



An Empirical Study on Consumer Buying Behavior in Internet Shopping

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博士論文

An Empirical Study on
Consumer Buying Behavior
in Internet Shopping

2015年 1月 19日

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An Empirical Study on Consumer Buying Behavior in Internet Shopping

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Abstract

Prior studies have identified that consumer buying behavior is influenced by class of products, personal characteristics of shoppers, and seller types and attributes. This conclusion also applies to the context of online shopping. In this thesis, the author offers three essays to investigate the relationships of consumer online buying behavior with three influential factors, namely, product classes, consumer characteristics, and seller attributes.

In the first essay, the author posits that product class (i.e., search, experience, service, and credence products) significantly affects consumer online patronage intentions. To explore the relationship between product class and patronage intentions, this essay empirically examines the differences in patronage intentions among the four classes of products. On the basis of analysis performed on data gleaned from an Internet-based survey, this study demonstrates that consumer online patronage intentions are the highest for search and service products, followed by experience products, and lowest for credence products. In addition, this essay examines the reason for the difference of intentions by discussing the relationship between risk perceptions and product classes.

The second essay focuses on the relationship between consumer characteristics and patronage preferences for the Internet and local stores. To further clarify the mechanism, this essay performs a longitudinal survey to investigate the direct effects of consumer characteristics (i.e., gender, income, age, education, work status, experience of online shopping, and risk perception) on online patronage preference and the moderating effects of these socioeconomic factors on the relationship between the two goals (saving money and saving time) and consumer patronage preference. The findings in this essay suggest that personal characteristics (except for age and online experience) mainly impose indirect effects through interactions with money consciousness and time consciousness respectively, rather than directly influence consumer patronage preference. In addition, the study also examines the difference in risk perceptions among consumers with different patronage preferences.

The third essay examines the relationship between seller attributes and consumer online purchases. To investigate this relationship, in this study, the author applies an estimation of GMM with dynamic models, and discusses the effects of seller attributes, which involve sales volume, the number of reviews, sales price, seller reputation, and seller types, on the quantities of consumer online purchases by using objective panel data collected from Taobao China. The mainly findings in this essay suggest that 1). Buyers are more inclined to buy an item from a seller who sets low prices in online shopping; 2). Seller sales volume and the number of reviews in the current period relate positively to the quantity of consumer purchases in the next period; 3). Reputation is positively related to consumer purchases in online markets; and 4). *Ceteris paribus*, online shoppers prefer buying an item from B2C sellers than

from C2C sellers. In addition, this study also finds that the relationship between seller attributes and the quantities of consumer purchases differs across product classes and seller types.

Keywords

Perceived risk, Product classes, Online patronage intentions, Consumer characteristics, Patronage preference, Online purchase goals, Seller attributes, Consumer demand, Objective data, Dynamic model

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Chapter 1

Introduction

Prior studies have identified that consumer buying behavior is influenced by class of products, personal characteristics of shoppers, and seller types and attributes. This conclusion also applies to the context of online shopping. In this thesis, the author offers three essays to investigate the relationships of consumer online buying behavior with three influential factors, namely, product classes, consumer characteristics, and seller attributes.

1.1 Background

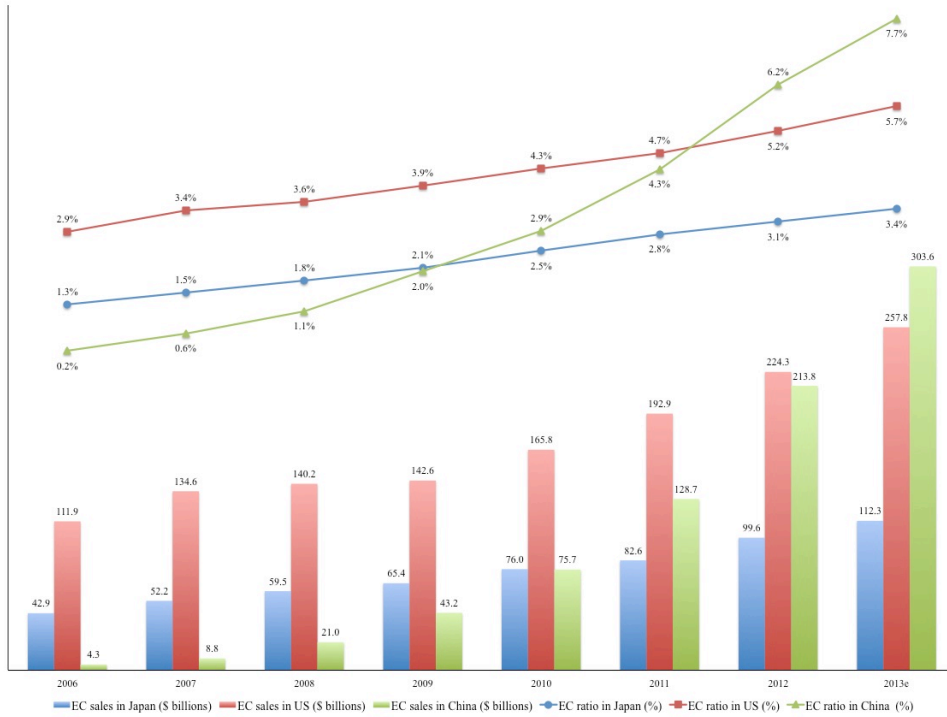
With the rapid growth of the Internet and the widespread popularity of e-commerce, online shopping has penetrated into our daily lives (Chen and Cheng, 2009; Lian and Lin, 2008). Reports from the World Bank and the U.S. Census Bureau declare that, in the last decade, more than 60% of the 2.8 billion Internet users worldwide have begun shopping on the Internet, making online shopping the fastest-growing activity among Internet users, and rocketing the development of E-commerce. Among all regions, as illustrated by e-commerce retail sales figures between 2006 and 2013e in figure 1.1,¹ the Asia/Pacific region provides the greatest potential in the world with regards to growth in e-commerce. For instance, the United States had nearly 200 million online shoppers and \$68.6 billion of goods were sold via the e-commerce website of eBay in 2011, more than \$2,100 every second (Ye et al., 2013). Similarly, in China, there were over 310 million online shoppers. Figure 1.2 reflects the estimates of Internet shopping in China from 2009 to 2016e. According to a survey published by the China Electronic Commerce Research Center, the total volume of trade in China's online retail markets was nearly 1.89 trillion RMB in 2013, with year-on-year growth of 42.8%, which accounted for 8.04% of total retail sales of consumer goods (CECRC, 2014)².

Along with the unceasing development of e-commerce, the importance of study on consumer buying

¹The latest statistics are up to November, 2013. "e" means estimate.

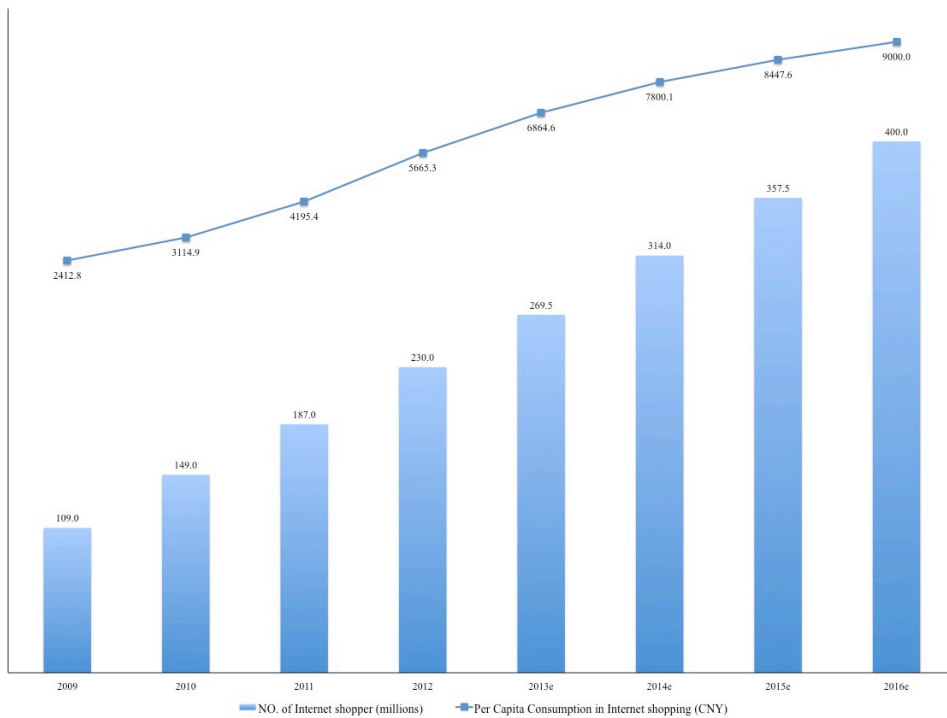
²"Data Monitoring of China's E-commerce Market in 2013". China Electronic Commerce Research Center. http://www.100ec.cn/zt/upload_data/down/2013ndbgqw.pdf

