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# How Do SMEs Finance Green Products or Services?

Derya FINDIK[1]

Kıvılcım METİN ÖZCAN[2]

Fatih Cemil ÖZBUĞDAY[3]

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## Abstract

*In the current study, we investigate the determinants of financing types of green products or services for the Small and Medium-Sized Enterprises (SMEs) in 27 EU countries and selected countries such as Norway, Iceland and the USA. We utilize the Flash Eurobarometer-Small and Medium-Sized Enterprises, Resource Efficiency, and Green Markets Survey (GESIS) and estimate a two-stage Heckman selection model to tackle sample selection bias. In the first stage, while we analyze the decision to produce green products or services, in the second stage, we focus on the financing of green product or services producers. The results suggest that the financial adequacy of the European SMEs that enables them to finance green products or services is crucial for producing green products or services. Firms need further resources to sustain those activities. In addition, technical expertise also plays a crucial role in producing green products or services. Financial adequacy, therefore, is not a sufficient condition for green production.*

***Keywords:*** *Small and Medium-Sized Enterprises; green product.*
***JEL Codes:*** *L25, O30, Q40, Q50.*



[1] *Ankara Yıldırım Beyazıt Üniversitesi. Ankara/Türkiye. Email: dfindik@gmail.com*
*http://orcid.org/0000-0002-3002-4391*
[2] *Ankara Sosyal Bilimler Üniversitesi, Ankara/Türkiye. Email: kivilcim.metin@gmail.com*
*http://orcid.org/0000-0002-9310-3492*
[3] *Ankara Yıldırım Beyazıt Üniversitesi. Ankara/Türkiye. Email: fcozbugday@ybu.edu.tr*
*http://orcid.org/0000-0001-5841-4343*

**Özet**

## *Küçük ve Orta Ölçekli İşletmeler Yeşil Ürün ve Hizmetleri Nasıl Finanse Ederler?*

*Bu çalışmada, neredeyse tüm AB ülkelerinde ve geçiş sürecinde olan ülkelerde Küçük ve Orta Ölçekli İşletmeler (KOBİ'ler) için yeşil ürün veya hizmetlerin finansman türlerinin belirleyicileri incelenmiştir. Bu amaçla, Flash Eurobarometre-Küçük ve Orta Ölçekli İşletmeler, Kaynak Verimliliği ve Yeşil Pazarlar Araştırması (GESIS)'na ait veriler kullanılarak iki aşamalı Heckman seçim modeli tahmin edilmiştir. İlk aşamada yeşil ürün veya hizmet üretme kararı analiz edilirken, ikinci aşamada yeşil ürün veya hizmet üreticilerinin finansmanına odaklanılmıştır. Sonuçlar, KOBİ'lerin yeşil ürün veya hizmetleri finanse etmelerini sağlayan finansal yeterliliğinin yeşil ürün veya hizmet üretmek için çok önemli olduğunu göstermektedir. Öte yandan firmaların bu faaliyetleri sürdürmek için daha fazla kaynağa ihtiyacı bulunmaktadır. Ayrıca, teknik uzmanlık yeşil ürün veya hizmetlerin üretiminde de önemli bir rol oynamaktadır. Bu nedenle finansal yeterlilik yeşil üretim için gerekli ama tek koşul değildir.*

***Anahtar Kelimeler:*** *Küçük ve orta ölçekli işletmeler, yeşil ürün.*
***JEL Kodları:*** *L25, O30, Q40, Q50.*



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*How Do SMEs Finance Green Products or Services?*
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## 1. Introduction

According to the Eco-Innovation Observatory (2012), eco-innovation is the "*introduction of any new or significantly improved product (good or service), process, organizational change or marketing solution that reduces the use of natural resources (including materials, energy, water and land) and decreases the release of harmful substances across the whole life-cycle.*" Even though there are many other definitions of eco-innovation (see Beise and Rennings, 2005; De Marchi, 2012), two common themes in these definitions of eco-innovation are the more efficient use of resources and fewer adverse environmental impacts (Hojnik and Ruzzier, 2016). Because of these themes, the stimulation of environmentally-friendly innovations is an urgent need in an era when the consequences of global climate change are being felt by world citizens. The expectation is that eco-innovations will help to reduce the emission of noxious materials across the whole life-cycle and will serve the environmentally sustainable

economic growth (Karakaya et al., 2014). For this reason, the promotion of eco-innovation is a priority for policymakers.

