Customer satisfaction and consumer expenditure in selected European countries

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Abstract

The relationship between customer satisfaction and company performance has been extensively researched at both the consumer and firm levels. However, little is known about the impact of customer satisfaction at the economy-wide level, especially in Europe. This study aims to link customer satisfaction to personal consumption expenditure using panel data collected from 1999 to 2011 and covering nine European countries. Our findings suggest a significant relationship between customer satisfaction and consumer expenditure in these countries. In addition, economic structure, culture, political economy and socio-economic factors have been examined to understand the impact of cross-country differences on this relationship. The results reflect the importance of satisfied consumers on the economy as a whole; thus, efforts at boosting customer satisfaction should become a national agenda.

Keywords
Customer satisfaction; Personal consumption expenditure (PCE); Customer satisfaction index (CSI); Service economy; Self-expressive values; Economic freedom

Highlights
- Presents a cross-country macroeconomic analysis of customer satisfaction;
- Analyzes panel data from nine European countries covering the period from 1999 to 2011;
- Emphasizes the importance of satisfied consumers for the economy as a whole
- Highlights economic structure, culture, and socio- and politico-economic factors as moderating effects of the customer satisfaction - consumer expenditure link

Paper type
Research paper
1. Introduction

The guiding philosophy of marketing management argues that the creation of customer satisfaction is the lifeblood of marketing theory and practice. What people essentially desire is not products but a satisfying experience (Baker et al., 1983). Sales and marketing strategies are therefore centered on creating customer satisfaction (Webster, 1992; Bond et al., 2001). At the firm level, it has been well documented that customer satisfaction is positively linked to a company’s business performance, profitability and competitive advantage (Oliver, 1997; Anderson & Mittal, 2000; Yeung & Ennew 2000; Helgesen, 2006). Companies often benefit from engaging in marketing practices that help enhance customer satisfaction (Mittal & Lasser, 1998; Sureshchandar et al., 2002). Therefore, regular customer satisfaction surveys are often undertaken by companies to assess their marketing effectiveness. Measures of customer satisfaction are also often used to determine compensation for executives (Ittner et al., 1997).

However, it is less clear how an economy as a whole could benefit from improved customer satisfaction. This uncertainty is mainly due to marketing’s inability to quantify its added value to the economy through a longitudinal analysis. Despite some conceptual emphasis on the macroeconomic relevance of customer satisfaction (see, for example, Fornell, Ittner, & Larcker 1996; Fornell et al., 1996), empirical studies on issues linking customer satisfaction to consumer spending and economic growth are scant. It is only quite recently that researchers have started to elevate customer satisfaction to a macroeconomic variable and analyze its effect on national consumption. One reason for the absence of empirical studies is insufficient customer satisfaction time-series data required for analysis. Fornell, Rust, and Dekimpe (2010) employed an asymmetric growth model to test the effects of changes in the American Customer Satisfaction Index (ACSI) on changes in consumer expenditure. Concurrently, Ramasamy and Yeung (2010) examined the extent to which the ACSI and the Consumer Confidence Index (CCI) can act as determining variables in the national consumption function.

In this study, we extend Fornell, Rust, and Dekimpe’s (2010) and Ramasamy and Yeung’s (2010) work by testing the effects of the Customer Satisfaction Index (CSI) on consumer spending in several European countries. The motivation of this study is not only to affirm previous findings in a different economic setting but also to generate insights into cross-country issues. Specifically, the study intends to address the following research issues: (1) Could CSI act as a significant driver of aggregate consumption expenditure in the selected European countries? (2) Does the influence of customer satisfaction on consumption expenditure vary across different European countries, and what factors account for these differences?

Nine European countries were selected based on consistent data availability. Panel data modeling techniques were employed in this study. Building on Fornell, Rust, and
Dekimpe’s (2010) model, we included income, inflation, debt and consumer confidence as control variables. We also investigated the role of cross-country differences that moderate the significance of the CSI as a driver of consumer spending. Drawing on the theories of several earlier cross-country studies comparing customer satisfaction at the national level (e.g., Morgeson et al., 2011; Ogikubo et al., 2009) as well as studies examining the moderating factors of the satisfaction-repurchase link (e.g., Seiders et al., 2005), we propose four major moderators: economic structure, culture, social economy, and political economy. The paper attempts to answer questions such as whether the CSI can be a more significant driver for an economy with a more significant service sector, a more educated economy, a higher per capita income, or with greater economic freedom. Pursuing these questions not only is interesting but also provides policy-makers with better insights into the influence of customer satisfaction on the economy. Our findings confirm the role of customer satisfaction as a significant driver of consumer expenditure in the European countries covered in this study. Furthermore, our results suggest that the CSI is a relatively more important driver of consumption in economies where the services sector is more dominant, where the economy is freer, and where education levels are lower. We also find that culture matters; i.e., consumption expenditure is influenced more by the CSI in societies with stronger survival values (as opposed to self-expression values). However, given the data limitations we experienced, our findings have to be considered as preliminary. Nevertheless, our findings, together with those of similar studies, could lead to more in-depth research into the link between macro-marketing and macro-economic variables.

2. Customer satisfaction at the micro level

Customer satisfaction studies at the micro level explore issues related to the consumer and the firm. At the individual consumer level, studies have focused on the nature, antecedents, moderators and consequences of customer satisfaction, and the variables under consideration are generally individual-level attitudinal or behavioral constructs. Empirical studies have investigated the relationship between customer satisfaction and customer loyalty (Anderson & Sullivan, 1993; Taylor & Baker, 1994; Shankar et al., 2003; Morgan & Rego, 2006), customer satisfaction and actual repurchase (Bolton et al., 2006; Seiders et al., 2005; Voss et al., 2010), and customer satisfaction and share of wallet, which is often treated as another important means of measuring customer loyalty (Baumann et al., 2005; Keiningham et al., 2005; Cool et al., 2007). Another stream of research investigated the moderating factors of customer satisfaction ratings, including demographic factors (Mittal & Kamakura 2001), customer experiences with competing firms (Wangenheim & Bayon, 2004), and perceived risk (Johnson et al., 2006).

At the firm level, studies have sought to examine the financial value that customer satisfaction brings to the company. For instance, using data from the Swedish
Customer Satisfaction Barometer (SCSB) (based on 77 firms representing 70 percent of Sweden’s economic output), Anderson et al. (1994) found a significant association between customer satisfaction and return on assets (ROA). Yeung and Ennew (2000) linked data from the ACSI to a range of financial performance measures, while Eklöf et al. (1999), Anderson et al. (2004), and Matzle et al. (2005) empirically demonstrated a relationship between customer satisfaction and shareholder value. Scholars have found that customer satisfaction boosts shareholder value by increasing cash flow growth and reducing its volatility (Fornell et al., 2006; Gruca & Rego, 2005). In particular, high levels of customer satisfaction should be negatively associated with the cost of debt financing and positively associated with credit rating (Anderson & Mansi, 2009). In sum, efforts at boosting customer satisfaction increase customer purchase and are financially rewarding to the firm.