Figure 1.1: E-commerce Retail Sales In Japan, US, and China From 2006-2013e



Source: Statistical Report on E-commerce Development by eMarket, U.S. Census Bureau, and METI.

Figure 1.2: Internet shoppers in China From 2009-2016e



Source: Monitoring Report on Internet shopping by iResearch.

behavior in online shopping has received increased attention from researchers. Sheth (1983) has identified the influential factors for consumer behavior as 1). product types and characteristics; 2). personal characteristics of shoppers; and 3). seller attributes and types. A number of scholars have examined and cited Sheth's consumer behavior theory in their studies (e.g., Blakney and Sekely, 1994; McDaniel and Burnett, 1990; Noble et al., 2006; Sheth and Parvatlyar, 1995). Although most of those prior studies are primarily for consumer behavior in a traditional market, many recent studies have also confirmed that this conclusion applies to online shopping behavior as well (e.g., Girard and Dion, 2010; Gounaris et al., 2005; Lim and Dubinsky, 2004; Moon et al., 2008; Swinyard and Smith, 2003; Vijayasathy, 2002).

Based on Sheth's consumer behavior theory, the author focuses on the following three empirical issues in this thesis. Despite substantial related discussion in the literature (e.g., Bellman et al., 1999; Levin et al., 2005; Girard and Dion, 2010; Swinyard and Smith, 2003), the author claims that it is necessary to examine the following issues further.

1. *What kinds of products are most likely to be purchased online?*
2. *What types of consumer are most likely to purchase online?*
3. *What kinds of online sellers do consumers prefer buying from?*

For the first issue, many previous studies indicated that consumers prefer to shop online when the products are predominated by attributes such as a large selection or speed of shopping. In contrast, consumers are more likely to make an offline purchase when the products are predominated by attributes like personal service or user experience (e.g., Chiang and Dholakia, 2003; Girard et al., 2002; Levin et al., 2005). However, with the development in online markets, it is pointed out that many of the "traditional" offline products are being purchased via the Internet by some more recent studies (e.g., Bandara and Chen, 2011; Beldona et al., 2011; Chocarro et al., 2013).

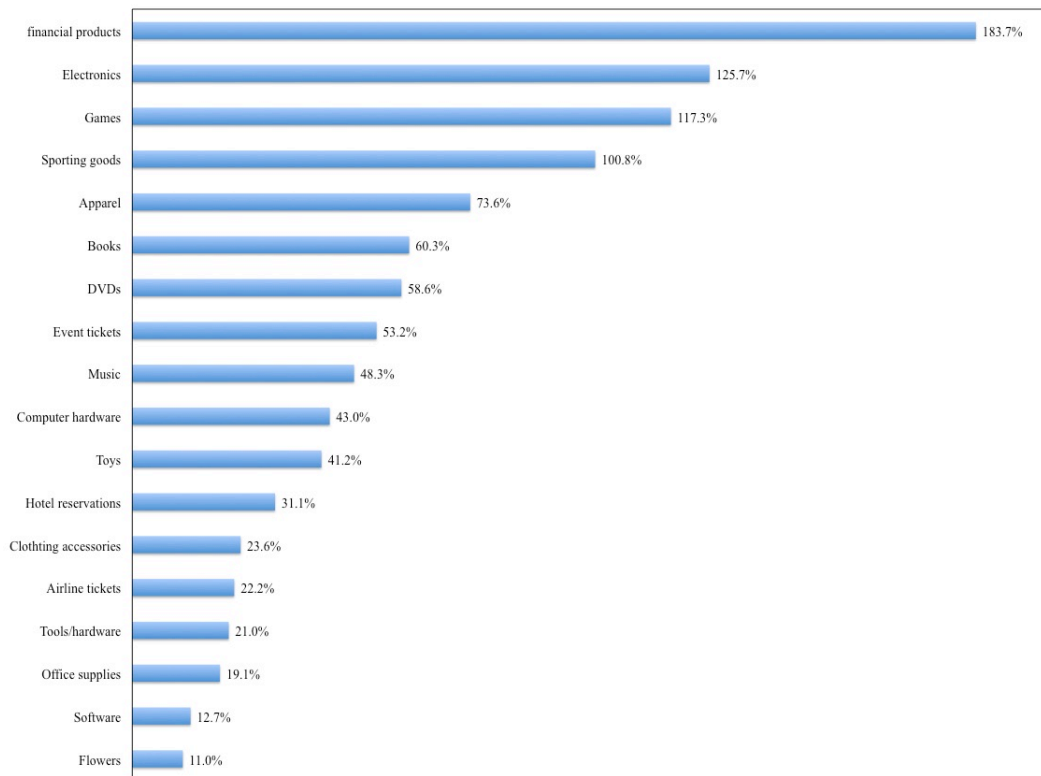
Figure 1.3 summarizes the percentage growth in online purchase frequency from 2002 to 2007 which was surveyed by Forrester.³ The results show that five of the fastest growing categories are financial products (183.7%), electronics (125.7%), games (117.3%), sporting goods (100.8%), and apparel (73.6%). Similarly, a survey conducted by iResearch⁴ in 2012 reported that the top 5 categories which consumers most shopped for online were Apparel/Footwear/Accessories, Mobile prepaid, Cosmetic/Personal care, Household Goods, and Books/Videos. Figure 1.4 shows the percentage of product categories in online shopping in 2012 in China.

For the second issue, personal characteristics of online shoppers are vital to determine their patronage preference (Sheth, 1983), and thus facilitate managers with insights to target consumers and position their product market. Many studies sought to understand what types of consumers are more likely to

³See <http://www.forrester.com/home/>

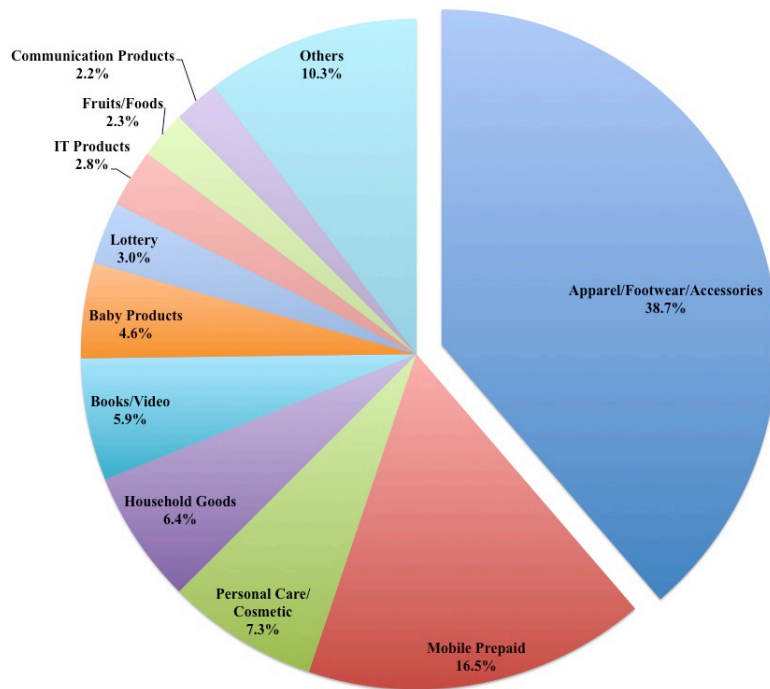
⁴See <http://report.iresearch.cn/>

Figure 1.3: Pct. growth in online purchase frequency from 2002 to 2007



Source: Forrester Research's Technographics Survey.

