation strategies (Rooij 2007, pp.18–19; Vernardakis 2016, pp.147–150).

Proactivity is one of the components of entrepreneurial orientation. In order to be proactive a firm must observe, evaluate, and respect key market factors, primarily consumers and competitors. Marketing as a business function is predominantly oriented toward the external environment and emphasizes the importance of both the market and the consumers who are the reason for the firm's existence (Hagen et al. 2012). Having a market orientation leads small businesses to growth (Panda 2014). Miles and Arnold (1991) and Hills at al. (2010) established the correlation between the market and entrepreneurial orientation. Sciascia et al. (2006) argue that market orientation is the main determinant of entrepreneurial orientation in SMEs. In addition to the importance of marketing for competitiveness, research on entrepreneurs' marketing practices is needed because after the initial stage of establishing a small business, it faces increasing marketing problems (Brush 1992).

Given this background, this study tests the following hypotheses:

H1a: The strategic choices of Serbian entrepreneurs concerning growth are entrepreneurially oriented.

H1b: The innovation practice of Serbian entrepreneurs is entrepreneurially oriented.

H1c: Marketing-related elements are an important sub-dimension of Serbian entrepreneurs' strategic choices, thus making them entrepreneurially oriented.

The performance of small businesses depends on the motives, aspirations, and intentions of the owner (Cliff 1998). Due to the significant involvement of the owner in the operation of small businesses, the venture's business goals and the personal goals of the owner are interconnected, and the strategic goals of the business are often a reflection of the owner's personal goals (Mukhtar 2002). Female business owners diversify the structure of their goals in an attempt to reconcile potential conflicting economic and non-economic goals (Brush 1992; Buttner 2001). Confronted with often mutually exclusive expectations in their private and working lives, to achieve a work–life balance women may put more emphasis than men on family (Lee et al. 2010). Some studies suggest that because

women's primary motives when starting a business are qualitative (e.g., independence, flexibility), women business owners are less likely to define quantitative business goals such as growth (Carter & Bennett 2006; Knorr et al. 2011). Moreover, the negative aspects of growth influence female owners when defining business goals, in the sense that growth implies greater stress and is time-consuming, reducing the amount of time that can be spent on family (Orser & Hogarth-Scott 2002). Female entrepreneurs have more modest growth expectations, are less willing to accept situations with uncertain outcomes, and perceive rapid growth as a threat to family relationships (Robichaud et al. 2007). For these reasons, many female entrepreneurs choose smaller businesses and slower growth (Cliff 1998; Buttner 2001; Knorr et al. 2011).

Product and process innovation is positively correlated with the faster growth of small businesses (Storey 2010). Female entrepreneurs who define growth as a business goal differ from those that do not want to grow in that they are oriented towards market expansion and technological innovation (Gundry & Welsch 2001). The innovative practices of female entrepreneurs may be determined not only by the aim of not growing the business in order to reconcile family and working life and maintain control, but also by the fact that women-owned businesses are overrepresented in industries where innovation is not a key determinant of survival (Lim & Envick 2013). Because women are not socialised to be innovative and nonconformist they may be less innovative later on as entrepreneurs (Kalleberg & Leicht 1991). Moreover, risk aversion and poorly assessed self-efficacy may limit the innovative practice of female entrepreneurs (Yu & Chen 2016). Innovation, and especially radical innovation, implies a higher level of risk and requires a certain set of competencies.

Empirical research on the marketing aspects of business practice suggests that, compared with their male counterparts, female entrepreneurs more frequently evaluate the quality of their offerings, analyse the level of customer satisfaction, and consider these practices to be a source of competitiveness (Kalleberg & Leicht 1991; Chaganti & Parasuraman 1996; Lee et al. 2010). Moreover, female entrepreneurs are better at assessing the quality of their products and services (Lerner & Almor 2002). A more qualitative attitude toward success and a relative business perspective suggest that most female entrepreneurs feel responsible to

their consumers and consider customer loyalty to be a measure of business success (Morris et al. 2006; Tan 2008).

Taking all the above into account, the following hypotheses are proposed:

H2a: The strategic choices of Serbian female entrepreneurs concerning growth are less entrepreneurially oriented than those of their male counterparts.

H2b: The innovation practice of Serbian female entrepreneurs is less entrepreneurially oriented than that of their male counterparts.