3. Customer satisfaction at the macro level

The customer satisfaction literature at the micro level described earlier indicates how consumers respond to satisfactory or unsatisfactory experiences and how companies can benefit from creating satisfactory customer experiences. At the macroeconomic level, it can be argued that customer satisfaction is a driver of aggregate consumer expenditure. From consumers’ perspectives, people tend to spend their incomes in ways that would yield the greatest satisfaction. The utility or satisfaction that consumers derive from previous consumption will therefore affect the expected utility of future purchases (Johnson et al., 1995), increase their consumption expenditure in the following period (Homburg et al., 2005), and lead to more cross- and up-selling (Li et al., 2005). Furthermore, satisfied consumers will generate positive word-of-mouth, which will increase the confidence of other consumers and encourage more spending (Danaher & Rust, 1996). The practices of monitoring customer satisfaction at the industry level reveal that customer satisfaction is an agenda not only for individual firms but also for the entire industry.

From a macroeconomic perspective, it is argued that while productivity measures the quantity of economic output, customer satisfaction measures the quality of economic output (Fornell, Ittner, & Larcker, 1996). Clearly, consumption will not be sustainable if the quality of output is compromised. More importantly, because aggregate consumption by households contributes a sizeable portion of GDP (for example, 70.1% in the US, 61.8% in the UK and 55.9% in Germany in 2010), increases in consumption expenditures due to increases in satisfaction levels can have a direct impact on the economy as a whole. Therefore, for the policy-maker, customer satisfaction has the “potential to be a useful tool for evaluating and enhancing the health of the nation’s economy, both in terms of national competitiveness and the welfare of its citizens” (Fornell et al., 1996, p. 15).

Despite this logic, some economists have questioned whether there is indeed a link
between overall customer satisfaction and economy-wide consumer-spending trends (Hilsenrath & Freeman, 2002). Their doubt is most likely attributed to the assumption in the economic theory of consumer behavior that regards one unit of satisfaction from a particular consumption package as being independent of the satisfaction derived from other consumption units. More importantly, ever since Keynes introduced personal disposable income as a determinant of income in the General Theory, economists have been pre-occupied with income as the main driver of consumption. From Milton Friedman’s (1957) Permanent Income Hypothesis to Ando and Modigliani’s (1963) Life Cycle Hypothesis, a considerable amount of attention has been devoted to this area. Other determinants of consumer spending have also been considered, including inflation rates, unemployment rates, and stock market performance (see for example, Hendry & von Ungern-Sternberg, 1981; Ludvigson & Steindel, 1999; Poterba, 2000). However, these determinants are also indirectly related to future income streams.

Nevertheless, researchers have investigated other drivers of consumer spending aside from income-related variables. For instance, Katona (1975) argued that consumption is a function of disposable personal income plus a variable measuring the aggregate willingness to spend, where such willingness is defined as the relative degree of optimism or pessimism felt by consumers. Consumer sentiment is defined as a measure of willingness based on a perceived future condition. Using the Index of Consumer Sentiment (ICS), Carroll, Fuhrer, and Wilcox (1994) investigated its explanatory power with respect to personal consumption expenditures. Desroches and Gosselin (2002) further argued that the ICS captured information about expected future income and the willingness of consumers to spend based on their perception of future uncertainties. Their theoretical justification was also partly based on Katona’s (1975) extension of the Keynesian consumption function.

The link between consumer sentiment/confidence and consumption expenditure has been empirically tested for several European countries. Belessiotis (1996) for France and Acemoglu and Scott (1994) for the UK suggested that consumer confidence is a leading indicator of future consumption. In the case of the UK, for instance, Delorme et al. (2001) found that the impact of consumer confidence on consumer spending was stronger compared to the US market. Cotsonitis and Kwan (2006) investigated the subject matter for Belgium, Denmark, France, Italy, Germany, Portugal, Spain, the Netherlands, and the United Kingdom. They examined whether the aggregate Consumer Confidence Index (CCI) for the EU had an impact on consumer spending in each selected country and whether each individual country’s confidence index had an impact on the consumer spending of the corresponding country. Their results showed that six out of nine countries’ consumer spending was affected by aggregate CCI, but the impact of the individual country’s CCI on the corresponding country’s consumer spending was generally small and could be explained away by other macroeconomic controlling variables.
Some recent research has examined whether a positive relationship can be found when both customer satisfaction\(^1\) and spending are aggregated across the US population. Fornell, Rust and Dekimpe (2010) viewed the role of customer satisfaction as a predictor of discretionary spending growth and found that satisfaction from previous purchases could explain 23% of the variation in the next quarter’s spending growth. Ramasamy and Yeung (2010) further confirmed and extended the findings of Fornell, Rust and Dekimpe (2010). They examined the influence of the ACSI and CCI on Personal Consumption Expenditure (PCE) and concluded that compared to the CCI, the ACSI can be used to predict a wider range of consumption categories. The findings from Fornell, Rust, and Dekimpe (2010) and Ramasamy and Yeung (2010) provided empirical evidence to support the plausible relationship between customer satisfaction and aggregate consumer spending. As both studies were conducted based on the US economy, the authors have called for further investigation to affirm the findings in other regions. The CSI reported in some European countries therefore provides a good opportunity for this investigation. Considering the mature market economy and sophisticated institutional structure in Europe, it is reasonable for us to develop the first hypothesis:

**H1: In the selected European countries, aggregate customer satisfaction is a significant driver of consumer expenditure.**

### 4. Cross-country moderating effects

It is noted that customer satisfaction may not yield an invariable influence on consumer expenditure and that its impact will be contingent on certain conditions. For instance, Fornell, Rust, and Dekimpe (2010) suggested that households’ Debt Service Ratio (DSR) might moderate the impact of consumer satisfaction. As rising debt levels may restrain consumers’ abilities to pay, the ability of customer satisfaction to predict future consumption will be attenuated. Ramasamy and Yeung (2010) examined this issue by taking the perspective of product difference. They found that the forecasting capacity of the ACSI had a significant impact on the consumption of durable goods and services, compared with the CCI, which had a significant effect on non-durables.