Figure 1.4: Pct. Buying product online in China at 2012



Remark: Observations of sample are 3039.

Source: Survey report of consumer online behavior by iResearch.

purchase online (Levin et al., 2005; y Monsuwé et al., 2004). However, most prior research focused on the statistical correlation between consumer characteristics and online patronage preference, and the conclusions were somewhat inconsistent (e.g., Bellman et al., 1999; Hernández et al., 2011; Swinyard and Smith, 2003). In addition, the discussions on indirect effects (i.e. moderating effects) of consumer characteristics on online patronage preference are also limited in the literature (Hansen and Jensen, 2009; Punj, 2012; Li and Huang, 2014).

Regarding the third issue, despite the importance of seller attributes on consumer buying behavior, most of the studies focus on the relationship between seller reputation and the growth of online sellers (e.g., Ye et al., 2013), and as such the literature lacks an empirical study that examines the relationship between seller attributes and consumer online purchases. In addition, because the existing studies usually only rely on surveys (attitudes, intentions, etc.), the analyses are statics, and the findings they identified may have some differences from the actual relationship. What's more, the moderating effects of product types and market types on the relationship between seller attributes and consumer online purchases have also not been considered in the literature.

Therefore, to fill the research gaps in the literature, the author further explores the relationships of consumer buying behavior in online shopping with these three influential factors, namely, product class, consumer characteristics, and seller attributes, through three in-depth analyses in this thesis.

1.2 Research Content

In this thesis, the author decides to perform the following three essays to further clarify the research issues.

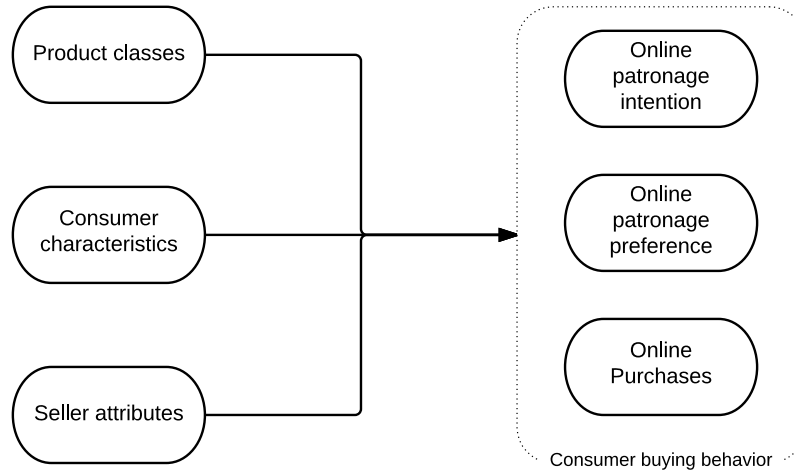
1. An in-depth analysis of the relationship between product classes and consumer online patronage intentions.
2. An in-depth analysis of the relationship between consumer characteristics and online patronage preference.
3. An in-depth analysis of the relationship between seller attributes and consumer online purchases.

Figure 1.5 represents the conceptual framework of this thesis.

Essay 1. In-depth Analysis of the Relationship between Product Classes and Online Patronage Intentions

In the first essay, the author focuses the research on the relationship between product classes and consumer online patronage intentions.

Figure 1.5: Conceptual framework for the research contents



In this essay, the author empirically examines the difference in consumer online patronage intentions among four classes of products (i.e., search, experience, credence, and service), and explores the reasons for the difference from the perspective of risk perceptions. To control for bias, the author conducts surveys in the United States, China, and Japan, which are three of the world’s largest online markets with different cultures and economic policies. Specifically, first, the author discusses the relationship between four product classes and consumer online patronage intentions, and finds that the intentions for online shopping are highest for search and service products, but lowest for credence products. Second, to explain the reasons for the finding, the author compares the amounts of six types of perceived risk (i.e., vendor, product performance, financial, psychological, time, and privacy) in the four product classes. As a result, the mean of the overall-risk is perceived as the lowest for search and service products, while it is perceived as the highest for credence products.

The main contribution of this essay is to further investigate the relationship between consumer online patronage intentions and four product classes. Compared with the existing research, this study adds service products as a separate class into SEC-product classification, and discusses the levels of perceived risks in different classes of products through a horizontal and vertical comparative analysis.

Essay 2. In-depth Analysis of the Relationship between Consumer Characteristics and Online Patronage Preference

In the second essay, the author focuses the research on the relationship between consumer characteristics and patronage preferences for the Internet and local stores.

In this essay, to draw a relatively general conclusion, the author performs an Internet survey in three of the world’s largest online markets with different cultures and economic policies – the United States, Japan, and China. Specifically, first, this essay re-examines the association between consumer charac-

teristics and patronage intentions for Internet and local stores on the basis of Bellman et al. (1999) and Swinyard and Smith (2003). Second, the author discusses the direct effects of consumer characteristics on the likelihood of online patronage preference after controlling for other potential cross-impacts. Third, to investigate the moderating effects of consumer characteristics, this study adds three explanatory variables of money-saved, time-saved, and delivery time, which all significantly affect customer online patronage preference, into the logit model, and examines the interactions between these three variables and socioeconomic characteristics variables. Based on the analysis, the author finds that the consumer characteristics (except for age and online experience) mainly impose indirect effects through their interactions with money consciousness and time consciousness respectively, rather than directly influencing their own patronage preference.

The main contribution of this essay compared with much of the prior research which focused on the statistical correlation between consumer characteristics and patronage preference (Bellman et al., 1999; Swinyard and Smith, 2003; y Monsuwé et al., 2004), is this essay not only explores the direct effects of consumer characteristics (i.e., gender, income, age, education, work status, experience of online shopping, and risk perception) on patronage preferences for the Internet and local stores through rigor methods, but also investigates the moderating effects of those socioeconomic factors on the relationship between the two goals of saving money and time and consumer online patronage preference.

Essay 3. In-depth Analysis of the Relationship between Seller Attributes and Consumer Online Purchases

In the third essay, the author focuses the research on the relationships of consumer online purchases with the factors of seller attributes.

This essay explores the relationship between seller attributes and consumer online purchases by using Taobao's transaction data. Specifically, this study examines the effects of sellers' previous sales volume, number of reviews, price, and reputations on consumer online purchases, and investigates the differences in these effects among different product classes and seller types. In the essay, the author collects a total of 12 types of products and 5797 sellers' monthly transaction data from Taobao China for the period from May, 2014 to November, 2014, and builds a dynamic model to discuss the empirical issue. The results statistically show that 1). Buyers are inclined to buy a search or experience product from a seller who sets low prices in online shopping; 2). Seller sales volumes and review numbers for the current period are positively related to the quantity of consumer purchases in the next period; 3). Reputation has a positive effect on consumer purchases, especially in C2C market; and 4). Online shoppers prefer buying an item from B2C sellers rather than from C2C sellers.