The financing sources of eco-innovation as a facilitating factor is critical since positive environmental externalities (or spillovers) arise from eco-innovation. On the whole, society benefits from eco-innovation as there is less of the pollution that could adversely influence economic agents. Eco-innovations have unique and distinguishing characteristics that require specific approaches for their promotion. For instance, eco-innovation suffers from the double externality problem (Rennings, 2000): innovation spillovers emerge during the research and development phase, whereas environmental spillovers turn up in the adoption and diffusion phase. Firms investing in environmental spillover-generating eco-innovations face higher costs than non-investing firms. Therefore, these spillovers can be a disincentive for firms' eco-innovation investments (Rennings et al., 2006). Furthermore, a lack of suitable financing mechanisms could be a barrier to firms' adoption of and investment in green products or services. These externalities should be addressed by policymakers to design public policies and firm practices on eco-innovation better.

The inadequacy of financing can be destructive, particularly for small and medium-sized enterprises with a huge potential of reducing adverse environmental impacts via green products or services. In spite of the potentially significant role of SMEs, there is limited amount of studies on the supply of green products or services by SMEs' in the related literature (Hoogendoorn et al., 2015; Gupta and Barua, 2018). Existing studies are limited to specific sectors such as leather (Hernández Pardo et al., 2012); fishery (Bar, 2015), and furniture (Susanty et al., 2016) or to certain countries such as France (Arfi et al., 2018). Therefore, the generalizability of the findings of these studies is problematic.

The empirical studies on eco-innovations mostly focused on internal or external drivers of eco-innovation (e.g., Horbach et al., 2012; Cainelli et al., 2012; Horbach, 2008; Rennings, 2000; Rennings and Zwick, 2002; Triguero et al., 2013; Kesidou and

Demirel, 2012; Cai and Li, 2018). Comprehensive literature reviews on the related studies are presented by Hojnik and Ruzzier (2016) and Karakaya et al. (2014). The relevant literature identifies three factors as drivers of eco-innovation: demand factors, organizational capabilities, and the stringency of environmental regulations (Kesidou and Demirel, 2012; Horbach, 2008; Cai and Li, 2018).

In the current study, we investigate the determinants of financing types of green products or services, which is a form of eco-innovations, for the European Small and Medium-Sized Enterprises (SMEs). To this end, we utilize the Flash Eurobarometer-Small and Medium-Sized Enterprises, Resource Efficiency and Green Markets Survey (GESIS), which is conducted in 27 EU countries and selected countries such as Norway Iceland and the USA[4] and estimate a two-stage Heckman selection model. In the first stage, we estimate the determinants of the decision to produce green products or services while we focus on the financing of green product or services producers in the second stage. The results indicate that the financial adequacy of the European SMEs that enables them to finance green products or services is crucial for producing green products or services but to a certain level. Firms need further assets to sustain those activities. Technical expertise also plays a crucial role in producing green products or services. Financial adequacy, therefore, does not provide a sufficient condition for green production. Additionally, firms, which do not have adequate financial resources, may search for external resources to implement their activities.

In this study, we use turnover to proxy firms' financial capacity. According to the results, it does not generate a positive effect on types of green financing. Only for firms exploiting firms' own resources, a certain interval of turnover generates a positive effect, but this effect turns out to be negative for higher categories of turnover.

[4] The list of countries includes France, Belgium, the Netherlands, Germany, Italy, Luxembourg, Denmark, Ireland, United Kingdom, Greece, Spain, Portugal, Finland, Sweden, Austria, Cyprus, Czech, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia, Bulgaria, Romania, Turkey, Croatia, Makedonia, Montenegro, Serbia, Albania, Moldavia, Norway, Iceland, and USA.

Additionally, operating in the retail sector is an advantage for firms financing their green production with their own resources, technical expertise, and external resources. Operating in the services sector generates positive and significant effect when firms finance themselves by external resources for green production. All these outcomes are valid for firms in middle-income countries.