In this paper, we extend our understanding of the relationship between customer satisfaction and consumption expenditure by investigating country specific issues and their impact on this link. In a study investigating the cross-national determinants of customer satisfaction, Morgeson et al. (2011) alluded to a range of country-level

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\(^1\) Customer satisfaction differs from consumer confidence in both definition and construct. While consumer confidence measures how optimistic people feel about their own future economic situation and the future of the state economy, customer satisfaction measures how people evaluate their consumption experience, expectation, and repurchase intention.
differences that “influence how consumers perceive and respond to their consumption experience and the level of satisfaction delivered by an economy” (p. 200). These differences include cultural, politico-economic, and socio-economic factors. In an earlier study, Ogikubo et al. (2009) compared the influence of economic conditions and economic growth on customer satisfaction in the US, Japan and Sweden and concluded that economic, socio-political and cultural differences account for the variation in customer satisfaction among these countries. When studying the relationship between customer satisfaction and repurchase at the individual level, Seiders et al. (2005) also argued that the factors that moderate the relationship could be summarized into three categories: consumer, relational, and marketplace characteristics. Some of these characteristics, such as income, education, and market competition, are also relevant at the aggregate level and can be incorporated into the socio- and politico-economic domain. Therefore, building on the factors considered in these previous studies, we propose four main factors that may moderate the influence of customer satisfaction on consumption expenditure: economic structure, culture, political economy and social economy. A visual representation of our framework is shown in Figure 1, and the ensuing hypotheses are developed to represent each of these factors.

Figure 1 about here

A notable difference among the economic structures of countries is the proportion of the national GDP represented by the service sector. Services are generally characterized as being highly dependent on personnel and customization to suit heterogeneous needs in creating customer satisfaction (Anderson, Fornell, & Rust, 1997). Unlike physical goods, services are intangible, making them hard to measure, store, and test (Grönroos, 1990). If something goes wrong in the service process, it is often difficult to identify the reasons and implement quality control (Hoffman & Bateson, 1997). These characteristics help explain why it is challenging to achieve a high level of service performance (Fornell & Johnson, 1993). Compared to purchasing goods where consumers can often assess product quality prior to purchase through free samples, test-drives and manuals, it is more difficult for consumers to evaluate and understand service offers (Edvardsson et al., 2000). Even if the service concept is clear and the prerequisites for a quality service are in place, the service’s intangibility makes it difficult for the service firm to display or communicate the offering in the marketplace (Grönroos, 1990). This situation results in customers placing great emphasis on their prior experience and experience-based referrals from others. Therefore, it could be argued that customer satisfaction should carry a greater weightage for consumer spending on services than on goods. Thus, we propose the following:

H2: Customer satisfaction should be a more significant driver of consumer expenditure in countries where the service sector is a larger component of the
National culture is another country-specific feature that is worth considering. Hofstede defined culture as “the collective programming of the mind which distinguishes the members of one group or category of people from those of another” (1994, p. 4). Such “collective programming” often influences the member’s values, beliefs and norms (Pizam et al., 1997) and their role as consumers. Prior research has confirmed the importance of culture to a range of customer satisfaction issues, such as the link between culture and consumer expectations (Donthu & Yoo, 1998), complaint behavior (Liu & McClure, 2001) and the willingness to report dissatisfaction (Crotts & Erdmann, 2000).

Despite the popularity of Hofstede’s five cultural dimensions in cross-cultural studies, it is not viable for us to adopt those dimensions in this study because two of our sample countries lack sufficient data coverage in those areas. Following Inglehart and Baker (2000), we use two dichotomous measures as national cultural indicators: survival vs. self-expression values and traditional vs. secular-rational values. We map the countries selected in this study on those dimensions, using data from the 2000 wave of the World Values Survey (Inglehart & Welzel, 2005). As shown in Figure 2, the survival vs. self-expression dimension (horizontal) is able to explain some differences between our sample countries far better than the traditional vs. secular-rational dimension (vertical). This observation leads us to focus on the former in the analysis. The survival/self-expression dimension is linked to the transition from an industrial society to a post-industrial society. Inglehart and Baker (2000) explained that societies with strong survival values tend to emphasize economic and physical security, show relatively low levels of subjective wellbeing, report relatively poor health, and demonstrate low interpersonal trust. Societies with self-expression values tend to show the opposite results on these issues.

It is argued that the survival/self-expression value likely influences how consumers perceive and respond to their consumption experience and the level of satisfaction delivered within an economy. For instance, Morgeson et al. (2011) found that consumers in self-expressive societies will express higher levels of satisfaction than those in societies with survival values. The higher levels of interpersonal trust developed in self-expressive societies result in more active consumer interaction, making positive word-of-mouth an important driver of purchase. In addition, the emphasis on subjective well-being and quality of life makes consumers more willing to pay for a satisfied experience. In contrast, the influence of experience may be less significant in survival societies due to the lower level of consumer interaction and the emphasis on economic and physical security. For these reasons, we suggest the following:
**H3: Customer satisfaction should be a more significant driver of consumer expenditure in self-expressive societies than in survival societies.**

In our study, we also attempt to examine the moderating effect of two socio-economic factors: education and income. These moderating factors are important because they can explain cross-country variation in the satisfaction-consumption relationship at the national level. Furthermore, these variables can be influenced by policy-makers.

Previous study suggests that the variation among the satisfaction rating can be explained by several consumer characteristics. For instance, Bryant and Cha (1996) analyzed the ACSI and found that consistent differences in satisfaction levels do exist among different socio-economic groups, irrespective of the types of goods. The study also demonstrates a negative relationship between customer satisfaction and the consumer’s level of education. In other words, customer satisfaction declines as education level rises. However, they could not ascertain the extent to which such differences in ratings can translate into repurchase behavior. Whether higher satisfaction reported by a relatively less-educated consumer will lead to a higher chance of repurchase is still an unanswered question.

Mittal and Kamakura (2001) are among the first to examine the moderating effect of consumer characteristics (e.g., age, gender, and education) on the satisfaction-repurchase link. They found that for the same level of rated satisfaction, consumers with more education tend to show a lower probability to repurchase than those with less education. The authors argued that “consumers with higher education could have greater ability to search and are cognizant of superior alternatives in the market” (p. 139). In another study, Capraro et al. (2003) investigated the influence of consumer knowledge on the relationship between customer satisfaction and customer defection. Their findings suggested that the likelihood of customer defection will increase as consumers obtain more knowledge and information about the alternatives, making customer satisfaction a weaker predictor of repurchase. Given these established links at the individual level, it is reasonable to argue that such relationships may also apply at the aggregate level. We argue that as levels of education increase, consumers’ ability to effectively search and evaluate information surrounding products/services will also increase. As consumers increase their reliance on external information about products/services, their satisfactory experiences tend to play a relatively less important role in determining their purchases. Thus, we propose the following hypothesis:

**H4: Customer satisfaction becomes a less significant driver for consumer expenditure as the nation’s level of education increases.**

Previous research also examines the influence of income on customer satisfaction.
Some studies suggest that as income increases, consumers tend to become more critical of the goods they consume and harder to please (Anderson et al. 2008; Bryant and Cha, 1996). Morgeson et al. (2011) further investigated this influence at the national level and found that consumers in societies with a higher per capita income tend to express lower satisfaction with goods and services. The authors explain that “consumers, as their wealth grows with the nation’s economy (over long periods of time), gradually become more demanding” (p. 212).

