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Determining Factors that Affect Farming in the Albanian Milk Sector

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ABSTRACT

In Albania, the agricultural sector is dominated to almost 60% by subsistence farming. Nevertheless, agriculture is one of the most important sectors of the economy, as it contributes to nearly 1/2 of employment in Albania and 1/5 to the GDP (ILO - International Labour Organisation, 2018).

The government has applied different policies and instruments in collaboration with foreign associations (GIZ, FAO) to improve and further develop this sector by inviting farmers in new initiatives.

Being part of an innovative organisation or being an innovative actor in terms of the role you play and functions you carry out in the value chain, are still considered as impasse by the majority of farmers in Albania. As a result, innovation and risk-taking are two factors that are contrary but strongly related to each other when it comes to the behaviour of Albanian farmers.

Keywords*: innovation; farmers characteristics; Albania; milk dairy sector*

JEL Code*: Q13*

1 Introduction - Country profile

Despite its growth, the agriculture sector faces many challenges. First and foremost, market access for smallholders, which dominate the sector – spot market selling is still prevalent.

Furthermore, a typical farm and its family members carry out every farming activity starting from production to the sale of the products within the market (Sokoli and Doluschitz, 2018). This is due to the lack of trust they have in other actors involved in the value chain. We still frequently notice that farmers hesitate to invest their capital in common assets, and someone outside of the family is in charge of managing these assets. To better understand the farmers' behaviour and their situation, a short description of the country profile on the milk and dairy sector has been analysed.

The country of Albania is divided into twelve prefectures, and one of them well-known for milk production is the region where the surveys took place. The region of Fier is the second largest region in Albania. Also, Fier has recorded the highest number of breeding cattle for several years at 14.5 %. As far as the structure of livestock in the cattle unit is concerned, the cattle have the most significant number of heads in Albania with 47.0 % of the total number. Sheep and goats are 31.0 %, pigs 6.0 %, and poultry 9.0 % of the total number of livestock units from Albanian regional statistical yearbook (INSTAT, 2018). Most of the Albanian farmers run semi-subsistence farms. As it is shown on the table below, the dairy industry in Albania is not well integrated into the market.

Table 1.
Value chain of dairy

Value chain integration		Farming	Collection	Processing	Wholesaling	Retailing	
1	Informal - direct milk selling	Subsistence farmers	→			Roadside, door to door	Domestic consumption
2	Non-integrated channel	Small, medium and large commercial farmers	→	Processors	→	Shops and supermarkets	
3	Partially integrated channel		Local Collectors	Processors	→		
4	Mostly integrated channel		Local Collectors	Processors	Wholesalers		

Source: Authors' adapted from Skreli and Imami (2019)

Milk production (mainly cow milk) is characterised by the existence of informal (direct selling from farmers to the domestic market and from farmers to the processors and then to the markets) and formal market channels (collection, processing and distribution by dairies). Even though there have been different public policies to support and protect farmers. In big cities, farmers are selling fresh milk and milk products directly to consumers on street markets (see Table 1 – Informal milk selling). Based on the institute of statistics (INSTAT, 2018) dairy cow farms can be divided into three groups: first group, precisely 94.481 farms (approximately 60%) of the dairy cattle farms have only one cow, classified as subsistence farms. Whereas the second group, 52.155 (approximately 32%) farms have two to three cows which makes one-third of the dairy cattle farm, and this group of cow milk production tends to sell part of the milk to make some profit. The third group, approximately 8% of the farms, have more than five milk cows. This small group of farmers show a higher willingness to innovation and new investment. Basically, dairy cows are nourished with forage and grazed on grasslands and meadows and kept in simple stables. The first and the second group of farms mostly milk their cows by hand. This group of farmers does not have adequate cooling facilities.

In the detailed studies done by Food and Agriculture Organisation (FAO, 2018) and Albania Agribusiness Support Facility (Skreli and Imami, 2019) on dairy and milk value chain, it is highlighted that the transportation and milk collection are considered to be the weakest points in the value chain. Both issues have been raised from our interviews taken place with the farmer as very sensitive.