H2c: Marketing-related elements are important sub-dimensions of Serbian female entrepreneurs' strategic choices, making women more entrepreneurially oriented in this regard than their male counterparts.

3. METHODOLOGY

Sample units were randomly drawn from the Serbian Business Register Agency's database for urban areas of the Republic of Serbia, obtaining a sample consisting of 327 micro, small, and medium-sized enterprises and individuals registered as entrepreneurs. An online questionnaire containing closed-ended questions was distributed to the sample units either by email or as hard copies. One hundred and one completed questionnaires were returned.

Both ownership and managing a business were accepted as criteria for qualifying as a respondent. This was seen as particularly important for researching the gender aspect of entrepreneurship because the gender of the decision-maker and not ownership per se causes the entrepreneurial gender gap (Aterido & Hallward-Driemeier 2011). Therefore, the respondents were asked whether they were the business owner and whether they played a significant role in making strategic and tactic business decisions. All 101 respondents stated that they were business owners responsible for strategic and day-to-day decisions.

Respondents were asked to choose from a selection of growth and innovation strategies, with the possibility of multiple choices. The importance of different aspects of marketing strategy was assessed on a five-point Likert scale (1 – completely irrelevant; 2 – irrelevant; 3 – no opinion; 4 – significant; 5 – especially significant).

The structure of the sample and its representativeness were analyzed from the perspective of the owner's gender and business industry. As Serbian official business statistics are often not gender-sensitive, other samples researched in the Serbian context were used as a reference to evaluate the representativeness of the sample's gender structure. With 34% of female and 66% of male respondents the gender structure of the sample corresponds to that analysed by Babović (2012) (binomial test: p=0.172, 1-tailed) and by the National Agency for Regional Development (2013) (p=0.464, 1-tailed). As for the business industry, most businesses in the sample (79.21%) were in the service sector, which is comparable with the national-level data (p=0.139, 1-tailed).

In line with the arguments presented in the hypothesis section, the elements used to assess the orientation of Serbian entrepreneurs' strategic choices were the main features of their growth, innovation, and marketing strategies. The four dimensions of the Ansoff matrix (market penetration, market development, product development, diversification) were used to categorize the entrepreneurs' growth strategies. Additionally, the respondents were offered the option of a stabilization strategy with no growth in the main quantitative performance measures. Accordingly, the respondents were asked to select (yes/no) one or more true statements referring to their choice of growth strategies, as follows: In the previous period your business was based on: 1) Increasing sales of existing products (services) in existing markets; 2) Entering new markets with existing products (services); 3) Introduction of new products (services) to existing markets; 4) Creating new products (services) for new markets; 5) There was no growth in sales, introduction of new products (services), or entry into new markets

The offensive innovation strategy was defined as introducing new products and services with two possible options: based on own research and development activities or on a licensing agreement. Changing some aspects of existing offerings was labelled as a defensive strategy. Imitating the products or services of competitors was a 'me-too' innovation strategy. New products or services introduced at the initiative of a supplier/buyer constituted a dependant innovation strategy. The respondents were asked to choose (yes/no) all of the strategies they had implemented in the previous period. Marketing strategy was assessed by the significance (on a five-point Likert scale) of quality, price, differentiation of supply, and customer satisfaction and loyalty.

Part of the analysis addressed the data descriptively using indicators such as frequency distribution and measures of central tendencies and dispersion. The association between two categorical variables (those related to growth and innovation strategies) was tested with the Chi-square test for association. In cases in which the null hypothesis presuming no association was rejected, the magnitude of association was measured with Cramer's V value. With regard to the continuous variables (concerning marketing strategy), the data failed the assumption of normal distribution. Therefore, the Mann-Whitney U test of differences between the two gender groups was run. The p-values are presented for 2-tailed tests unless otherwise noted.

4. RESULTS AND DISCUSSION

The level of entrepreneurial orientation in the growth strategies implemented by Serbian entrepreneurs was evaluated according to how frequently the various growth strategies and the stabilization strategy were implemented. The results are shown in Table 1.