However, in regard to the satisfaction-repurchase link, it is postulated that income should intensify the relationship between satisfaction and repurchase behavior. For instance, by measuring objective repurchase behavior, Seiders et al., (2005) show that household income will positively enhance the effect of satisfaction on repurchase visits and spending. Fornell et al. (2010) also argue that if consumers’ discretionary spending shrinks, it will attenuate the impact of a consumer’s satisfaction with prior purchases. This reasoning implies that customer satisfaction can be a better predictor for consumers with higher income than their poorer counterparts. Lower-income consumers are generally more price-driven in their purchases and more subject to the influence of price discounts and in-store promotions. In such situations, it is reasonable to assume that lower-income consumers place a higher value on price and that past experiences become less important in influencing the purchase decision. Higher-income consumers tend to pay more attention to the hedonic and functional utility of their purchases and less attention to price. Thus, their past satisfactory experiences become more important to their subsequent purchases. If this logic exists at the individual level, it is reasonable to make a similar argument at the aggregate level. Thus, we posit that:

**H5: Customer satisfaction becomes a more significant driver of consumer expenditure as the nation’s per capita income increases.**

Miller and Kim (2012) define an economically free society as one where “the power of economic decision-making is widely dispersed, and the allocation of resources for production and consumption is on the basis of free and open competition so that every individual or firm has a fair chance to succeed.” The potential link between market characteristics and customer satisfaction has long been noted (Johnson et al., 2002; Seiders et al., 2005). It is expected that consumers should experience greater utility/satisfaction in a freer market. For instance, Johnson et al. (2002) argue that firms in countries with higher levels of economic freedom will have greater motivation to satisfy their customers. In a more recent study, Morgeson et al. (2011) also found a positive relationship between economic freedom and customer satisfaction. They argued that increased openness to international commerce and internal business will “broaden the number, quality and pricing of competitive alternatives in a manner beneficial to the consumers (and their satisfaction)” (p. 202).
Aside from its direct impact on customer satisfaction, economic freedom also plays a positive moderating role on customer satisfaction and repurchase behavior (Seiders et al., 2005). An economy with lower economic freedom tends to have fewer firms and thus fewer choices available to consumers. Therefore, a consumer may continue to purchase despite low satisfaction because of the limited choices in the marketplace. This situation will make customer satisfaction a weaker predictor of consumer spending. In countries with greater economic freedom, firms will show a stronger willingness to establish customer satisfaction for fear that unsatisfied consumers will switch to other choices. Therefore, firms will be motivated to provide various economic incentives and relationship programs to customers, which will help “enhance the positive effect of satisfaction on repurchase behavior” (Seiders et al., 2005, p. 31). Thus, we posit that:

**H6: Customer satisfaction is a relatively more significant driver of consumer expenditure in countries with higher economic freedom.**

5. Data, methodology, and results

Our study employs panel data modeling techniques. Panel data models do everything that is possible with a time series model while also controlling for individual-specific, time-invariant variables and addressing unobserved heterogeneity. A few advantages of panel data are particularly important to the present study. First, the estimation can take country-specific heterogeneity into account explicitly; second, panel data, by nature, provide more variability and less collinearity among variables and thus increase estimation efficiency; and third, panel data can minimize the bias that might result if we aggregate countries into broad groupings. The use of panel data in estimating common relationships across countries is particularly appropriate for the current research agenda because it allows the identification of country-specific effects that control for missing or unobserved variables (Judson & Owen, 1997). In other words, it assumes that time-invariant country differences exist, the effects of which could impact or bias the outcome variable (consumption in our case). Thus, the use of panel data models allows us to control for these time-invariant variables. Most importantly, the country-specific estimation of the relationship between customer satisfaction and consumption at the economy level demands a time series of significant length. Until time-series data of significant length are available, the only feasible alternative for conducting the estimation is to employ panel data models and techniques, i.e., pooling a sample of several countries over a certain period of time to conduct such estimations so as to obtain a common estimation.

Spurious regression is less likely when modeling with panel data compared with time series data, especially for models with level data. Phillips and Moon (1999) and Kao (1999) explained that this independence works effectively by smoothing out the usual unit root dependency for each unit. Thus, the technique helps mitigate the spurious
regression problem arising in the time series case.

Data for the analysis were collected from five data sources: Euromonitor; the European Commission’s consumer surveys; Jan Eklöf’s EPSI (European Performance Satisfaction Index); the World Values Survey; and the World Bank’s World Development Indicators. Our data analysis covers the period from 1999 to 2011 in nine countries: the Czech Republic, Denmark, Estonia, Finland, Greece, Latvia, Lithuania, Portugal, and Sweden. The selection of countries was based on the availability of all required data from a common source for at least a three-year period.

The EPSI, formerly known as the European Customer Satisfaction Index (ECSI), is based on a microeconomic model that considers causal relationships among a set of antecedents of customer satisfaction. It considers customer satisfaction to be a cumulative experience rather than the result of recent transactions and has been built to be compatible with other national satisfaction barometers (Eklöf et al., 1999). The EPSI is currently under the management of the European Foundation for Quality Management, the European organization for quality, and the academic network, International Foundation for Customer Focus (see Eskildsen & Kristensen, 2007; Eklöf & Selivanova, 2008 for more description and methodology of EPSI). Eklöf and Westlund (2002) suggested that the EPSI is based on a thorough analysis of theory and an implementation of best practice methodology of data collection, measurement and analysis. It uses survey data, collected by telephone interviews, to create latent variables, e.g., customer expectations, perceived product quality, perceived service quality, perceived value and corporate image, to compute the customer satisfaction measurement. Moreover, it is a well-structured method to measure customer satisfaction and represents another variation to the ACSI model. Indeed, both the EPSI and the ACSI were modified from the first uniform national measurement instrument for customer satisfaction and customer loyalty in Sweden - the Swedish Customer Satisfaction Barometer.

The first annual wave of the EPSI survey (1999) conducted more than 100,000 interviews across 11 countries; some 10 industries were surveyed, including retail banking, fixed and mobile line telecommunications, and supermarkets. These industries were common across countries, allowing for regional aggregation. In 2011, the survey expanded to 1,000,000 respondents across 16 countries. In most countries, the EPSI covers the financial sector (banking and insurance), the ICT sector (tele- and data communication), energy, distribution and trade, personal transportation as well as dominant socio-ethical sectors such as education and health. Further aggregations produced index profiles for industries and economies.