The main contributions of this essay are reflected in four points. First, this research introduces the theory of network externality to an online shopping context. Second, the author investigates the

differences in the relationship between seller attributes and consumer purchases across product classes and seller types. Third, the author applies a dynamic model to examine the relationship between seller attributes and consumer online purchases. Finally, compared with the prior studies that mainly rely on survey, the data used in the essay is objective panel data, which can truly reflect consumer buying behavior in Internet shopping.

1.3 Outline

To investigate the issues outlined above, the author has structured this thesis in a number of interrelated chapters.

In Chapter 2, on the basis of the consumer behavior theory of Sheth (1983), the author reviews the literature related to consumer buying behavior in online shopping from the perspectives of 1). perceived risk; 2). product classes and attributes; 3). consumer characteristics; and 4). seller attributes.

Chapter 3 introduces the in-depth analysis of the relationship between product classes and online patronage intentions. In this chapter, Section 2 reviews the literature related to product classification framework and perceived risk, and builds hypotheses. Section 3 presents research methodology, including data collection and descriptive statistics on the collected data. Section 4 presents the data analyses and the results. Section 5 concludes the essay with a discussion of the managerial implications of the findings and suggestions for future research.

Chapter 4 introduces the in-depth analysis of the relationship between consumer characteristics and online patronage preference. In this chapter, Section 2 features a literature review that grounds the key hypotheses. Section 3 reports the data collection practices and descriptive statistics on the collected data. Section 4 presents the econometric analyses and explicates the key findings that can be generated thereof. Finally, the author offers conclusions, and describes the implications in Section 5.

Chapter 5 introduces the in-depth analysis of the relationship between seller attributes and consumer online purchases. In this chapter, Section 2 reviews the literature and proposes the related hypotheses. Section 3 describes the research methodology, including data collection, variables measurement, and modeling techniques. Section 4 introduces the techniques of GMM models, and explains the estimated results. Lastly, Section 5 summarizes the findings, and describes the implications of the current research.

Finally, Chapter 6 concludes the whole thesis with the conclusions, contributions, and managerial implications of the current research, and provides some suggestions for future research.

Chapter 2

Literature Review

Sheth (1983) identifies that consumer buying behavior is affected by 1). product types and classifications; 2). personal characteristics of shoppers; and 3). seller attributes and types. In addition to Sheth's consumer behavior theory, the conceptual framework of this research is also rooted in the theory of perceived risk (Girard and Dion, 2010). Therefore, this thesis reviews the related literature from the following four perspectives:

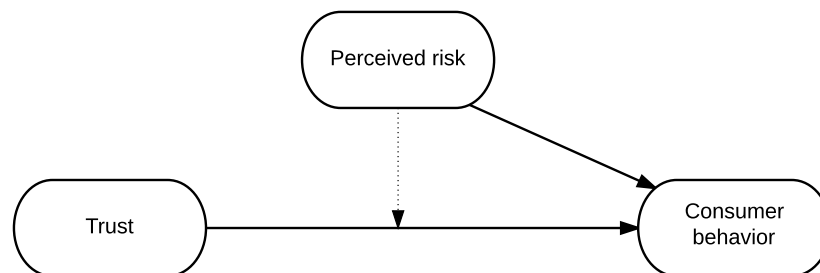
1. Perceived risk
2. Product classes and attributes
3. Consumer characteristics
4. Seller attributes

2.1 Perceived Risk

Despite the fast growth of online shopping, the phenomenon where consumers use information gathered online to make purchases off-line is still commonly observed (Forsythe and Shi, 2003). As well as in traditional markets, gaining consumer trust is also especially important for e-commerce marketers (Dimoka et al., 2012; y Monsuwé et al., 2004; Pavlou and Fygenon, 2006; Strader and Ramaswami, 2002). This is because consumers face uncertainty and potentially undesirable consequences and perceive risks (Dowling and Staelin, 1994; Taylor, 1974), which means consumer behavior involves risk-taking (Bauer, 1960). Perceived risk is a useful context to explain barriers to online shopping. Therefore, many existing studies have pointed out that perceived risk, which was in negative correlation with trust, affects consumer buying behavior in Internet shopping (Forsythe and Shi, 2003; Garbarino and Strahilevitz, 2004; Lim, 2003).

As shown in figure 2.1, according to the existing literature, perceived risks directly affect consumer willingness to buy (Stewart, 2003), and also moderate the relationship between trust and consumer behavior in online markets (Kim and Prabhakar, 2004). Many studies have found consumers perceive a relatively high risk in online shopping. Because of the asymmetry of information in online markets, consumers can only evaluate items through seller descriptions, but they cannot understand the detail of the items and services before buying (Ye et al., 2013). Also, the security of payment is another concern of consumers in online shopping (Forsythe and Shi, 2003; Sweeney et al., 1999).

Figure 2.1: The relationship between perceived risk and consumer behavior



Most of the perception studies pointed out that perceived risks in e-commerce are typically reflected in financial, product performance, social, psychological, physical, time loss, and privacy (Forsythe and Shi, 2003; Girard and Dion, 2010; Lim, 2003). In addition, since buyers and sellers are separated by time and distance, the quality of a seller on fulfillment is unknown before transacting (Ghose and Ipeirotis, 2009). Thus, the perceived risk in vendor is also a concern of many consumers.

Financial risk is usually regarded as an economic risk. It represents the possibility of monetary loss arising from online shopping, including the financial loss of a consumer whose credit card information is misused (Forsythe and Shi, 2003; Lim, 2003; Sweeney et al., 1999). Previous studies found that the major obstacle to online purchase has been cited as that consumers do not like to provide their credit card information over the Internet, because most of the consumers believe that their credit card information is easily stolen online (Caswell, 2000; Maignan and Lukas, 1997). Forsythe and Shi (2003) have summarized that consumer apparent sense of insecurity regarding online credit card usage stems primarily from a concern about financial risk.

Product performance risk mainly represents consumer worries about the quality of the products. Horton (1976) defines product performance risk as the loss incurred when a brand or product does not perform as expected. Most of the time, the dimension of product performance risk is similar to the usefulness or functionality of a product (Lim, 2003). Due to the distance gaps between buyers and sellers (Sheth et al., 1988), consumers can only evaluate items through seller descriptions, but the ability to judge product quality online may be limited by barriers to touching, feeling, and experiencing the product, inaccurate product colors and insufficient information on quality attributes relevant to the

consumer resulting in an increased product performance risk (Forsythe and Shi, 2003).

Psychological risk may refer to disappointment, frustration, and mental stress because of an unsuccessful experience (Jacoby and Kaplan, 1972). Compared with psychological risk, physical risk is the possibility that a product is harmful to an individual's health (Jacoby and Kaplan, 1972) or that a product does not look as good as the consumer expects (Shapiro and Varian, 1999). Many prior studies pointed out that an unpleasant experience during online shopping negatively affect consumer online purchase decisions or behavior in the next period (Hoffman et al., 1999).

Time loss risk refers to the loss of time, which means consumers spent more time than they expected. In earlier studies, the time loss risk is mainly reflected in inconvenience incurred due to difficulties in navigation and submitting orders (McCorkle, 1990; Roselius, 1971). In contrast, perceived time loss risk in the recent studies represents the possibility that consumers lose time because of delays in shipping (Liao and Keng, 2013). Li and Huang (2014) indicated that consumer preference to engage in online purchasing is heavily influenced if delivery takes more than four days. Some studies also pointed out that the perceived risk in time loss is usually fraught with financial risk because consumers fear the loss of express item when they receive products delays (Liao and Keng, 2013).

Privacy risk is the possibility that a consumer's personal information is collected and inappropriately used by sellers or businesses (Jarvenpaa and Todd, 1996; Lim, 2003; Nyshadham, 2000). Many Internet users worry about whether their personal information, such as home address, credit card information, and telephone number, will be disclosed through the Internet (Benassi, 1999; Forsythe and Shi, 2003; Maignan and Lukas, 1997).