Table 1: Strategies of Serbian entrepreneurs

Percentage of female/male respondents within each type of strategy			
	Female	Male	Total
Market penetration	32.9	67.1	100.0
Market development	17.4	82.6	100.0
Product development	28.9	71.1	100.0
Diversification	18.2	81.8	100.0
Stabilization	53.8	46.2	100.0
Percentage of male, female, and total respondents selecting each strategy*			
	Female	Male	All respondents
Market penetration	70.6	73.1	72.3
Market development	23.5	56.7	45.5
Product development	38.2	47.8	44.6
Diversification	5.9	13.4	10.9
Stabilization	20.6	9.0	12.9
Total female/male %	33.7	66.3	100
respondents N	34	67	101

* Respondents were allowed to choose more than one strategy

The data presented in Table 1 shows that the strategy most rarely chosen by Serbian entrepreneurs is diversification: only 10.9% of entrepreneurs implemented this strategy. The second-least-implemented strategy was stabilization (12.9%). By far the largest number of Serbian entrepreneurs implemented penetration strategy (72.3%), followed by market development strategy (45.5%) and product development strategy (44.6%). This means that with the exception of the diversification, growth strategies are more common among Serbian entrepreneurs than stabilization strategies. In other words, Serbian entrepreneurs choose market penetration, market development, and product development over stabilizing business performance. If entrepreneurship is understood as an activity that necessarily implies growth (Carland et al. 1984; Morris 1998; Scarborough 2012), then these results show that Serbian entrepreneurs are growth-oriented and thus not only entrepreneurs by form but also by the content of their business activities, confirming Hypothesis H1a. As growth orientation assumes a higher level of risk tolerance, this means that Serbian entrepreneurs are not risk-averse. Nevertheless, when analysing the growth patterns in more detail it is evident that the most frequently implemented growth strategy is growth based on existing offerings (products or services) in existing markets, chosen by 72.3% of all entrepreneurs. Expansion into new markets with existing offerings and development of new offerings for existing markets are of almost equal appeal to Serbian entrepreneurs, as 45.5% and 44.6% (respectively) of all entrepreneurs have implemented these growth strategies. Finally, introducing new offerings in new markets (i.e., diversification) and the strategy of stabilization (10.9% and 12.9% of entrepreneurs, respectively) are implemented less than other growth strategies. Two growth strategies from opposite sides of the risk spectrum represent the extremes: market penetration strategy, as the least risky option, is the most frequently used (chosen by 72.3% of entrepreneurs), while diversification, as the riskiest growth strategy, is the least frequently implemented (10.9% of entrepreneurs implement it). Although it is a very widespread perception that entrepreneurs are prone to taking risks, it seems that Serbian entrepreneurs are moderate risk-takers. This is similar to the findings of Ahmad (2010), Chavez (2016), and Salleh and Ibrahim (2011), all of who suggest that in fact entrepreneurs have a tendency towards moderate levels of risk.

Further analyses show that the choice of a particular growth strategy differs between genders. Results of the Chi-squared test of association show that there is a statistically important relation between the gender of the entrepreneur and the type of the growth strategy that they choose to follow (Table 2).

Table 2: Statistical tests of the difference between genders

		Pearson χ^2	*Cramer's V*
Gender–Growth strategy		χ^2=14.964 *(p=0.011)*	0,029
Gender–Innovation strategy	Implementation of the strategy	χ^2=0.085*(p=0.771)*	-
	Particular innovation strategy	χ^2=4.764 *(p=0.445)*	-
		Mann-Whitney U test	
Gender–Marketing strategy		Quality: U=1.182.50 (*p=0.403)*	
		Price: U=1.076.50 (*p=0.716)*	
		Differentiation: U=904.00 ($p_{one\text{-}tailed}$*=0.043)*	
		Customer satisfaction and loyalty: U =1.005.00 *(p=0.349)*	