The study contributes to the varying literature to focus on the determinants of financing types of green products or services supplied by SMEs. In the analysis of the factors of the financing types, the study also takes into account that launching green products or services is a strategic decision made by SMEs and corrects for sample selection bias. Furthermore, the paper focuses on a multi-sector and multi-country dataset that includes SMEs in European countries, which makes the validity of the results more powerful. The findings of the study imply that financial resources are necessary but not sufficient for launching green products or services by European SMEs. The findings also reveal that the determinants of financing types of green products or services differ by sector and country.

The paper proceeds as follows. Section Two presents the literature review on the determinants of green production. Section Three includes data used in the study and explains the empirical strategy. Section Four displays the results obtained from the two-stage Heckman selection model. Section Five concludes and discusses policy implications.

## 2. Literature Review on Determinants of Green Production

Activities protecting the environment have been mentioned by various terms in the literature. Among those, ‘green,' ‘eco,' ‘environmental,' and ‘sustainable' come to the fore (Díaz-García et al., 2015). The literature on green production, green innovation, or eco-innovation date back to 1970s but gained popularity in 1990s due to the two papers receiving a high number of citations (Albort-Morant et al., 2017). One, which is written by Russo and Fouts (1997), analyzes corporate environmental performance

from a resource-based perspective. Accordingly, environmental performance positively affects economic performance. The second one by Bansal and Roth (2000) focused on motivations for conducting green production and determined three of them, namely competitiveness, legitimation, and ecological responsibility that encourage firms to produce green products or services. As for the first one, companies are enforced to conduct production activities to obtain a competitive advantage and protect the status quo. Besides competitiveness, firms follow a green production strategy to fulfill their obligations and gain legitimacy. At last, firms started to consider ecological conditions and negative externalities stemming from their production.

In addition to those papers mentioned above, the dynamics of green production are also analyzed in many papers (Arundel and Kemp, 2009; Demirel and Kessidou, 2011; Kesidou and Demirel, 2012; González-Moreno et al. 2013; Triguero et al., 2013; Bocken et al., 2014; Cai and Zhou, 2014; Cuerva et al., 2014; Bossle et al., 2016; Hojnik and Ruzzier, 2016; Cai and Li, 2018). Arundel and Kemp (2009) use the term of eco-innovation to address all activities encapsulating energy efficiency, greenhouse gas reduction, waste minimization, reuse and recycling, new materials, and eco-design. In addition to drivers such as regulation, demand from the market, capturing new markets, cost reduction, and image, authors put their effort into measuring eco-innovation.

In a similar vein, Demirel and Kesidou (2011), through focusing on three types of eco-innovation, use two types of drivers, namely external environmental policy instruments and internal firm-specific dynamics. As for the first one, regulations or taxes are important factors that reduce environmental pollution. By using the combination of taxes and regulations, they found that there is a positive relation between eco-innovation and policy instruments, implying that those instruments stimulate eco-innovations. In addition to external factors, internal factors such as the adoption of environmental management systems which are proxied by the presence of European Union's Environmental Management and Audit Scheme and ISO 14001 certificate by a firm and achieving cost efficiency and equipment upgrades play a vital

role for eco-innovations. González-Moreno et al. (2013) analyze the drivers of eco-innovation in the chemical industry and find that intra-group sources of innovations are the main source eco-innovation. Triguero et al. (2013) focus on three types of drivers as supply-side, demand-side, and regulatory factors triggering eco-innovations. Accordingly, entrepreneurs who give emphasis to build up collaborations with organizations outside the firm tend to introduce eco-innovations. Market share of the firm is a determining factor for eco-product and organizational innovations while cost savings are crucial for eco- process innovations. As far as the role of regulations is considered, current regulations are important for product and eco-organizational innovations while expected regulations and external financial incentives do not play any role.