Vendor risk refers to the reputation of a seller or business. Because of the time and distance gap between consumers and businesses, vendor risk becomes much more concerning to online shoppers (Ye et al., 2009, 2013). Many studies found that vendor risk has a significant correlation with all other six types of risk (Lim, 2003). In recent years, with the development of e-commerce, many platforms released the reputation scores of each seller to consumers to boost their confidence. Thus, overall risk in vendor refers to consumer concerns regarding whether a seller can provide a better service and whether a seller can fulfill the items as described (Utz et al., 2009; Ye et al., 2013).

Most of the research found that consumers most concerned with the perceived risk in financial, product performance, time loss, and vendor (Bhatnagar et al., 2000; Featherman and Pavlou, 2003; Garbarino and Strahilevitz, 2004; Girard and Dion, 2010; Lim, 2003). Although privacy concerns and psychological risk are two frequently cited reasons for not purchasing online (Maignan and Lukas, 1997; Benassi, 1999), the conclusions in Forsythe and Shi (2003) demonstrated that psychological and privacy risks did not significantly predict any of the Internet shopping behaviors examined. In contrast, the significant effects of psychological and privacy risks on customer online patronage preference are confirmed by Girard and Dion (2010). In addition, although payment security is of particular concern to consumers, the

development of information encryption technology and the widespread use of third party payment has enhanced consumer trust of payment in e-commerce (Chen et al., 2010), and so the negative effects of financial risk on online buying behavior have been progressively attenuated (Chellappa and Pavlou, 2002; Kim et al., 2010).

2.2 Product Classes and Attributes

Over a long period of time, product attributes have been treated as an essential predictor of whether a consumer will decide to purchase online (Levin et al., 2003, 2005; Sethuraman et al., 2005). Especially recently in the last 20 years, many studies have focused on why online shopping differs across products (Levin et al., 2003, 2005).

For the issue of “what types of products are most likely to be purchased online, ” most of the earlier studies focused on whether the key attributes of a product can be determined over the Internet (e.g., Chiang and Dholakia, 2003; Levin et al., 2003; Lynch et al., 2001). Chiang and Dholakia (2003) and Lynch et al. (2001) have shown that products which consumers need to touch or experience are mostly purchased in physical stores. Meanwhile, Levin et al. (2003, 2005) indicated that the special importance of being able to personally handle and inspect the product before purchasing underlies the preference for traditional in-shop purchase for products like clothing, health, and grooming products. In contrast, “low touch” products like tickets, CD or software are likely to be bought online because those products seldom need to be inspected before purchase (Chiang and Dholakia, 2003; Levin et al., 2005). In addition, the products which have higher brand awareness (Elliot and Fowell, 2000) or can have most of their key attributes determined over the Internet (Girard et al., 2002), and products which are clearly standardized (Grewal et al., 2004) have a relatively high likelihood to be purchased from the Internet. These conclusions can be summarized that consumers prefer purchasing online when products are predominated by attributes such as large selection or speed of shopping, and they prefer shopping offline when products are predominated by attributes like personal service or user experience (Girard et al., 2002; Levin et al., 2005).

According to the literature, the conventional product-classification framework—Convenience, Shopping, and Specialty (CSS), has been used to explain consumer choices for different types of physical retail outlets (Copeland, 1923). Therefore, many studies have focused on a relatively new product-classification framework which is called Search, Experience, and Credence, to examine the customer patronage preference instead of “high/low touch distinction” in recent years (Girard et al., 2002; Girard and Dion, 2010; Wan et al., 2012). Although the number of studies on the direct effect of product classes on purchase intentions for different types of retailers is relatively small, a significant relationship between product classes and preference for shopping online has been found in the literature (Girard et al., 2002; Girard

and Dion, 2010; Levin et al., 2005).

The SEC-product classification framework has been evolving for nearly 40 years (Darby and Karni, 1973; Nelson, 1970, 1974). However, the discussions on the saliency of its operationalization in the context of online and offline shopping are still limited (Girard and Dion, 2010; Viswanathan and Childers, 1999). Girard and Dion (2010) summarized that the definitions of the SEC-products include the levels of availability of information, uncertainty, and cost/difficulty consumers encounter in obtaining and evaluating the attribute information of products.

The characteristics of search products are that most of the information for product attributes (price, quality, performance, size, color, style, safety, etc.) can be easily obtained from the Internet, which means consumers can confidently evaluate the quality before purchase (Wan et al., 2012). The typical products for the “search” class are things such as books and CDs.

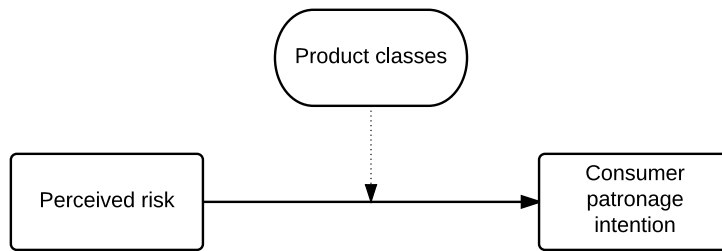
Experience products are identified as those whose relevant attribute information cannot be easily known from the Internet, which means that consumers can only evaluate the quality once they are consumed or serviced (Girard and Dion, 2010; Nelson, 1974; Wan et al., 2012). Furthermore, on the basis of the cost/difficulty of information search, Klein (1998) divided experience products into 2 types: (1). full information on dominant attributes cannot be known without direct experience, like wine, cosmetics; (2). information search for dominant attributes is more costly/difficult than direct experience, such as digital cameras, and some OEM products.

Credence products are defined as those whose relevant attribute information is not available prior to or for a considerable period of time after the use of the product/service, which means that consumers cannot evaluate the quality until a long time after the purchase. Some typical products for “credence” classes in many prior studies involve vitamins, auto insurance (Wan et al., 2012), and supplements (Girard and Dion, 2010).

Related literature shows that customer patronage intentions for the Internet are the highest for search products, followed by experience products, and the lowest for credence products (Alba et al., 1997; Girard et al., 2002; Girard and Dion, 2010; Wan et al., 2012).

Girard and Dion (2010) indicated that the relationship between product classes and customer patronage preference is rooted in the theory of perceived risk. This is because both the SEC product classification framework and the theory of perceived risk involve information integrity (Kim et al., 2008; Lim, 2003; Nicolaou and McKnight, 2006). For instance, as the information on product attributes for the search class can be easily determined over the Internet, it can be regarded as complete information by consumers, which makes the level of perceived risk decreased. The relationship between product attributes and perceived risk has been widely discussed in previous studies (Chaudhuri, 1998; Girard and Dion, 2010; Mitra et al., 1999; Phau and Poon, 2000). The types of risk perceived by consumers are mostly specific to product characteristics and the availability of information/uncertainty about a

Figure 2.2: The relationship between product classes and consumer patronage intentions



product’s attributes (Girard and Dion, 2010). Therefore, it is considered that product classes moderate the relationship between perceived risk and consumer online patronage intentions (See figure 2.2).

Chaudhuri (1998) indicated that the level of overall risk perception of the product is determined by product classes. In the research of Girard and Dion (2010), it was found that the amount of overall risk consumers perceive for product classes is the lowest for search, followed by experience, and the highest for the credence products.

Due to the characteristics of search products, in that complete information is available over the Internet, they are the easiest to evaluate compared with other classes of products. Mitra et al. (1999) demonstrated that the level of risk perception gradually increased from search to experience to credence products. Girard and Dion (2010) found that all types of risks, including financial, product performance, social, psychological, physical, and time loss, are perceived as being significantly higher for search products compared with experience and credence products.