While a comparable percentage of female and male entrepreneurs implement a market penetration strategy (70.6% and 73.1%, respectively), all the other growth strategies are more often chosen by male entrepreneurs. By contrast, twice as many female entrepreneurs implement a stabilization strategy (20.6% versus 9.0%). The riskiest strategy of diversification is the least chosen strategy within the group of female entrepreneurs (5.9%), while the goal of stabilization is the least desired by their male counterparts (9.0%). At the same time, comparing the structure of the groups of entrepreneurs implementing the various growth strategies, the largest relative share of female entrepreneurs is in the group of entrepreneurs implementing a stabilization strategy (53.8%). Moreover, this is the only group in which the relative participation of female entrepreneurs is higher than the relative participation of male entrepreneurs (53.8% versus 46.2%). This distribution of frequencies coupled with their relation with the entrepreneurs' gender indicates that Serbian women entrepreneurs are more risk-averse regarding the growth of their businesses. The results are comparable with those showing that female entrepreneurs more frequently choose known technology, products, and markets (Hisrich & Brush 1984; Hughes 2005; Menezis

et al. 2006). Therefore, using the Ansoff matrix of growth strategies, it can be concluded that most Serbian female entrepreneurs have a conservative and cautious approach to market development and product development strategies, and especially to the riskiest strategy of diversification. This confirms Hypothesis H2a.

The results obtained from the Serbian sample (at least regarding growth) support the argument of Morris et al. (2006) that women are less prone to risk and that this is a cross-cultural phenomenon. Robichaud et al. (2007) and Watson et al. (2017) also suggest the existence of gender differences in growth orientation in favour of men. Danes et al. (2007) even claim that being small and stable is a conscious choice to meet personal, professional, and family goals, and not a stage in the development of women-owned businesses. Similarly, Bowen and Hisrich (1986, p.402) and Alsos et al. (2006, p.681) suggest that in most cases "women-owned businesses start as small and stay small". The lower limit of the target size that women define for their businesses is the result of their greater risk aversion, as well as the greater importance they attach to the qualitative aspects of their businesses (Watson 2002). Table 3 presents results on the innovation practices of Serbian entrepreneurs.

More than two-thirds of entrepreneurs (73.7%) implemented a form of innovation regarding their offerings, products, or services. This is true for both the group of female (71.9%) and the group of male (74.6%) entrepreneurs. The majority of those who innovate are men (68.5% of male entrepreneurs versus 31.5% of female entrepreneurs), but the majority of entrepreneurs who do not implement certain innovation strategies are also male (65.4% of male entrepreneurs versus 34.6% of female entrepreneurs). These relative shares are comparable to the relative gender structure of all entrepreneurs (67.7% male and 32.3% female), suggesting that there is no gender-based difference in the innovation practice of Serbian entrepreneurs. This conclusion is further confirmed by the results presented in Table 2, which show that whether or not there is innovation is unrelated to the entrepreneur's gender. This corresponds with previous findings that entrepreneurs in general tend to be innovative and that this is a basic characteristic of entrepreneurs (Piperopoulos 2011, pp.18–22; Lukeš 2013).

Table 3: Innovation strategies

Implementation of innovation strategies			
Percentage of female/male respondents within the groups of those who do/do not implement innovation strategies			
	Female	Male	Total
Do implement	31.5	68.5	100.0
Do not implement	34.6	65.4	100.0
Percentage of male, female, and total respondents who do/do not implement innovation strategies			
	Female	Male	All respondents
Do implement	71.9	74.6	73.7
Do not implement	28.1	25.4	26.3
Total	100.0	100.0	100.0
Type of innovation strategy implemented by Serbian entrepreneurs			
Percentage of female/male respondents within each type of strategy			
	Female	Male	Total
Offensive innovation based on own research and development	26.7	73.3	100.0
License agreement	15.4	84.6	100.0
Defensive innovation	34.1	65.9	100.0
Imitation	33.3	66.7	100.0
Dependent innovation	39.3	60.7	100.0
Percentage of male, female, and total respondents selecting each strategy *			
	Female	Male	All respondents
Offensive innovation based on own research and development	52.2	66.0	61.6
License agreement	8.7	22.0	17.8
Defensive innovation	60.9	54.0	56.2
Imitation	8.7	8.0	8.2
Dependent innovation	47.8	34.0	38.4
Total female/male respondents %	31.5	68.5	100.0
Total female/male respondents N	23	50	73

* Respondents were allowed to choose more than one strategy

Generally speaking, innovation introduces a certain level of risk. Therefore, the fact that 7 out of 10 Serbian entrepreneurs innovate leads to the conclusion that entrepreneurs in Serbia have a high tolerance for risky innovatory business practices. This reasoning complements the previous statement that Serbian entrepreneurs are growth-oriented and thus risk-taking. When observed by type of innovation strategy (within the group of those who innovate), the most frequent forms of innovation strategy are offensive innovation based on own research and development, followed by defensive strategy. These strategies are chosen by 61.6% and 56.2%, respectively, of all entrepreneurs who innovate. More than one-third of entrepreneurs (38.4%) have implemented innovations on request and following the instructions of their larger supply-chain partner, which confirms the importance of collaboration within the supply chain (Hilmola et al. 2015). The fact that the majority of Serbian entrepreneurs innovate and frequently choose the riskiest innovation strategy demonstrates their entrepreneurial orientation, thus confirming Hypothesis H1b.