Similarly, Bocken et al. (2014) conclude that government plays an intermediating role to encourage innovation. Cai and Zhou (2014), from a developing country perspective, find that eco-innovation is triggered by both internal and external factors. Similar to the previous studies, regulations, market demand, and competitors affect eco-innovations. Additionally, firms' integrative capabilities that enable them to adopt a suitable combination of internal and external factors for eco-innovation facilitates eco-production. Moreover, Bossle et al. (2016) reveal that there are three internal factors that ease the adoption of eco-innovations, namely human resources, the presence of managerial concern towards environmental issues, and environmental capabilities. Among those, human resources come to the fore. As an external factor, collaboration with the outside organizations is crucial for eco-innovations while normative pressure and environmental regulations are secondary sources of adopting environmental practices. Cuerva et al. (2014), on the contrary, find that technological capabilities of the firm such as R&D and human capital do not trigger green innovation while the adoption of Quality Management System significantly affects the green innovation. In addition to these, SMEs have difficulty conducting innovative activities due to financial constraints. Hojnik and Ruzzier (2016) argue that regulations, market pull factors, the presence of environmental management system, cost savings and

company size play a determining role for all types of eco-innovations including product eco-innovation, process eco-innovation, organizational eco-innovation, and environmental R&D. Cai and Lee (2018) conclude that among various factors as technological capabilities, environmental, organizational capabilities, a market-based instrument, competitive pressures, and customer green demand, competitive pressure is the main driver of eco-innovation.

## 3. Data and Methodology

To examine the determining factors of financing green products or services, we use the Flash Eurobarometer-Small and Medium-Sized Enterprises, Resource Efficiency and Green Markets Survey (GESIS) which is conducted in, including 27 EU countries and selected countries such as, Norway, Iceland and the USA. Total number of countries considered in the study is 37.We use the last wave of the survey (2017) to reveal the current situation of green markets in those countries. The survey includes questions uncovering the perceptions of SMEs towards producing or selling green products or services. Additionally, the survey touches upon issues such as the extent to which SMEs rely on environmental rules and regulations, sources of resource efficiency, using environmental management system, financing environmental actions, and energy efficiency.

### 3.1 Variables definitions

To construct our model, we first estimate the determinants of green production. We, therefore, generate a binary variable taking the value of 1 if the firm produces or sells green products or services in the current year. As shown in Table 2, 30 percent of the sample is derived from green products or services producers. As for the types of financial support the firms received, there are four alternatives in the questionnaire such as i) *firms' own sources ii) firms' own technical expertise iii) external sources, and iv) other sources*. We focus on the first three categories and eliminate the last one. External resources include bank credits, support from family members, and non-financial

support such as consultancy and commercial associations. As seen in Table 2, 20 percent of the sample rely on firms' own resources to finance green products or services, while 16 percent use their technical expertise to achieve green production. The number of firms receiving external support, on the other hand, is rather low. About 10 percent of firms need external resources to implement green production activities.

To detect the determinants of financing types of green products or services, we focus on green products or service producers. When deciding on each category of financing types, we have eliminated observations that the related category intersects with the other by using cross-tabulation. Each category, therefore, is composed of observations representing the related category solely. That is, firms relying on their own resources to implement green production activities do not include observations of other categories such as own technical expertise and external resources.

In this study, we have three types of explanatory variables, including turnover, age, sector, and country groups. As shown in Table 1, we consider various categories of turnover to observe its effect on green production. We also include the age of the firm, which is calculated by using the establishment year of the firm. Sector and country-fixed effects are also included in the analysis as control variables. The sector is composed of four categories, namely manufacturing, retail, services, and industry. Furthermore, we also construct country dummies based on World Bank (2019), which classifies countries in terms of their income levels. Accordingly, we divide our country groups into two categories such as high-income countries and middle-income countries.

### 3.2 Two-stage Heckman procedure

To estimate financing types of green products, we observe two types of decisions. The first one is the decision to produce green products or services while the second is the decision to type of financial support of firms getting involved in green production. The decision, therefore, necessitates a selection model (Heckman, 1979). We conduct a two-stage Heckman procedure to estimate financing green products or

services model. Accordingly, the selection equation is shown by Eq. (1), where z* shows the unobserved variable. The selection equation is demonstrated below.

$$z^*=\gamma' w + u \quad u \sim N(0,1)$$

$$z=1 \text{ if } z^*>0$$

$$z=0 \text{ if } z^* \leq 0$$

while the outcome equation is shown as

$$y = \beta' x + e \quad e \sim N(0, \delta^2)$$

where $y$ is observed if z=1.