Compared with search products, information on experience product attributes cannot be easily gained from the Internet. It increases the complexity and cost of obtaining the relevant product attribute information (Chaudhuri, 1998; Li et al., 2002; Nelson, 1974). Previous studies suggested that because of the uncertainty, perceived financial risks and risks in product performance are relatively high for experience products (Girard et al., 2002; Levin et al., 2005). In contrast, consumers would be more willing to take time to confirm the relevant information before making a purchase (Li et al., 2002). However, in the research of Girard and Dion (2010), it was found that product performance, financial, and time loss are the three most perceived risks for experience products.

Given the characteristics of credence products, in contrast to experience goods, consumers cannot evaluate the quality even a long time after purchase (Darby and Karni, 1973; Nelson, 1974; Wan et al., 2012). Mitra et al. (1999) revealed that the perceived financial, social, and psychological risks are much higher for credence products than for the other products. This is because the utility gain or loss of credence goods is difficult to measure after consumption as well. In light of the level of uncertainty being highest for credence products (Hsieh et al., 2005; Mitra et al., 1999), Girard and Dion (2010) extend Mitra et al. (1999)’s study, and found that all types of risk, involving financial, product performance, social, psychological, physical, and time loss are perceived to be significantly higher for credence products

Table 2.1: Summary of product classes

Products	Attributes	Risk perceptions
Search	(1). Most of the information of product attributes can be easily obtained from Internet; (2). Consumers can confidently evaluate the quality of before the purchase.	The level of risk perceptions is gradually increased from search to experience to credence products [Mitra et al., 1999]. All types of risks are perceived significantly higher for search products than for experience and credence products [Girard and Dion, 2010].
Experience	(1). Relevant attribute information can not be easily known from Internet; (2). Consumers can evaluate the quality of once they are consumed or serviced.	Perceived risks in product performance and financial are relatively high [Girard et al., 2002; Levin et al., 2005; Li et al., 2002].
Credence	(1). Relevant attribute information is not available prior to and after the use of the product/service for a considerable period of time; (2). Consumers cannot evaluate the quality of even a long time after the purchase.	The level of uncertainty is the highest [Hsieh et al., 2005; Mitra et al., 1999]. The perceived risks in financial, social, and psychological are much higher for credence products than for other products [Mitra et al., 1999]. All types of risks are perceived higher than for search and experience products [Girard and Dion, 2010].

than search and experience products.

Table 2.1 summarizes the characteristics of product classes and the relationship between product classes and risk perceptions.

2.3 Consumer Characteristics

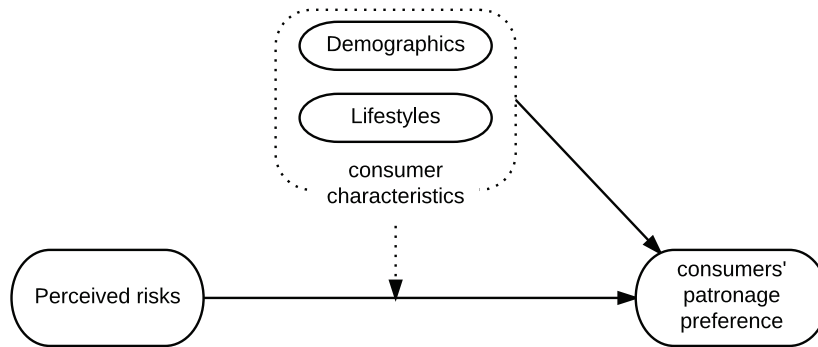
Personal characteristics of online shoppers are vital to detect their patronage preference. Sheth (1983) has also indicated that customer patronage preference will be influenced by consumer characteristics. In many previous studies, personal characteristics include demographics and lifestyle (e.g., Bellman et al., 1999; Girard and Dion, 2010; Rohm and Swaminathan, 2004; Susskind, 2004). In addition to Sheth's patronage preference theory, Chaudhuri (1998) has pointed out that the level of risk perception is also an important factor in affecting purchase intentions due to the risk-taking nature of consumer behavior decisions (Bauer, 1960). Figure 2.3 draws the relationship between consumer characteristics and patronage preference.

In this section, the author reviews the characteristics of demographics, lifestyles, and their relationship with risk perceptions in online shopping, on the basis of the existing literature.

2.3.1 Demographics

In many previous studies, characteristics of consumer demographics involve gender, age, education, income level, and cultural differences, etc (e.g., Bellman et al., 1999; Garbarino and Strahilevitz, 2004; Hernández et al., 2011; Swinyard and Smith, 2003).

Figure 2.3: The relationship between consumer characteristics and patronage preference



Gender difference as an important factor, has been largely discussed to explain online shopping behavior (e.g., Rodgers and Harris, 2003; Chang et al., 2004; Chiu et al., 2005). Although there is a lot of evidence suggesting that females have also made a significant contribution to the development of e-commerce (Dennis et al., 2010; Hasan, 2010), unlike in traditional markets which is performed by females, males prefer buying an item on the Internet (Bae and Lee, 2011; Slyke et al., 2002; Yang and Wu, 2006). As for the reasons for these observations, Comber et al. (1997) explained that it is because male consumers have greater experience with, and more positive attitudes toward computers and the Internet than females. Li and Huang (2014) found that male consumers are inclined to make an online purchase decision because of time consciousness. Compared with female consumers, men are usually results-oriented in their shopping behavior (Chang et al., 2004; Sebastianelli et al., 2008; Zhou et al., 2007). As introduced previously, perceived risk negatively related to the preference for online patronage (Bhatnagar et al., 2000; Forsythe and Shi, 2003; Lim, 2003). In the view of risk perception, the existing literature suggested that women perceive a higher level of risk in online purchasing than do men. In addition, having a site recommended by a friend leads to both a greater reduction in perceived risk and a stronger increase in willingness to buy online among women, compared to among men (Garbarino and Strahilevitz, 2004).

Despite the mixed findings on the relationship between age and online shopping intentions in the literature (Bellman et al., 1999; Hernández et al., 2011; Korgaonkar and Wolin, 1999; Rohm and Swaminathan, 2004), most of the prior research indicated that young consumers are more likely to purchase online (Bellman et al., 1999; Swinyard and Smith, 2003). Compared with middle-aged and old-aged people, young people use e-commerce much earlier and longer, and prefer to get information by searching on the Internet (Chiou-Wei and Inman, 2008). It makes youth relatively quick to accept online shopping. And because of the important generational differences in the use of the Internet, many prior studies also indicated that young shoppers trusted e-commerce more, and perceived less risk for online shopping than seniors do (Hernández et al., 2011; Rohm and Swaminathan, 2004). In addition, due to a relatively high financial burden and working pressure, young people have less disposable income and discretionary time

than others. As saving money and saving time are two of the most important reasons related to online shopping, a number of recent studies demonstrated that age potentially moderates the effect of mental accounts on online purchase goals (i.e., saving money and saving time) of interest (Li and Huang, 2014; Punj, 2012).

Online shoppers tend to be better educated (Bellman et al., 1999; Liao and Cheung, 2001). This is because those people adopt the Internet relatively early (Swinyard and Smith, 2003). Related studies demonstrated that more educated consumers are more capable of processing information during their shopping (Henry, 1980; Hult et al., 2004). Also, consumers with better education seem to be more likely to engage in an extended search for information and make greater use of price information (Beatty and Smith, 1987; Punj, 2012; Russo et al., 1975). In addition, some studies found that education level negatively related to the degree of risk perception in online shopping (Connolly and Bannister, 2008). However, the finding in the study of Li and Huang (2014) indicated that education level produces no effect on online shopping.

Income is positively related to online shopping tendency. In consumer behavior theory and economic theory, income is always regarded as an important factor to predict consumer demand (Bouis, 1994; Kagel et al., 1981). Most of the previous research found Internet shoppers to be wealthier (Bellman et al., 1999; Swinyard and Smith, 2003). One possible economic explanation attributes it to the law of diminishing marginal rates of substitution that drives higher-income consumers in their tendency to have more interest in the time-saving characteristics of online shopping. According to the literature, shopping online helps consumers to reduce the cost of search time and transportation time (Okada and Hoch, 2004; Punj, 2012). In addition, many studies suggested that consumer income has a positive and strong correlation with their education level, which is negatively related to risk perception and positively related to online patronage preference (Li et al., 1999; Susskind, 2004).