Most of the female entrepreneurs chose the defensive innovation strategy (60.9%), meaning that most of them are introducing certain changes to their existing offerings. As opposed to this practice, most of the male entrepreneurs implement offensive innovation by developing new offerings (66.0%). By choosing to just modify existing products and services and thus stay on the same familiar ground, female entrepreneurs show their higher aversion to risk. Nevertheless, although certain gender differences in innovative practices are registered, the results show that these differences are not statistically significant (Table 2). The fact that male entrepreneurs are the majority in every group of entrepreneurs implementing innovation strategies can be explained by the fact that male entrepreneurs constitute the majority of all innovative entrepreneurs and of entrepreneurs in general.

Since there are no statistically important differences regarding both presence and type of innovation strategy, Hypothesis H2b is not supported. Similarly, Sonfield et al., (2001), and Shukla et al. (2015) find no difference in innovativeness between genders. In the frame of Hypothesis H2b, it seems that Serbian female entrepreneurs are as entrepreneurially oriented as males, at least regarding their innovation practice.

Marketing strategy is very important for Serbian entrepreneurs, as all aspects of this strategy have a high average score of importance for entrepreneurial businesses practice (Table 4).

Table 4: The importance of marketing strategy elements for Serbian entrepreneurs

Aspect of marketing strategy	Importance score (1-5)		
	Female	Male	Total
Quality	4.48	4.55	4.53
Price	4.35	4.06	4.16
Differentiation	4.35	3.98	4.11
Customer satisfaction and loyalty	4.76	4.57	4.64

It seems that Serbian entrepreneurs are very aware of the importance of market orientation, and especially of customer satisfaction and loyalty, which is the most important marketing strategy in their businesses, supporting Hypothesis H1c.

It is a little surprising that aspects such as a high level of differentiation and an affordable price, which sometimes are considered to be negatively correlated (Parnell 2006; Prajogo 2007), are both highly ranked, with an average score above 4. In reference to Porter's 'stuck in the middle' debate (Porter 1998), these results suggest that the days when cost leadership and differentiation were mutually exclusive are gone.

These marketing strategy aspects are self-rated by entrepreneurs, and so the results can only be interpreted as showing the importance of these aspects for entrepreneurs and not as competitiveness attributes from the customers' point of view. Nevertheless, the results suggest that Serbian entrepreneurs are aware of the fact that in a modern challenging and competitive environment, success is achieved only by those who are able to compete in several areas without trade-offs between quality, price, speed of delivery, flexibility, etc. (Singh et al. 2007). This perception of modern business challenges is an antecedent of the so-called hybrid strategy, denoting competitive behaviour based on more than one source of competitiveness (Gomes et al. 2009; Salavou 2015).

Gender-related analysis of marketing strategies shows that for male entrepreneurs, quality is the most important market performance element, while

the other aspects of marketing strategy (price, differentiation, customer satisfaction, loyalty) are more important marketing strategy elements for female entrepreneurs. Testing the significance of the differences identified here shows that there is a statistically significant gender difference in the importance of the entrepreneurial marketing strategy of differentiation (Table 2). Thus, Hypothesis H2c is partially supported. Lituchy and Ravley (2004) find that most female entrepreneurs choose a certain niche for their businesses. Thus, the differentiation of their offerings may be a way of capturing and maintaining these small market segments (Davis & Olson 2008).

5. CLOSING REMARKS

Being an entrepreneur is not the same as being entrepreneurially oriented: these two constructs have to be separated. Usually, entrepreneurship is understood as exploiting market opportunities to start one's own business. On the other hand, entrepreneurial orientation focuses on the nature of the business activity itself. In other words, to be entrepreneurially oriented means to be risk-taking, innovative, and proactive while identifying and exploiting business opportunities. In the modern dynamic and sometimes-hostile business environment, to be an entrepreneur is insufficient: in order to achieve competitive advantage one has to be entrepreneurially oriented.