Although there have been different initiatives from the government and international organisations through projects (e.g. GIZ, FAO, IPARD), the quality of the milk remains a critical issue. The system for the control of milk quality is still weak. Although there have been several controlling restrictions from the government, some of the milk continues to be sold on the road or sold directly by the farmer at home within one day, providing cooling on their refrigerator. Thus, a significant proportion of the

Figure 1. Picture taken on the field: Cows resting in the farm

milk is consumed directly and untreated, unprocessed and/or controlled. There is significant pressure on the price as this milk must be marketed within one day. Several reasons exist for this, including the value of the product, connections, freshness and tradition. Consumers instead buy cheap milk directly from farmers. Accordingly, the dairy industry plays a vital role in the Albanian agri-food sector (MAFCP[1], 2018).

Based on the country profile and problematics, this research analyses *the willingness of farmers to accept innovativeness*. To better understand their behaviour, a four-dimensional analysis has been conducted. Based on the comprehensive literature of innovation, the following factors have been highlighted as relevant to farmers behaviour in this study as following: innovation, objectives, proactivity and risk-taking.

2 Research framework

Significant elements of the research framework become to be described in this part, including innovation, objective, proactivity and risk as factors that influence farmers behaviour in acceptance of innovations. Relevant literature has been used for discussion of these factors.

Innovation. Some articles reported innovative activities that help innovators to reflect on their responsibility and impact on society. This can be addressed by increasing awareness within the organisation and the employees. Firstly, by discussing and articulating the reason for the importance of the firm and secondly the impact it has in a broader concept like society. (Dossa and Kaeufer, 2014; Weltzien, 2011).

As mentioned from Bocken et al. (2013), individuals who analyse the innovatory process need to be conscious that people, in our case farmers, can have different values which motivate them, as this affects the development of innovation (Bocken et al., 2013).

Abdirahman et al. 2014, following Agarwal et al. 2012, consider that the '*social capital of the organization (and its members) might be seen to be a potentially important determinant of the extent to which managers as change agents can engage in the learning, experimentation, reflection and communication (…) as it shapes the organization's access and exposure to new ideas*.'

Abdirahman et al. (2014) point out that mobilising large transfers of knowledge, social networks and learning processes are involved in the context of innovations. Thus, 'the formal' structure of the network, but also the quality and relational characteristics that are played out, have a role on the nature that occurs in the learning environment (Berthon et al., 2007).

As stressed by Boehlje and Bröring (2011), the model of Tolbert and Zucker (1983), revised by Kennedy and Fiss (2009), has expanded the classic two-stage adoption/diffusion model. The interpretation is whether the change/innovation that will respond to the case is packaged as an opportunity or as a threat. If the case is considered an opportunity, then gain is possible, there are easy control and high potential to take up the challenge and implement the innovation. On the other hand, when the case is treated as a threat, it indicates possibilities of loss, little control and most probably a struggle to innovate.

Objective. Open communication is vital in order to become aware of the subjectivity of knowledge and to merge different conceptions of reality (Chalmers, 2013). Activities that motivate or sometimes force farmers to approach problems from a different perspective will bring a new vision on farmers' current practices. This to say that it may inspire them to embrace new innovative movements in their farm such as cooling, milking labour (Elmquist et al., 2009; Lampikoski, 2014). This is important, as present knowledge, experiences and routines affect how problems are understood and subsequently affect the search for solutions (Bocken et al., 2014). From time to time, it is also important to examine whether the information is accurate and objective (Baba et al., 2010; Elmquist et al., 2009). However, strong evidence as to what functions and what does not in order to accomplish the envisaged objectives in terms of broader collaboration patterns and organisational-level innovation is still at an infant stage, taking into account the country profile and the history of its development (Crescenzi et al., 2018).

Proactivity. Innovation in both products and processes can facilitate a new entrant's challenges of these structural entry barriers that favour the unavoidable. The degree of innovation, as a new phenomenon to the people/farmers, has a significant impact on structural entry barriers. A new entrant can facilitate entry by 1) use of new/different resources/inputs, thus challenging the market, 2) dramatically lowering the cost of production/distribution, and 3) introducing superior performance or lower-cost products that exceed the switching costs for current customers and attract non-customers. Christensen and Raynor (2003) categorize such disruptive innovations as new-market distractions. They state that this kind of innovations, "*enable a whole new*

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population to begin owning and using the product, and to do so in a more convenient setting … rather it pulls customers out of the mainstream value network into the new one because these customers find it more convenient to use the new product".