In addition to those personal socioeconomic characteristics, previous studies also mentioned that consumer patronage preference may be influenced by cultural differences (Bosnjak et al., 2007; Gefen, 2000; Overby and Lee, 2006) and economic policies (Dür and Elsig, 2011; Kacen et al., 2013), though empirical research on those influences is still limited. The existing studies found that consumers from an individualistic culture are more likely to use the Internet for e-commerce than those from a collectivistic culture. Furthermore, a more masculine society has more predominant male shoppers and is more involved in online shopping (Chau et al., 2002; Park and Jun, 2003; Shiu and Dawson, 2002; Stafford et al., 2004; Zhou et al., 2007).

2.3.2 Lifestyles

Compared with the characteristics of consumer demographics, the literature suggested that consumer lifestyle has more influence on online shopping.

Experience in online purchasing is positively related to online shopping tendency but negatively related to the likelihood to abort an online transaction (Brown et al., 2003; Zhou et al., 2007). Much prior research found that Internet usage is regarded as the most important factor to predict consumer online shopping intentions (Bellman et al., 1999; Liao and Cheung, 2001; Lohse et al., 2000). By comparing those who did and did not make purchases online, Swinyard and Smith (2003) found that online shoppers seem to be more computer literate and more likely to spend time on the computer. Similarly, as has been reviewed by Levin et al. (2005), Bellman et al. (1999) also found that typical Internet shoppers experience a more “wired lifestyle” and are more time-constrained than consumers who have less online shopping experience. A “wired lifestyle” is regarded as a critical predictor of consumer perceptions of risk related to Internet shopping, characterizing consumers who frequently and expertly use the Internet (Bellman et al., 1999; Lohse et al., 2000; Moe and Fader, 2004). It means that shoppers who have extensive online experience are more likely to make an online purchase decision because such consumers have a relatively high ability to process information from the Internet (Levin et al., 2005). In addition, Internet usage is negatively related to perceived product risk (Liao and Cheung, 2001; Nysveen and Pedersen, 2004). For instance, Li and Huang (2014) found that having engaged in online shopping can attenuate consumer perceptions of risk related to delivery time. On the other hand, in the study of Hernández et al. (2011), the finding suggested that the experience acquired while shopping online nullifies the importance of socioeconomic characteristics.

Time constraint is rooted in the negative effect of learning about products in physical stores (Lohse et al., 2000; Swinyard and Smith, 2003). Previous studies found Internet shoppers to be more time-constrained than non-Internet shoppers (Bellman et al., 1999; Levin et al., 2005; y Monsuwé et al., 2004). This is because economic theory stipulates consumers will balance time-related costs on the basis of the economic value they place on that time (Leclerc et al., 1995; Okada and Hoch, 2004; Punj, 2012), which indicates that time-starved people tend to value their time more than those with extensive time resources. Given that, Punj (2012) indicated that consumers who have more time and less income exhibit a greater tendency toward saving money by purchasing online, while those who are “income rich and time poor” show interest in saving time.

Taken together, table 2.2 summarizes the literature on the effects of consumer characteristics on online shopping behavior, including demographics, psychological perception, and online shopping experience.

2.4 Seller Attributes

In addition to product types and consumer characteristics, consumer behavior will also be influenced by seller-related factors (Sheth, 1983; Girard and Dion, 2010). In recent years, the importance of seller attributes in online shopping has attracted increasing attention from researchers and business managers

Table 2.2: Summary of studies on consumer characteristics related to online shopping

Factor types	Individual factors	Surveyed studies	Major findings
Demographics	Gender	[Alreck and Settle 2002; Brown et al. 2003; Donthu and Garcia 1999; Korgaonkar and Wolin 1999; Levy 1999; Li et al. 1999; ; Rodgers and Harris 2003; Slyke et al. 2002; Stafford et al. 2004]	Male consumers make more online purchases and spend more money online than females; they are equally or more likely to shop online in the future, and are equally or more favorable of online shopping. Women have a higher-level of web apprehensiveness and are more skeptical of e-business than men.
	Age	[Bellman et al. 1999; Bhatnagar and Ghose 2004b; Bhatnagar et al. 2000; Donthu and Garcia 1999; Joines et al. 2003; Korgaonkar and Wolin 1999; Li et al. 1999; Rohm and Swaminathan 2004; Stafford et al. 2004]	There are mixed findings on the relationship between age and online shopping intention.
	Income	[Bagchi and Mahmood 2004; Donthu and Garcia 1999; Korgaonkar and Wolin 1999; Li et al. 1999; Susskind 2004]	Income is positively related to online shopping tendency.
	Education	[Bagchi and Mahmood 2004; Bellman et al. 1999; Donthu and Garcia 1999; Li et al. 1999; Liao and Cheung 2001; Susskind 2004]	Education level produces mixed effects ranging from no effect to a positive effect on online shopping.
	Culture	[Chau et al. 2002; O'Keefe et al. 2000; Park and Jun 2003; Park et al. 2004; Shiu and Dawson 2002; Stafford et al. 2004]	Consumers from an individualistic culture are more likely to use the Internet for e-commerce than those from a collectivistic culture A more masculine society has more predominant male shoppers Perceived risk is negatively related to online shopping intention.
Psychological perception	Risk perception	[Bhatnagar and Ghose 2004a; Bhatnagar and Ghose 2004b; Bhatnagar et al. 2000; Featherman and Pavlou 2003; Garbarino and Strabilevitz 2004; Huang et al. 2004; Jarvenpaa and Todd 1997; Jarvenpaa and Tractinsky 1999; Jarvenpaa et al. 1999; Joines et al. 2003; Kolsaker et al. 2004; Liang and Jin-Shiang 1998; Liao and Cheung 2001; Park et al. 2004; Pavlou 2003; Pires et al. 2004]	
Online Shopping experience	Benefit perception	[Chen et al. 2002; Limayem et al. 2000; Pavlou 2003]	Perceived usefulness is positively related to the intention to purchase online.
	Frequency of Internet usage	[Bhatnagar and Ghose 2004b; Bhatnagar et al. 2000; Cho 2004; Citrin et al. 2000; Jarvenpaa and Todd 1997; Jarvenpaa and Tractinsky 1999; Liao and Cheung 2001; Nysveen and Pedersen 2004; Park 2002]	There are mixed results for the effects of Internet usage on online shopping intention. Internet usage is negatively related to perceived product risk.
	Frequency of online purchases	[Brown et al. 2003; Cho 2004; Foucault and Scheufele 2002; Moe and Pader 2004; Park and Jun 2003; Yang and Lester 2004]	Frequency of purchases is positively related to online shopping tendency and negatively related to the likelihood to abort an online transaction.
	Satisfactory levels about past online transactions	[Cho 2004; Devaraj et al. 2002; Foucault and Scheufele 2002; Koivumi 2001; Pires et al. 2004]	Previous satisfaction has a positive relationship with online shopping tendency

Note: Revised on the basis of Zhou et al. (2007)

alike, and many of the studies have focused on the relationship between seller attributes and consumer online purchases (e.g., Archak et al., 2011; Korgaonkar et al., 2006; Utz et al., 2009; Ye et al., 2013). In the literature, characteristics of seller attributes in online shopping involve sales volume (Li and Liu, 2007; Resnick and Zeckhauser, 2002; Ye et al., 2013), price information (Brynjolfsson and Smith, 2000; Goel et al., 2010), business reputation (Ba and Pavlou, 2002; Hou, 2007; Ye et al., 2009, 2013), convenience, perceived value (Eastlick and Feinberg, 1999), service, firm size, and business pattern (e.g., B2C, C2C) (Fan et al., 2013; Li and Liu, 2007; Jones and Leonard, 2008; Oh, 2002). In this thesis, the author generalizes the above attributes into the following three groups: (1). Sales performance; (2). Reputation and trust; and (3). Seller types.