Although strategic management is not a formal process in most entrepreneurial ventures, all entrepreneurs make strategic choices, whether implicitly or explicitly. Research on entrepreneurial practices shows that truly successful entrepreneurs are not only business owners but also people whose business behaviour is entrepreneurially oriented – in other words, those with risk-taking, innovative, and proactive behaviour. This paper analysed the entrepreneurial orientation of aspects of entrepreneurs' strategic decisions in order to examine their competitive potential. Moreover, recognizing documented differences between female and male entrepreneurs, the gendered aspects of the entrepreneurial orientation of their strategic behaviour were observed.

Serbian entrepreneurs are growth-oriented, as they more frequently choose growth strategies (with the exception of diversification) than stabilization. This confirms the expectation that Serbian entrepreneurs' strategic choices concerning growth are entrepreneurially oriented – in other words, risk-prone. Nevertheless,

it seems that Serbian entrepreneurs choose moderate levels of risk, preferring market penetration, while diversification is the least frequently chosen growth strategy. As for the gender aspect, the results confirm the hypothesis that female entrepreneurs' strategic choices regarding growth have a less pronounced entrepreneurial orientation. Serbian female entrepreneurs are more conservative when it comes to growing their businesses. They choose to keep their quantitative performance stable more frequently than men, and are less prone to the riskiest strategy of diversification.

The results show that more than two-thirds of Serbian entrepreneurs have introduced innovations, with the majority of them choosing one of the two riskiest innovation strategies (offensive and defensive innovation). These results support the proposal that Serbian entrepreneurs' decisions regarding innovation are entrepreneurially oriented. No statistically important gender differences were found regarding the level of entrepreneurial orientation in the innovative practices of Serbian entrepreneurs.

Finally, the entrepreneurial orientation of Serbian entrepreneurs is evidenced in the high rating given to the importance of marketing strategy elements in their businesses, a condition which is necessary for their proactivity. As expected, female entrepreneurs show a higher level of marketing orientation, but this is only statistically significant regarding the importance of differentiation of their offerings.

To conclude, judging by their risk-taking propensity, innovativeness, and proactivity, the entrepreneurial orientation of Serbian entrepreneurs confirms their competitive potential. However, the sample size of 101 units poses limitations regarding the generalizability of the results, and to reach more definite conclusions these results need to be tested on a larger national sample. Nevertheless, this paper shed light on some issues important for both entrepreneurial theory and policy. First, it fills the gap in domestic entrepreneurial theory by exploring the under-researched topic of Serbian entrepreneurs' entrepreneurial orientation and strategic management practice. Although it does not incorporate in detail all dimensions of entrepreneurial orientation, this study is a good starting point for further research on the entrepreneurial orientation of Serbian entrepreneurs. Future research should

investigate the link between level of entrepreneurial orientation and entrepreneurs' business performance. Moreover, this study does not deal with the determinants of entrepreneurial orientation. Broader contextual considerations, including both internal and external variables (e.g., size, age, and type of business; age, human capital, and other personal characteristics of the entrepreneur; national culture, gender stereotypes, market characteristics and the like) would benefit a comprehensive understanding of the entrepreneurial orientation of Serbian entrepreneurs.

Notwithstanding, the results presented in this paper have one important implication for policymakers designing support measures for entrepreneurs, especially female entrepreneurs. Once again, this study shows that women entrepreneurs are less growth-oriented than men when managing their businesses. This result supports others that call for a more comprehensive understanding of the issue of female entrepreneurs and business growth. Affirmative and gender-specific policy is needed to encourage and support the growth of women-owned and managed businesses. This paper raises the question of whether staying small is a business goal that female entrepreneurs personally desire, or if it is imposed by environmental limitations and gender-specific barriers – and, if so, what should be done about this. The existence of gender differences in entrepreneurial practice affirms the necessity for a gender-specific approach in both research and support for entrepreneurship. However, in order to define appropriate measures to tackle the determinants of these gender differences they first have to be identified. Follow-up studies are needed that will map the factors that determine the difference between female and male entrepreneurs' strategic choices.

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