On the other hand, in weaker regional systems, domestic firms confronting economic risk tend to decrease their innovation exposure, allegedly becoming even more vulnerable, while response remains proactive (Gagliardi and Iammarino, 2017).

Risk. Naturally, in most cases of convergence, sourcing the essential knowledge and experiences from beyond their factory gate is necessary, and the key to successful innovation management. Boehlje and Bröring (2011) argue that, while the new industry segments present opportunities for new fields of business and economic growth, they are often also quite challenging as firms have to employ knowledge (experts/specialists) and technologies. Which is not within their traditional framework of expertise or core businesses; the same challenge is also faced within the farmer association groups or even on farms individually. Very often, they lack the knowledge and experience necessary to cope with the risks and uncertainties of the new challenge. Some companies argue that, as one cannot fully predict all risks and uncertainties, it might be safer to develop and release the innovation and then make consequent effective adjustments (learning -whilst-doing) (Ortega et al., 2014; Kinder, 2010). The changing background conditions to which the farmer have to respond can originate from within the farm but also from the external environment (Parry, 2012). Farms, therefore, need to learn how to integrate innovation without putting the status of the farm at risk. If the administrator of the farm or the managing group of the farm association can cope with it, a next step would be to formalise this within the farm or the group of farmers and to give it different farm capability (Pandza et al., 2013; Schumacher et al., 2013).

Considering the research framework and the country profile analysed above, the following hypotheses have been raised to test the farmers' attitudes:

a) Innovative farmers tend to be more risk-taking and proactive.
b) A high level of risk-taking from farmers tends to be more proactive and express a higher willingness to adopt innovations.
c) Strategic objectives mediate the effects of risk and proactivity in innovation.

3 Material and Methods

Taking into account the crucial relationships that exist among factors, further analysis has been taken into account to identify the sample and target group. In the first step, we have considered different research studies that were conducted by several organisations such as GIZ and EU projects in Balkan countries, to understand better the obstacles that farmers are facing in Albania. We screened them and decided to develop our research in the milk production/dairy sector, due to its economic/sectorial importance on the one hand and shortcomings of quality, on the other hand. This is one of the sectors frequently studied from a production point of view but also as a primary link to the final dairy products such as yoghurt or cheese. To emphasise: there is no research related to further development or studying the farmers' attitude toward collective action, their interaction with other actors of the supply chain and the reasons behind their decision making.

The statistical analyses of this paper are based on a structured survey (238 farmers interviewed face-to-face). The survey has been carried out during June - October 2017 in the Fier region, which is the leading region for milk production in Albania. We used a structured survey with closed questions measured in Likert scale: 1 – Totally disagree to 5- Totally agree. Two master students have been trained to join the surveys in the field. Dairy farmers with two or more cows have participated in the survey. The farmers with one cow have been left out of the target group as they belong to the group of subsistence farms. The structured survey was complemented with in-depth interviews and focus group discussions.

The Confirmatory Factor Analyses (CFA) technique analyses models in which both the number of factors and their correspondence with the indicators are explicitly specified. In our case (see Figure 2, at Results chapter) a standard CFA model, as the most common model, has been tested in the literature, with four factors and at least three indicators per factor. The model represents the following hypothesis:

(1) indicators RS1 - RS3 measure factor Risk,
(2) indicators IN1 - IN4 measure factor Innovation,
(3) indicators OB1- OB4 measure factor Objective,
(4) indicators PR1-PR3 measure factor Proactivity

The factors are co-vary with each other. Each indicator has a measurement error term, such as *e1* for the indicator OB4. CFA models have the following characteristics (Kline, 2011):

- "*Each indicator is a continuous variable represented as having two causes, a single factor that the indicator is supposed to measure, and all other unique sources of influence represented by the error term…*
- *The measurement errors are independent of each other and the factors.*
- *All associations between the factors are unanalysed (the factors are assumed to covary)*".

The single arrow that points from a factor to an indicator represents the presumed causal effect of the factor on the observed scores. Statistical estimates of these direct effects are called factor loadings or pattern coefficients, and they are generally interpreted as regression coefficients that may be in an unstandardized or standardised form (Kline, 2011). Indicators in standard CFA models are endogenous, and the factors are exogenous variables that are free to vary and covary. This also describes reflective measurement.