The selection equation is estimated by maximum likelihood using a Probit model to determine the probability of producing green product or services. Throughout this procedure, instead of estimating these two equations separately, we simultaneously estimate both selection and outcome equations with the help of Heckprobit procedure by STATA. In this study, therefore, we apply two equations. The first one shows the determinants of the decision to produce green products or services, while the second one focuses on green product or services producers. The level of producing green products/services $y$ is observed only when the selection equation equals 1and regressed on the explanatory variables, $x$. The second stage re-runs the regression with the estimated expected error term included as an extra explanatory variable, removing the part of the error term correlated with the explanatory variable and avoiding the bias. Sample selection bias has been corrected by the selection equation, which determines whether an observation makes it into the non-random sample.

**Table 1** Variable Definition

| Variable | Definition |
|---|---|
| GREEN PRODUCT | Binary variable taking the value of 1 if the firm produces or sells green product or services |
| OWN RESOURCES | Binary variable taking the value of 1 if the firm finances its green production relying on their own resources |
| OWN TECHNICAL EXPERTISE | Binary variable taking the value of 1 if the firm finances its green production relying on their own technical expertise |
| EXTERNAL RESOURCES | Binary variable taking the value of 1 if the firm uses external resources to finance its green production |
| AGE | Natural logarithm of firm age (current year-firm's establishment year) |
| TURNOVER | Categorical variable based on the question of firms' turnover in the previous year. There are six categories. It takes the value of 1 if turnover is equal or less than 100,000 Euros; 2 for 100,000-500,000 Euros; 3 for 500,000-2,000,000 Euros; 4 for 2,000,000-10,000,000 Euros; 5 for 10,000,000-50,000,000 Euros; 6 for more than 50,000,000 Euros |
| SECTOR | Categorical variable taking the value of 1 if the firm operates in the manufacturing industry, 2 for retail, 3 for services, and 4 for the industry. |
| COUNTRY GROUP | The categorical variable is constructed based on World Bank (2018) classification that group countries according to their income levels. It takes the value of 1 if the firm is a member of the middle-income country group (Turkey, Bulgaria, Romania, Macedonia, Montenegro, Serbia, Albania, Moldovia, and 0 if it belongs to the high-income country group. |

### 3.3 Data and Descriptive Statistics

In the sample, there are 4,297 firms that produce or sell green product or services. Among those, we examine firms using their own resources, own technical expertise, and external resources. As far as the distribution of country groups is considered, middle-income countries constitute 13 percent of the whole sample. Considering the mean value of age, firms in the sample are middle-aged.[5]

[5] We take into consideration the outliers and exclude them in the analysis. We also used the natural logarithm of the variables to achieve normal distribution.

**Table 2** Descriptive Statistics

| VARIABLES | N | Mean | Standard Deviation | Kurtosis | Skewness |
|---|---|---|---|---|---|
| Green Product | 14,127 | 0.304 | 0.460 | 1.725 | 0.851 |
| Own Resources | 4,297 | 0.203 | 0.402 | 3.188 | 1.479 |
| Own Technical Expertise | 4,297 | 0.162 | 0.369 | 4.359 | 1.833 |
| External Resources | 4,297 | 0.0938 | 0.292 | 8.766 | 2.787 |
| Country Group | 15,019 | 0.133 | 0.340 | 5.659 | 2.159 |
| Sector | 15,018 | 2,43 | 1,035 | 0.689 | 1.84 |
| Turnover | 14,691 | 3.315 | 1.654 | 1.845 | 0.187 |
| Age | 13,926 | 26.30 | 556.83 | 3.459 | -0.358 |

## 4. Estimation Results

Table 3 displays the estimation results. We used various categories of TURNOVER in this study to observe its effect on each dependent variable. The probability of using own resource is significantly higher for the firms with 100000-500000 turnover than the firms with 500000 or more, but the turnover is indifferent between 500000-50000000 in terms of the probability of having own resource or not.

Similar results are also found by Kessidou and Demirel (2012), Horbach (2008, 2012), De Marchi (2012), Triguero et al. (2013). As far as Model 2 and 3 are considered, compared to firms with 50000000 turnover, firms are less likely to use own technical expertise and external resources.