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2 http://www.epsi-finland.org/industry-studies/introduction-industry-studies.htm
3 The EPSI does not consider or have sufficient time series for some larger and more significant countries in Europe, such as Germany, the United Kingdom, and France. Of the 16 countries, 9 fulfilled our three-year data requirement for the EPSI (Spain, Cyprus, Azerbaijan, Georgia, Kazakhstan and Croatia did not have sufficient data). Countries like Norway and Russia were then dropped from the list due to the unavailability of other required data, in particular, the consumer
Consumer confidence data were sourced from the economic databases and indicators of the European Commission. We aggregated monthly averages to represent annual scores and to ensure consistency with EPSI’s annual data. Personal Disposable Income (PDI), annual inflation, and debt data were taken from Euromonitor. PDI refers to disposable income, which is defined as gross income minus social security contributions and income tax and is measured in constant US dollars (in per capita values). While Fornell, Rust, and Dekimpe (2010) used total consumer credit outstanding as their control debt variable, we used the proportion of non-mortgage households to total households in country \( i \) at time \( t \) as the control variable. This was based on the availability of consistent data across countries. A high ratio indicates a lower level of indebtedness of citizens in that country. Finally, the dependent variable, Personal Consumption Expenditure (PCE), defined as total personal expenditure on goods and services in the domestic market and measured in constant US dollars, was also sourced from Euromonitor. The summary statistics of the data used in the basic model are shown in Table 1.

Table 1 about here

We applied Im, Pesaran, and Shin’s (2003) test to check for the presence of unit root in all variables. If a non-stationary series, \( y_t \), need to be differenced \( d \) times before it becomes stationary, then it is said to be integrated of order \( d \) or I(d). If the null hypothesis that all panels contain a unit root is rejected, then it is stationary or I(0). If the null is not rejected, then the corresponding differenced data are subjected to the same test. We conclude that the series is stationary, I(1), if the null is rejected for the differenced data. Table 1 reports the panel data unit root test statistics for each variable and whether each I(1) variable is co-integrated with the dependent variable. The IPS (Im, Pesaran, & Shin, 2003) statistics confirm that PCE, PDI and CSI were I(1) variables, while the rest of the time-series variables were I(0).\(^4\) Table 1 also provides test statistics showing whether I(1) regressors are co-integrated with the dependent variable (PCE). Westerlund (2007)’s \( P_t \) and \( P_a \) statistics are used to test if the I(1) regressors (PDI and CSI) are co-integrated with the dependent variable (PCE). According to Persyn and Westerlund (2008), the two tests are designed to pool information over all the cross-sectional units to test the null of no co-integration for all cross-sectional units against the alternative of co-integration for all cross-sectional units. Rejection of the null should therefore be taken as evidence of co-integration for confidence data since they are not members of the EU. We included Portugal although it was dropped from the EPSI network in 2006. So in the end, 9 countries were selected for our analysis.\(^4\) Consumer confidence was found to be I(0), and not consistent with Lemmens et al. (2007). This may be due to differences in data and methodology used, sample period and countries selected. Our analysis was based on (computed) yearly panel data covering the period from 1999 to 2011 and panel data techniques that aimed to increase the power of unit root tests based on a single time series, whereas Lemmens et al.’s analysis was based on monthly data from Nov 1995 to Feb 2004. Furthermore, their unit root tests were carried out separately for each selected country. Additionally, Lemmens et al., focused on large EU economies, whereas our sample comprises relatively smaller EU economies.
the panel as a whole. Thus, they can be regarded as stringent tests. \( P_t \) sets the number of leads and lags in the test equation based on the number of years in the data, while \( P_a \) sets the number of leads and lags in the test based on the Akaike information criterion. Our results show that \( PCE \) and \( PDI \) are co-integrated, but no long-run co-integration relationship was found between \( PCE \) and \( CSI \). We use these results to guide the rest of the model building.

Given that \( PCE \) and \( PDI \) are fundamentally and statistically co-integrated, we started the modeling by fitting the long-run consumption model given in Equation 1 (Eq. 1) with panel data and a fixed effect specification, as suggested by the relevant Hausman test (see Abeysinghe & Choy, 2004; Davidson et al., 1978; Saad, 2011):

\[
PCE_{it} = (\alpha_i + u_{it}) + \beta_0PDI_{it} \quad \text{Eq. 1}
\]

where \( \alpha_i (i=1...9) \) is the unknown intercept for each country; \( u_{it} \) is the error term; subscript \( i \) denotes country and \( t \) refers to time. Next, given the unit root and co-integration results, the short-run dynamics of consumer satisfaction (\( \Delta CSI \)), consumer confidence (\( CCI \)) and other controlling variables are appended to the consumption model. We follow Fornell, Rust, and Dekimpe (2010) and use inflation (\( \Delta CPI \)) and debt (\( DEBT \)) as controlling variables. The expected signs for the controlling variables are negative and positive, respectively. Given the additional variables, the following difference equation is fitted to guide the rest of the analysis:

\[
\Delta PCE_{it} = (\nu_i + \varepsilon_{it}) + \beta_2\Delta PDI_{it-1} + \varepsilon_3 ECT_{it-1} + \delta \Delta CSI_{it-1} + \theta CCI_{it-1} + \beta_1 \Delta CPI_{it-1} + \beta_2 DEBT_{it-1} \quad \text{Eq. 2}
\]

where \( \nu_i (i=1...9) \) is the unknown intercept for each country; \( \varepsilon_{it} \) is the error term; \( \Delta PCE \) and \( \Delta PDI \) are the changes in personal consumption expenditure \((\text{per capita})\) and personal disposable income \((\text{per capita})\), respectively. \( ECT \) is the error-correction term obtained from Equation 1 \((\text{i.e., } PCE_{it-1} - \beta_0PDI_{it-1})\). \( \Delta CSI \) is the change in customer satisfaction, \( CCI \) is the level of consumer confidence, and \( \Delta CPI \) and \( DEBT \) are as previously defined.

All variables in Eq. 2 are stationary. Moreover, it is believed that Eq. 2 expresses the consumption function correctly.\(^5\) Spanos (1989) provides a comprehensive analysis concerning different forms of the consumption function. The theoretical and statistical adequacies of alternative models were compared to judge the extent to which the selected models conform to theory and fit the theoretical parameters derived by consumption theories. Our Eq. 2 is identical to Model 8 in Spanos (1989). The same model proved empirically successful for both the US and the UK.

Some diagnostic tests are used to guide our selection of the estimator. We use

\(^5\) The lagged consumption growth was considered as a RHS variable but the inclusion of it turns the error-correction term to positive, that is, inconsistent with consumption theories.
Breusch and Pagan (1980)’s LM test to test the null hypothesis of no random individual effects ($\sigma^2_u=0$). If the null is not rejected, OLS can be used to estimate Equation 2. The test statistic is 18.8 ($p=0.016$). The null is clearly rejected. Thus the pooled regression model is not appropriate, and the panel estimator should be adopted (see Baltagi & Griffin, 1983; Shaanan, 1997; Costantini & Martini, 2010). Among the panel estimators, we use the Hausman test to decide on the choice of fixed effect (FE) versus random effect (RE) estimation. Under the null hypothesis, both estimations are consistent. In contrast, the alternative hypothesis suggests FE over RE. The test statistic is 15.9 ($p=0.014$). Therefore, the FE estimator should be the best alternative among the three competing estimators (OLS, FE and RE).