To confirm the validity and the model-good-fit for the hypothesised model, absolute fit indices were evaluated (parentheses indicate model fit criteria., (Harrington, 2009):

Table 2.
Model fit values

MODEL FIT CRITERIA		MODEL VALUES
CMIN (minimum discrepancy) / DF (degrees of freedom)	1-3	2.290
The root means square error of approximation or RMSEA	< 0.08 or > 0.05	0.074
Good of fit index or GFI	> 0.9	0.917
Adjusted good of fit index or AGFI	> 0.9	0.877
Comparative fix index or CFI	0-1	0.961

Source: authors data elaboration

Whereas, the Kaiser-Meyer-Olkin (KMO) criterion indicates the adequateness of the sampling (Cerny and Kaiser, 1977), measured as follows:

$$KMO_j = \frac{\sum_{i \neq j} r_{ij}^2}{\sum_{i \neq j} r_{ij}^2 + \sum_{i \neq j} u_{ij}^2}$$

where:

$R = [r_{ij}]$ is the correlation matrix and

$U = [u_{ij}]$ is the partial covariance matrix

Table 3.
KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.885
Bartlett's Test of Sphericity	Approx. Chi-Square	2991.982
	df	171
	Sig.	.000

Source: SPSS sample results

Sample

From the total sample of respondents, 70.6% were male, and 29.4% female. The average age is 52 years. The study reveals that 94% of the respondents, which are mostly the heads of households, work in agriculture activities as their primary occupation. Only 2.9% of interviewees have a University degree, while 55.9% have only primary education and 41.2% have a high school education. Of the 41.9% of the interviewees who have a high school education, 69.3% have a professional high school education with a focus on agriculture, and 30.7% have a general high school education. A short synopsis is demonstrated in Table 4:

Table 4.
Socio-Demographic of the sample

Gender	**Male**			**Female**	
	70.6%			29.4%	
Age	**Up to 25 year**	**26 – 35**	**36 - 45**	**46 – 55**	**56 and above**
	2.1%	7.1%	15.1%	38.2%	37.4%
Education	**Elementary school**	**General High school**		**The high school in Agriculture**	**University**
	55.9%	10.5%		30.7%	2.9%

Source: authors data elaboration

The following hypotheses have been raised to test the farmers' attitudes:

a) Innovative farmers tend to be more risk-taking and proactive.
b) A high level of risk-taking from farmers tends to be more proactive and express a higher willingness to adopt innovations.
c) Strategic objectives mediate the effects of risk and proactivity in innovation.

A confirmatory factor analysis is used for further analysis and evaluation of our hypothesis.

4 Results

A significant section in our overall research was farmers' *innovation*, *objectives*, *proactivity* which refers to anticipation (Lubberink et al., 2017) and if they are willing to take the *risk* in the future decision making or they see it as shadow effect behind challenge innovation.

Following these four factors, the main *research question* of this paper is:

– How exposed are Albanian farmers to innovation?

In our research, farmers' innovation and risk-taking deals with the ability of a farmer to adopt something new in order to improve their own farms and when they belong to farmers associations, to improve their appearance in the competitor market. Innovation as adoption can be measured at the individual farm level in each time period by the share of agriculture land the new technology or by the per hectare quantity of input used (Feder et al., 1985). This to say that the measures of innovation indicate both timing and the extent of new inputs by farmers (Sunding and Zilberman, 2001). In the present study, product, process and market innovation represent the measures to evaluate farmers' innovation in Albanian farmers.

As it is indicated from the factor analysis, four factors have been identified: farmers' adaptability with innovation related to better technology, taking the challenge to try new varieties in their production in order to fulfil the demand from the buyers and to raise the quality in order to sell at a higher price. Furthermore, the same farmers have been asked whether they have taken any of the mentioned initiatives in the last three years.

The following dimensions were considered in relation to the issue of future objectives: further activities development, new technologies, increased contact with other actors and increased production.

Regarding proactivity, the challenge of taking new steps such as using new technologies when no other farmer has done that before – the concept of a pioneer strategy - initiated implementation of new techniques which others would not take (Schneider et al., 2007). When a farmer has positive experiences on his farm, he is willing to make further improvements.

When it comes to the risk factor, some farmers were not really interested in challenging themselves. They would hesitate to take the challenge to use another variety if it were not well known or they were not willing to invest if they were not sure about the benefit they would gain. On the other hand, if they were recommended a new technique or new variety (which was explained as a better one) they would take the risk - challenge.