As for the firms relying on their own technical expertise, the negative effect of turnover indicates that the presence of technical expertise plays a crucial role in producing green products or services in comparison to financial resources. However, it does not imply that having financial assets is useless. The absence of financial resources, on the contrary, necessitates firms to search for external support for green production as observed in the last model, EXTERNAL RESOURCES.

Age of the firm (AGE) does not have a significant effect on green production and financing own resources and external resources in Model 1. This result supports some of the earlier findings of (Horbach, 2008, 2012; Cuerva et al., 2014). For the second type of green financing, namely OWN TECHNICAL EXPERTISE, AGE does have negative and significant effect implying that young firms are much able to develop their technical expertise due to the presence of younger employees and new graduates.

The INDUSTRY in which the firm operates in is vital for green production. We found positive and statistically significant coefficients (for similar findings see (Berrone et al., 2013; De Marchi, 2012; Horbach, 2008). In those studies, industries are elaborated in terms of their relevance to environmental issues. For instance, Berrone et al. (2013) apply the polluting industries classification to control for industrial effect on green production. In this study, manufacturing is a reference category and coefficients of the remaining industry categories are interpreted with reference to the specified category. Operating in RETAILING sector generates positive and significant effect for both firms relying on their own resources and external resources. However, the same variable has a negative and significant effect for firms using their own technical expertise. As far as the SERVICES industry is considered, it is only significant for EXTERNAL RESOURCES.

To control for country groups, we use World Bank (2018) classification based on income levels of the countries as explained by Table 1. The reference category is HIGH-INCOME COUNTRIES. This variable is only included in the selection. Accordingly, being a member of MIDDLE-INCOME COUNTRIES generates a negative and significant effect for all three models.

**Table 3** Main Estimation Results

| | Model 1 Own Resources (Outcome Eq.) | Green Product (Selection Eq.) | Model 2 Own Technical Expertise (Outcome Eq.) | Green Product (Selection Eq.) | Model 3 External Resources (Outcome Eq.) | Green Product (Selection Eq.) |
|---|---|---|---|---|---|---|
| TURNOVER (Euro) | | | | | | |
| 100,000<= | 0.083 | 0.181*** | -0.025 | 0.190*** | -0.155* | 0.189*** |
| | (0.057) | (0.040) | (0.080) | (0.040) | (0.090) | (0.040) |
| 100,000-500,000 | 0.116** | 0.240*** | -0.171** | 0.249*** | -0.156 | 0.250*** |
| | (0.057) | (0.040) | (0.079) | (0.040) | (0.095) | (0.040) |
| 500,000-2,000,000 | -0.004 | 0.318*** | -0.163* | 0.329*** | -0.214** | 0.329*** |
| | (0.063) | (0.042) | (0.088) | (0.042) | (0.104) | (0.042) |
| 2,000,000-10,000,000 | -0.029 | 0.515*** | -0.240** | 0.526*** | -0.371*** | 0.525*** |
| | (0.068) | (0.045) | (0.108) | (0.045) | (0.122) | (0.045) |
| 10,000,000-50,000,000 | 0.102 | 0.236*** | -0.169* | 0.243*** | -0.235** | 0.243*** |
| | (0.066) | (0.046) | (0.087) | (0.046) | (0.104) | (0.046) |
| AGE | -0.009 | 0.011 | -0.049** | 0.0139 | -0.012 | 0.014 |
| | (0.020) | (0.014) | (0.023) | (0.014) | (0.028) | (0.014) |
| RETAIL | 0.190*** | 0.178*** | -0.201*** | 0.179*** | 0.291** | 0.178*** |
| | (0.047) | (0.032) | (0.054) | (0.032) | (0.113) | (0.032) |
| SERVICES | -0.028 | -0.096*** | -0.001 | -0.092*** | 0.164** | -0.093*** |
| | (0.050) | (0.033) | (0.059) | (0.033) | (0.076) | (0.033) |
| INDUSTRY | -0.013 | 0.123*** | -0.063 | 0.126*** | 0.112 | 0.126*** |
| | (0.0563 | (0.036) | (0.062) | (0.036) | (0.094) | (0.036) |
| MIDDLE INCOME COUNTRIES | | -0.460*** | | -0.387*** | | -0.387*** |
| | | (0.032) | | (0.038) | | (0.038) |
| Constant | -1.613*** | -0.780*** | 0.353 | -0.805*** | -0.355 | -0.805*** |
| | (0.076) | (0.055) | (0.281) | (0.056) | (0.463) | (0.056) |
| Number of Obs. | | 12,865 | | 12,865 | | 12,865 |
| Censored Obs. | | 8,906 | | 8,906 | | 8,906 |
| Log Pseudolikelihood | | -9647.898 | | -9480.961 | | -8953.376 |
| Wald Chi2 | | 43.48 | | 37.52 | | 42.04 |
| Athrho | | 3.175 | | -0.871*** | | -0.731** |
| Rho | | 0.996 | | -0.701 | | -0.623 |
| Wald Test of Independent Equations (rho=0) | | 78.82*** | | 9.05** | | 4.57* |

Standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1

## 5. Conclusion and Discussion

Small and Medium-Sized Enterprises (SMEs) are one of the main pillars of the economy in both low income and high income countries, and they make substantial contributions to economic growth (OECD, 2013; IEA, 2015). In fact, in the European Union (EU), total employment by SMEs is around 90 million people, and this number rises by 1.1 million every year. In 2013, the total value-added created by European SMEs was the US $4,023 trillion, equivalent to 30% of GDP in the European Union (IEA, 2015). These figures imply that there is great potential for SMEs in Europe to reduce negative environmental effects. Flash Eurobarometer surveys by the European Commission (2013, 2015, 2017) indicate that European SMEs' cumulative impact on the environment is substantial. Recognizing the potential contribution of SMEs, the European Commission introduced the Green Action Plan for SMEs in Europe, which aims to guide SMEs to benefit from the opportunities offered by the green economy. In addition to taking resource efficiency actions and providing circular economy solutions, one of the actions to be taken by European SMEs, in this regard, is to introduce green products or services to the markets. The supply of green products or services by SMEs also serves to the twelfth of the "Sustainable Development Goals" (SDGs) of the United Nations (UN): Responsible Consumption and Production. Thus, as drivers of eco-innovation and key players of rising green industries, SMEs have a crucial position in achieving green growth. New and young SMEs, which take commercial and technological opportunities that are neglected or ignored by incumbent large enterprises, are particularly important for the introduction or development of green innovations on the market.

In spite of the potentially significant role of SMEs in the reduction of adverse environmental impacts via green products or services, there are not many studies on the supply of green products or services by SMEs' in the related literature (Hoogendoorn et al., 2015; Gupta and Barua, 2018). Existing studies are limited to specific sectors such as leather (Hernández Pardo et al., 2012); fishery (Bar, 2015), and furniture

(Susanty et al., 2016) or to certain countries such as France (Arfi et al., 2018). Furthermore, even though there is an abundance of empirical studies on drivers of eco-innovation, the financing of eco-innovations has received little attention in the related literature.

In the current study, we investigate the determinants of financing types of green products or services for the European SMEs. In doing so, we use the Flash Eurobarometer-Small and Medium-Sized Enterprises, Resource Efficiency, and Green Markets Survey (GESIS), which is conducted by including 27 EU countries and selected countries such as Norway, Iceland and the USA. We estimate a two-stage Heckman selection model. In the first stage, we estimate the determinants of the decision to produce green products or services while we focus on the financing of green product or services producers in the second stage. The results show that the financial adequacy of the European SMEs is critical for supplying green products or services. However, after a certain level, SMEs need further assistance to sustain producing green products or services. They need technical expertise. Hence, financial adequacy does not guarantee to sustain green production. In addition, SMEs without sufficient financial resources may search for external resources.

The results indicate that the determinants of financing types of green products or services differ by sector and country. SMEs in retail sectors finance their green production with their own resources, technical expertise, and external resources. As far as the sectors are considered, firms in the services sector tend to finance their green production by using external resources. Moreover, launching green products or services is less likely in middle-income countries in comparison to high-income countries. The results further indicate that there is no positive effect of turnover on types of green financing. The age of the establishment does not have a recognizable influence on the decision to launch a green product or service by an SME.

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