The final estimations are shown in Table 2. The fitted model suggests that all regressors are statistically significant at the 5% level. Based on the principle that the effects of independent variables are solely within-cluster effects in a fixed-effects model (Wooldridge, 2002; Bartels, 2002), for a given country, as $\Delta CSI$ increases across time by one unit, $PCE$ per capita increases by 57.84 units, holding fixed the controlling variables and country-specific effects. The size of the CCI coefficient is more than three times smaller than $\Delta CSI$. The variables entered explain 58% of variations in $\Delta PCE$. The Jarque-Bera test statistic does not reject the null hypothesis that errors are normally distributed. Note that the reported intercepts are the average of country-specific intercepts. However, in a panel data model, the country-specific intercepts have weak explanatory value (Wooldridge, 2002).

Table 2 about here

To confirm the predictability and examine the lag structure of $\Delta CSI$, we follow Fan and Wong’s (2007), and Ramasamy and Yeung’s (2010) methodology to check the bivariate relationship between $\Delta PCE$ and $\Delta CSI$. We regress $\Delta PCE$ on different lags of $\Delta CSI$ and consider the changes in the relationship when accounting for the effect of the main controlling variable. Previous researchers concluded that the independent variable is a good predictor when different lag structures do not distort the significance of specific independent variables. The results are reported in Table 3.

On the LHS of Table 3, $\Delta PCE$ is regressed on $\Delta CSI$ and lagged $\Delta CSI$s. One to three lags are considered. The coefficient(s) of $\Delta CSI$ are (jointly) significant for all three cases. Similarly, on the RHS of Table 3, the same result is revealed when the controlling variable and its lags are added. Given these results, we can regard CSI as a good predictor of $PCE$, and its effects remain significant even when more lags were added. Therefore, H1 is not rejected.

Table 3 about here

To examine Hypothesis 2 – 6, the proposed moderating factors are added to Eq. 2 one at a time. Consider Equation 3 (Eq. 3):
\[ \Delta PCE_{it} = (\alpha_t + u_{it}) + \beta_1 \Delta PDI_{it-1} + \beta_2 ECT_{it-1} + \delta \Delta CSI_{it-1} + \theta \Delta CCI_{it-1} + \beta_3 CPI_{it-1} + \beta_4 DEBT_{it-1} + \beta_5 MF_{it-1} + \beta_6 (MF_{it-1} \times \Delta CSI_{it-1}) \]  

Eq. 3

where \( MF_{it-1} \) is the moderating factor and \( MF_{it-1} \times \Delta CSI_{it-1} \) is the interacting variable; the rest of the variables were previously defined. Given the hypotheses we developed, five moderating factors are considered one at a time.\(^6\) These factors and their sources of data are listed and described in Table 4.

---

**Table 4 about here**

Except for \( \Delta PDI \), the selected moderating factors are either time-invariant or sluggish (rarely changing) variables. Neither the fixed- nor random-effect estimators are feasible options for handling such estimations. The former would sweep away the moderating variables when eliminating the country-specific effects; and the latter would impose the assumption that the entity’s error term was not correlated with any RHS variables. We showed that this assumption was restrictive for our data when estimating Equation 2. To fit Equation 3 with a time-invariant regressor, Plumper and Troeger (2007)'s Panel Fixed Effects Regression with Vector Decomposition approach is used. The proposed estimator allows us to estimate time-invariant or rarely changing variables with a fixed effect model. Using Monte-Carlo experiments, Plumper and Troeger (2007) showed that their proposed processes performed better than other methods for handling panel data estimations with time-invariant regressors. The estimations of Equation 3 with one moderating factor entered at a time are reported in Table 5.

**Table 5 about here**

An interaction term is a way to show that the predictive effect varies by subgroups of predictors. Focusing on the interaction terms, our results in Table 5 suggest that SURV negatively moderates, while SERV, EDU, and FREE positively moderate the relationship between changes in customer satisfaction and changes in consumption. In the empirical analysis, we provided supportive evidence for H2 and H6 at the 10% significance level and for H4 at the 5% significance level. However, we did not find supportive evidence for H3 and H5. In H3, we argued, based on previous literature, that customer satisfaction should positively affect consumption expenditure in societies that are self-expressive. However, our results find the interacting variable to have a negative co-efficient (significant at the 5% level). This observation suggests that the satisfaction-consumption link is actually weaker in countries that are high in

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\(^6\) We follow procedures for the detection of interaction terms developed by previous researchers like Cohen and Cohen (1993) and Cox (1984). These procedures examine the significance of interaction terms one at a time to avoid over-fitting. Including all interacting terms into one equation would also result in a co-linearity issue, as \( \Delta CSI_{it-1} \) is a product term in all the interaction terms. A test of co-linearity of the moderating factors also produced negative results.
self-expressive values.

5. Discussion and implications

Our study is an attempt to establish a satisfaction-outcome link at the macro level. Using well-established econometric techniques and models, we find that customer satisfaction plays a crucial role in determining consumption expenditure in selected European countries.

From a theoretical point of view, the paper adds to the scarce but growing literature on customer satisfaction and consumer expenditure at the macro level. We have extended the findings of Fornell, Rust, and Dekimpe (2010) and Ramasamy and Yeung (2010) to another important economic region. In addition, we find that cross-country differences, including economic structure, culture, and socio- and political-economic factors moderate the satisfaction-consumption relationship. Specifically, we find that the influence of customer satisfaction is stronger in economies with a high reliance on the service sector, as we hypothesized in H2. While prior research has investigated the link between customer satisfaction and business performance across different industries, these studies tend to be conducted within a country, mostly in Sweden (Anderson, Fornell, & Rust, 1997; Edvardsson et al., 2000; Nilsson, Johnson, & Gustafsson, 2001). Our findings, to some degree, are in line with Edvardsson et al. (2000), who argued that customer satisfaction shows a more positive impact on revenue growth for services than for products. However, our findings provide even more convincing evidence, with data covering nine countries over a 12-year period.

Our findings suggest that a nation’s level of education and its economic freedom are two important moderators of the customer satisfaction-consumption link. In H4, we suggested that the link between customer satisfaction and consumption expenditure is weaker among countries with higher levels of education. Because EDU denotes the percentage of the labor force with only primary education, a higher number indicates a lower level of education. Our results of a significant positive coefficient (60.254) suggest that customer satisfaction affects consumption expenditures more in countries where the level of education is relatively lower. Previous research has confirmed that higher levels of education are associated with lower levels of loyalty (Mittal & Kamakura, 2001). Highly educated customers tend to demand more information related to their purchase, and therefore, they affect the degree of sensitivity with which investments in satisfaction convert to loyalty (Bae et al., 2011). This finding implies that consumers’ increasing capacity to search for and process information, which results from an increase in education, will weaken their reliance on previous consumption experiences in future purchases. Thus, in countries where levels of education are higher, converting satisfaction into increased consumption is bound to be more challenging.
Our results also show that the satisfaction-consumption link is stronger for countries with higher economic freedom, as argued in H6. This outcome is consistent with the study of Jones and Sasser (1995), who showed that the satisfaction-loyalty link is more prevalent in markets where competition is intense. As explained earlier, firms in economies with greater freedom tend to place high value on customer satisfaction and are motivated to retain customers and encourage repeat purchases through various incentives and relationship programs. Our results show that the satisfaction-loyalty link does extend to increased consumption.