Table 5.
Factor Analysis - Pattern Matrix

Variable		Proactive Innovation	Risk	Objective	Innovation
IN2	I like to try new technologies on my farm	.855			
IN4	I like to try new varieties on my farm to meet the buyer's demands better	.767			
IN1	I am interested in the latest information technology for product marketing	.764			
IN3	If I am producing a better product, I am willing to seek other buyers	.711			
PR1	I am ready to improve the technology that others will not	.633			
PR2	I am ready to start new practices that other farmers will not begin	.582			
PR3	Although I have outstanding results on the farm, there are still things to be improved	.516			
RS2	I prefer not to invest in my farm if I do not know what benefits there will be		.753		
RS3	I do not intend to expand because I do not want to have an additional cost		.722		
RS1	I will continue with the current variety, and I will not replace it with varieties that I do not know		.715		
OB1	I intend to add activities over the next 3 years (processing, store opening in town, etc.)			-.851	
OB4	I will add production activities in the next 3 years (using credit and my savings)			-.801	
OB3	The next 3 years, I intend to expand contacts with other actors in the chain (factories)			-.785	
OB2	The next 3 years, I plan to apply new technology (yield, quality)			-.783	
RS4	If someone suggests varieties with high yield, I will do this hoping for higher profits			-.477	
PR4	I am not afraid of failing, as long as I get the opportunity to learn from a new technology			-.385	
IN6	Over the last 3 years, I have changed production technology, as per suggestions by the buyer				.830
IN5	Over the last 3 years, I have changed production technology, learning from other farmers				.707
IN7	During the last 3 years, I have changed the sales market / buyers				.422

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalisation.[a]
a. Rotation converged in 12 iterations.
Kaiser-Meyer-Olkin (KMO) 0.885

Source: authors data elaboration

The pattern analyses in the framework of factor analysis are demonstrated in Table 5 for better clarification. We have regrouped our factors in contrast to our initial expectation before taking questionnaires in the field. For instance, the first questions about innovation have been grouped with proactiveness. This is due to the similarity of the groups and their strong correlation to each other.

For this reason, the factor has been renamed as proactive innovation. The factors innovation and proactivity are clearly separated when farmers were asked about which activities they have already undertaken in recent years,

as moving towards innovation. For this reason, confirmatory factor analysis has been done to better analyse and understand the correlations within variables and factors.

As has been shown previously, the model represents the following hypothesis:

(1) indicators RS1 - RS3 measure factor Risk,
(2) indicators IN1 - IN4 measure factor Innovation,
(3) indicators OB1- OB4 measure factor Objective,
(4) indicators PR1-PR3 measure factor Proactivity

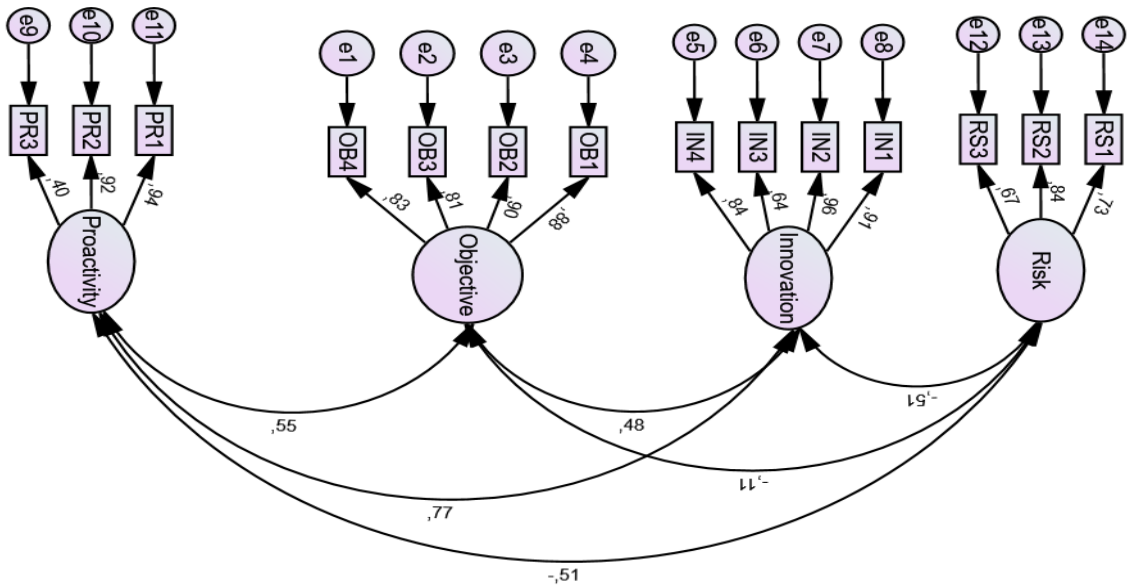

Figure 2. Confirmatory factor analysis
Source: authors data elaboration with SPSS-Amos

In order to confirm the validity and the model-good-fit for the hypothesised model, absolute fit indices were evaluated (parentheses indicates model fit criteria): CMIN (minimum discrepancy) / DF (degrees of freedom) (1-3), the root mean square error of approximation or RMSEA (< 0.08 or > 0.05) (Lopes-Silva et al., 2014), good of fit index or GFI (> 0.9), adjusted good of fit index or AGFI (>0.9), comparative fix index or CFI (0 - 1) (Harrington, 2009).

Different combinations have been created between latent constructs. The model presented has achieved the best model fit values related to the norms represented above. While running the analysis, the values are represented as follows: CMIN/Df = 2.290, GFI = 0.917, AGFI = 0.877, RMSEA = 0.074, CFI = 0.961, and the chi-square is significant (p-value = 0.000).

In order to avoid multicollinearity, the factors should not have a covary higher than 0.8. As we can see from the diagram of confirmatory factor analysis, only the two factors: innovation and proactivity have a slightly high coefficient. This may also explain the effect that was shown previously at the factor analysis (see Table 5).

5 Discussion

As we have mentioned above, from different and more fundamental studies on dairy value chain farmers face different challenges in gaining and accessing the market. Asymmetric information through the value chain is another fundamental challenge which causes a divergence in sustainable development. Lack of information makes farmers “blind/blank” in front of the buyers or other actors in the value chain (Skreli et al., 2011).

Basically, much of their scepticism and hesitation is driven by these challenges. Lack of milking, processing and transportation infrastructure are critical factors which have a negative influence on the further development of farmers and on the risk-taking.

Against the historical background and changing regulations, challenging infrastructure and centralised economy, farmers take more time to adapt and process the development when it comes to group movements and especially when it comes to trust among each other. This is a crucial reason that taking innovative steps such as adopting new technologies, trying new products, adapting environmental approaches means uncertainty and open dilemmas, particularly for Albanian farmers (Sutcliffe, 2011).

The farmers that see participation in an innovative market idea, as an opportunity and use both technical efficacy and social legitimacy as decision logic in their decision making are more pursuing in innovation and change and consequently are better compared to other farms. On the other side, farmers who view the change as a threat will delay their innovation and participation in the future developed markets (Boehlje and Bröring, 2011).

Governmental initiatives interspersed with different associations or preferably with just the farmers' associations in Albania, should work more closely in order to deliver the information required by dairy farmers and the professional training required by farmers.

To conclude, innovation and risk-taking are two factors that are contrary but strongly related to each other. It is essential to know the background of the area in order to analyse the capability and the step they can take into innovation. In addition to understanding the innovation environment, it is important to understand the social needs or the problem to be addressed (Bartlett, 2009; Chalmers and Balan, 2013; Edwards-Schachter et al., 2012).

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Annexes

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	34	162,610	71	,000	2,290
Saturated model	105	,000	0		
Independence model	14	2455,020	91	,000	26,978

RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	,124	,917	,877	,620
Saturated model	,000	1,000		
Independence model	,704	,280	,169	,243

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	,934	,915	,962	,950	,961
Saturated model	1,000		1,000		1,000
Independence model	,000	,000	,000	,000	,000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	,780	,729	,750
Saturated model	,000	,000	,000
Independence model	1,000	,000	,000

NCP

Model	NCP	LO 90	HI 90
Default model	91,610	58,320	132,622
Saturated model	,000	,000	,000
Independence model	2364,020	2206,158	2529,228

FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	,686	,387	,246	,560
Saturated model	,000	,000	,000	,000
Independence model	10,359	9,975	9,309	10,672

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	,074	,059	,089	,005
Independence model	,331	,320	,342	,000