Nevertheless, our findings show some unexpected results regarding the influence of culture on the satisfaction-consumption link. In H3, we argued that customer satisfaction should be a more significant driver for consumption expenditure in self-expressive societies than survival ones. However, our results suggest that the satisfaction-consumption link is weaker for countries that are high on self-expressive values. An in-depth investigation into this issue shows that societies with strong survival values tend to emphasize collectivism and those with strong self-expression values emphasize individualism (Inglehart & Oyserman, 2004). Liu et al. (2001) found that collectivist consumers tend to stick to the same service provider once they are satisfied. This result is further endorsed by Jin et al. (2008), who also found a stronger satisfaction-loyalty link in Korea (a highly collectivized society) than the US (a high individualistic society). Compared with self-expressive societies, customers in societies with high survival values pay more attention to fundamental economic and physical security (Inglehart & Baker, 2000) where product/service quality is less guaranteed. Therefore, consumers tend to rely on past satisfactory experiences as a means to avoid uncertain quality in future consumption. This situation could explain why the link between satisfaction and consumption is relatively more significant in societies with stronger survival values.

Our study offers some helpful managerial and policy implications. At the managerial level, our findings elevate the role of marketers and marketing activities in customer satisfaction to one of national interest. The marketing effort emphasizes better ways to deliver goods and services to create more satisfying experiences. Though we do not directly measure how marketing activities contribute to the economy, the empirical evidence in the study clearly confirms the economic contribution of customer satisfaction, which is only achieved through good marketing. Thus, marketers need to understand that their efforts to satisfy the appetites of customers do not merely meet sales and profit targets at the firm level but also have a direct impact on economic growth. The marketing effort to improve customer satisfaction will help increase the aggregate level of consumer spending, which ultimately benefits both the company and economy.

The findings imply that companies should not trade customer satisfaction for a short-term sales target because declining customer satisfaction will hurt both the
company and industry growth in the long term. The findings might also imply that dramatically reducing marketing budgets in reaction to economic downturns is a questionable strategy for companies. As marketing managers lose the human and other resources necessary to take care of customers, the resultant decline in customer satisfaction may lead to a vicious circle. Managers would further benefit from a better understanding of moderating variables, such as education and culture, which can be used to segment customers. As Multinational Corporations (MNCs) are operating in many countries, examining cross-national differences in this customer satisfaction-consumption link has potential value. Our results suggest that MNCs should realize that companies’ efforts to satisfy customers will have different results in different countries. These macro-level factors also impact the reward of their efforts beyond their product and service performance. The firm can choose the proper markets where their efforts to develop customer satisfaction will yield more consumption.

The implications for policy-makers are even more direct. Our findings show the need for every country to establish some form ofCSI. Policy-makers should understand that such a national index not only gauges the quality of goods and services consumed but also provides a valid forecast for future consumption activities at the macro level. Therefore, as a matter of national interest, policy-makers should provide incentives and increase the pressure on firms to constantly invest in customer satisfaction. This is especially true for economies with a strong service sector because consumer spending is influenced more strongly by customer satisfaction in the service sector. Services often score very low in customer satisfaction due to the characteristics explained earlier. Even in the US, where customer satisfaction is higher than in European countries, e.g., Germany and Sweden (Johnson, Herrmann, & Gustafsson, 2002), the bottom five industries in the ACSI are consistently industries in the service sector (e.g., airlines, television and telephone services). As services become even more dominant, policy-makers should give increasing attention to customer satisfaction in this sector. As advanced economies struggle with low economic growth rates, policy-makers may leverage the lagged customer satisfaction in services to encourage economic growth. In addition, our findings on economic freedom suggest to policy-makers that greater business freedom will further enhance the role of customer satisfaction in boosting long-term economic growth.

The findings of this study are limited by the availability of both time series and cross-sectional data. In terms of time series data, the EPSI is only collected on an annual basis, which limits the variation along the time dimension. As for cross-sectional data, several significant countries are not within the EPSI network including Germany, France and the UK. The small number of countries selected in the

See BBC News (2003) for Pearson cutting the marketing budget during the economic downturns; see Qualified Remodeler (2005) for construction firms setting marketing budget as the first-to-cut item; see Sweeney (2001) for high-tech industry slashing marketing budgets during economic downturns.
study also limits our empirical strategy to evaluate other cross-country differences and generalize our findings across the entire European continent. As for the EPSI measure itself, Steenkamp & Baumgartner (1998), Baumgartner & Steenkamp (2001) and Harzing et al. (2009) warned that a similar measure might not necessarily be exactly equivalent across countries, largely due to the differences in the response styles among cultural groups. It is also likely that some cultural groups are harder to please than others. Remedial methods to control for various response biases have been proposed, but these methods are more relevant for conducting research with primary data. However, such potential biases may be assumed to be minimal for the current study because our model used changes in satisfaction. Furthermore, the EPSI has been widely regarded as an exercise based on a generalizable conceptual framework. Given these data limitations, future research could validate our results by including more European countries as CSI data become available. In addition, further research into those marketing activities that relate to customer satisfaction could be undertaken. For instance, the impact of advertising on customer satisfaction at the macro level could be evaluated to understand the real role of the former in improving macroeconomic performance.

References


Wangenheim, F., & Bayon, T. (2004). Satisfaction, loyalty and word of mouth within the customer base of a utility provider: Differences between stayers, switchers and


**Table 1. Summary statistics, unit root and co-integration tests**

<table>
<thead>
<tr>
<th></th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>N</th>
<th>IPS test (^2) (level/1(^{st}) difference)</th>
<th>Co-integration (^3)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PCE</strong></td>
<td>5981.00</td>
<td>30414.90</td>
<td>18194.54</td>
<td>7724.97</td>
<td>87</td>
<td>-0.4045/-2.1357**</td>
<td>NA</td>
</tr>
<tr>
<td><strong>PDI</strong></td>
<td>6314.60</td>
<td>29598.20</td>
<td>18595.16</td>
<td>7894.52</td>
<td>87</td>
<td>-0.1682/-4.1227***</td>
<td>-5.980**/-4.933*</td>
</tr>
<tr>
<td><strong>CSI</strong></td>
<td>64.00</td>
<td>81.10</td>
<td>70.59</td>
<td>3.63</td>
<td>87</td>
<td>-0.0087/-5.1933***</td>
<td>-3.301/-1.495</td>
</tr>
<tr>
<td><strong>CCI</strong></td>
<td>-49.60</td>
<td>23.43</td>
<td>-5.52</td>
<td>19.13</td>
<td>87</td>
<td>-1.5475*/NA</td>
<td>NA</td>
</tr>
<tr>
<td><strong>ΔCPI</strong></td>
<td>-1.10</td>
<td>15.50</td>
<td>3.05</td>
<td>2.53</td>
<td>87</td>
<td>-5.6242***/NA</td>
<td>NA</td>
</tr>
<tr>
<td><strong>DEBT</strong></td>
<td>.18</td>
<td>.81</td>
<td>.50</td>
<td>.20</td>
<td>87</td>
<td>-2.9492**/NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

1 Common samples;
2 IPS test (level/1\(^{st}\) difference); for level data that were found to be stationary, the corresponding differenced data was not tested for the presence of unit root.
3 Co-integration with PCE using Westerlund (2007)’s panel co-integration tests \(P_r\) and \(P_a\) statistics;
***, **, * denote significance at 1%, 5% and 10% respectively.
Table 2. Estimation results of total sample

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-statistic</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\Delta PCE_{it}$</td>
<td>1632.7</td>
<td>4.51***</td>
<td>-1.69*</td>
<td></td>
</tr>
<tr>
<td>$\Delta PDI_{it}$</td>
<td>-1632.7</td>
<td>-2.19**</td>
<td>4.51***</td>
<td></td>
</tr>
<tr>
<td>$\Delta CSCI_{it}$</td>
<td>57.84</td>
<td>2.54**</td>
<td>2.19**</td>
<td></td>
</tr>
<tr>
<td>$\Delta CCI_{it}$</td>
<td>15.08</td>
<td>2.04**</td>
<td>2.54**</td>
<td></td>
</tr>
<tr>
<td>$\Delta CPI_{it}$</td>
<td>-1678.23</td>
<td>-8.71***</td>
<td>-2.19**</td>
<td></td>
</tr>
<tr>
<td>$\Delta DEBT_{it}$</td>
<td>4618.23</td>
<td>2.31**</td>
<td>2.31**</td>
<td></td>
</tr>
</tbody>
</table>

The numbers in parentheses are the t-statistics; *** and ** denote significant at 1%, 5% and 10%

$R^2=0.58$; Durbin Watson statistic=1.89; Jarque-Bera statistic=0.24; N=71 (unbalanced panel)
Table 3. Regressing $\Delta PCE$ on lagged $\Delta CSI$ and lagged $\Delta PDI$

<table>
<thead>
<tr>
<th>k</th>
<th>RMSE of baseline model</th>
<th>$H_0$: $\delta(s)=0$? p-value</th>
<th>$H_0$: $\delta(s)=0$? p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>621.53</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>2</td>
<td>645.97</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>3</td>
<td>674.22</td>
<td>0.000</td>
<td>0.012</td>
</tr>
</tbody>
</table>
### Table 4. Moderating factor of cross-country difference

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Moderating factor</th>
<th>Description</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>SERV</td>
<td>Proportion of the services sector in GDP</td>
<td>Proxy for the differences in terms of economic structure.</td>
<td>World Bank’s World Development Indicators</td>
</tr>
<tr>
<td>PDI</td>
<td>Income per capita</td>
<td>Proxy for socio-economic differences. Disposable income measured as gross income minus social security contributions and income tax, in constant US dollars (in per capita values).</td>
<td>World Bank’s World Development Indicators</td>
</tr>
<tr>
<td>EDU</td>
<td>Education levels</td>
<td>Proxy for socio-economic differences. Measured by the proportion of the country’s labor force with only primary education.</td>
<td>World Bank’s World Development Indicators</td>
</tr>
<tr>
<td>SURV</td>
<td>Survival vs. self-expression values</td>
<td>Proxy for cultural differences among countries. Measured based on a battery of questions as per Inglehart &amp; Welzel, 2005.</td>
<td>World Values Survey</td>
</tr>
</tbody>
</table>
Table 5. Cross-country moderators and the CSI-PCE link

<table>
<thead>
<tr>
<th>Variable</th>
<th>MF=</th>
<th>( \Delta PDI )</th>
<th>SERV</th>
<th>FREE</th>
<th>SURV</th>
<th>EDU</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>-1628.991</td>
<td>0.103</td>
<td>622.140</td>
<td>0.500</td>
<td>101.955</td>
<td>0.344</td>
</tr>
<tr>
<td>( \Delta PDI_{it} )</td>
<td>0.378***</td>
<td>0.006</td>
<td>0.430***</td>
<td>0.003</td>
<td>0.373***</td>
<td>0.009</td>
</tr>
<tr>
<td>( ECT_{it-k} )</td>
<td>-0.328***</td>
<td>0.034</td>
<td>-0.317*</td>
<td>0.079</td>
<td>-0.428***</td>
<td>0.015</td>
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<tr>
<td>( \Delta CSI_{it-1} )</td>
<td>54.511**</td>
<td>0.043</td>
<td>57.434*</td>
<td>0.054</td>
<td>85.884**</td>
<td>0.011</td>
</tr>
<tr>
<td>( CCI_{it-k} )</td>
<td>15.221**</td>
<td>0.040</td>
<td>21.214***</td>
<td>0.002</td>
<td>22.762***</td>
<td>0.003</td>
</tr>
<tr>
<td>( \Delta CPI_{it-1} )</td>
<td>-168.78***</td>
<td>0.000</td>
<td>-85.315***</td>
<td>0.002</td>
<td>-64.44***</td>
<td>0.020</td>
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<tr>
<td>( DEBT_{it-k} )</td>
<td>4615.534</td>
<td>0.027</td>
<td>-9375.140</td>
<td>0.352</td>
<td>-6291.818</td>
<td>0.562</td>
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<tr>
<td>( MF_{it-k} )</td>
<td>0.341***</td>
<td>0.000</td>
<td>-8.233</td>
<td>0.683</td>
<td>-31.645</td>
<td>0.462</td>
</tr>
<tr>
<td>( MF_{it-k} \times \Delta CSI_{it-1} )</td>
<td>0.010</td>
<td>0.615</td>
<td>0.803*</td>
<td>0.095</td>
<td>25.677*</td>
<td>0.092</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.582</td>
<td></td>
<td>0.538</td>
<td></td>
<td>0.580</td>
<td></td>
</tr>
<tr>
<td>Adj. R-squared</td>
<td>0.469</td>
<td></td>
<td>0.400</td>
<td></td>
<td>0.449</td>
<td></td>
</tr>
</tbody>
</table>

***, ** and * denote significant at 1%, 5% and 10%
Figure 1. Framework of cross-country moderators

- Economic structure: services economy
- Culture: survival – self expression
- Socio-economic: Education, per capita income
- Political Economy: economic freedom
Figure 2. Culture – values map, 2000