This section reviews the characteristics of the three groups of seller attributes on the basis of the existing literature. Table 2.3 summarizes the studies on the relationships between seller attributes and consumer purchases.

2.4.1 Sales Performance

According to marketing and retailing theory, sales price and sales volume are two important indicators to measure a firm or seller's sales performance. Meanwhile, these two indicators also significantly influence the quantities demanded by consumers (Goel et al., 2010; Porter, 1974; Voss et al., 1998).

In economic theory, following the law of demand, the demand curve is almost always represented as downward-sloping, meaning that as price decreases, consumers will buy more of the good (Varian and Norton, 1992). However, the demand curve may be upward-sloping when the item is a Veblen good (Veblen, 2005). Previous studies have demonstrated that most of the commodities in online markets accord to the law of demand (Degeratu et al., 2000), while a price premium may occur for some brand goods (Kwon and Lennon, 2009; Rios and Riquelme, 2008). In addition, since the online market has relatively low entry barriers, the number of sellers in online markets seems to be larger than in traditional markets (Chan et al., 2007; Forman et al., 2009; Goolsbee, 2001). Therefore, online markets are regarded as a perfectly competitive market by many researches (Brynjolfsson and Smith, 2000). In the classic economic model, firms in perfectly competitive markets usually lower their price to increase their sales volume, until the sales price is equal to the marginal revenue (Varian and Norton, 1992). Based on this theory, many empirical studies indicated that new online sellers usually compete for customers with other sellers by a using penetration pricing strategy (Ellis-Chadwick et al., 2009).

On the other hand, seller total sales volume is considered to directly represent the total quantities demanded by consumers by many economic and retailing studies (Chen et al., 2001; Chiang et al., 2003; Chen et al., 2004). Therefore, sales volume usually serves as an explained variable in many studies. However, in light of the theory of network externality, a seller's previous sales volume may positively relate to subsequent consumer purchases (Liebowitz and Margolis, 1994; Lin and Lu, 2011; Katz and

Table 2.3: Summary of studies on seller attributes related to consumers' purchases

Factor types	Individual factors	Surveyed studies	Major findings
Sales performance	Sales price	[Brynjolfsson and Smith, 2000; Ellis-Chadwick et al., 2009; Goel et al., 2010; Rao and Bergen, 1992]	(1). The law of demand: the price of a product increases, quantity demanded falls. (2). Price premium: the price increase, the demand also increase.
	Sales volume	[Backer, 1999; Li and Liu, 2007; Limayem et al., 2000; Porter, 1974; Shapiro and Varian, 1999]	Sales volume represent the quantities of consumer demand; Demand by a typical consumer is positively related to quantities demanded by other consumers.
Reputation	Reviews	[Archak et al., 2011; De Maeyer, 2012; Zhu and Zhang, 2010]	The volume and textual contents of product reviews are important determinants of consumers' choices
	eWoM	[Gruen et al., 2006; Gu et al., 2012; King et al., 2014; Park and Lee, 2009]	External WOM sources have a significant impact on the retailer's sales.
	Reputation ratings	[Ba and Pavlou, 2002; Hou, 2007; Ghose and Ipeirotis, 2009; Ye et al., 2009, 2013]	(1). Reputation reduce consumers' risk perceptions, enhance the trust between buyers and sellers, and contribute to a better sales performance. (2). Reputation have a positive impact on consumers' purchase; Reputation has a significant correlation with price premium in thin markets.
	Feedback	[Cabral and Hortacsu, 2010; Houser and Wooders, 2006; Melnik and Alm, 2002; Ye et al., 2009, 2013]	Positive feedback is positively related to consumers' purchases, while negative feedback negatively affect the purchases; The effect of negative feedback on consumers' purchase significantly higher than positive feedback.
Seller types	B2C	[Fan et al., 2013; Jones and Leonard, 2008; Jeon et al., 2008; Li and Liu, 2007; Oh, 2002; Westland and Clark, 1999; Wigand, 1997; Ye et al., 2013]	(1). Industry level: little number of sellers; relatively positive sales performance. (2). Resources level: large scale of business; excellent sales channel; capital well-funded. (3). Reputation: well trusted
	C2C		(1). Industry level: large number of sellers; intertype competition; relatively low price. (2). Resources level: small scale of business; resource-constrained. (3). Reputation: weak reputation; "losing to win."

Shapiro, 1985). For instance, Becker (1991) found that the demand by a typical consumer is positively related to the quantities demanded by other consumers. Although Becker's network externality theory has not been empirically confirmed in an online shopping context, several studies have observed that online shoppers exhibit a greater tendency towards making a purchase decision based on the sales volume in a previous period. Li and Liu (2007) noticed that shoppers in Taobao China prefer ranking online stores by the accumulated sales volume in the previous 30 days before they purchase. This is because of the incomplete information in online markets, which makes shoppers evaluate the sellers and items by checking the sales volume of each seller (Shapiro and Varian, 1999).

2.4.2 Reputation and Sales Performance

Existing studies related to seller attributes focus on the relationship between seller reputation and sales performance. Most of the research has indicated that reputation is positively related to sales performance in not only traditional markets but also online markets (Cabral and Hortacsu, 2010; Ghose and Ipeirotis, 2009; Houser and Wooders, 2006; Ye et al., 2013).

As introduced above, because of the existence of the information asymmetry, consumers face uncertainty and potentially undesirable consequences and perceived risks in online markets (Dimoka et al., 2012; Dowling and Staelin, 1994; Taylor, 1974). Unlike purchases in traditional markets where buyers can buy face to face with retailers, buyers and sellers are separated by time and distance in online markets (Ghose and Ipeirotis, 2009), which means consumers in online markets can only evaluate items through seller descriptions (Ye et al., 2013).

The importance of reputation is mainly embodied in that it can reduce consumer risk perceptions (Jones and Leonard, 2008; Li and Zhang, 2002), enhance the trust between buyers and sellers (Ba and Pavlou, 2002; Utz et al., 2009), and contribute to better sales performance (Ghose and Ipeirotis, 2009; Hou, 2007; Ye et al., 2013). Therefore, many e-commerce platforms have introduced reputation mechanisms by releasing seller reputation scores and item reviews to consumers to boost their confidence (Bolton et al., 2004; Fan et al., 2013).

Reputation positively related to seller sales volumes (Dewan and Hsu, 2004; Resnick and Zeckhauser, 2002; Ye et al., 2009, 2013; Zhang and Zhang, 2011). Among them, Resnick and Zeckhauser (2002) found a seller's reputation has a high correlation with their sales volume on eBay. Likewise, Dewan and Hsu (2004) also noticed that reputation significantly related to the likelihood of sales on eBay auction. In a different country and e-commerce platform, Li and Liu (2007) introduced that a good reputation can help a seller to win the opportunities of sales on Taobao and eBay China. Similar results are also demonstrated in Ye et al. (2009, 2013), which pointed out that positive feedback positively related to subsequent seller sales volume on Taobao, while negative feedback reduced the probability of sales. According to consumer behavior theory, this is because reputation negatively mediates the level of risk

perception, which is negatively related to consumer online shopping and e-commerce usage (Howard, 1977; Kim et al., 2008; Ye et al., 2013).

On the other hand, reputation has a positive correlation with price premium (Ba and Pavlou, 2002; Melnik and Alm, 2002; Hou, 2007). Many studies have indicated that reputation is a statistically and economically significant determinant of price (Houser and Wooders, 2006; Ye et al., 2013). Especially in online markets, because of imperfect information, it is difficult for consumers to observe the real qualities of the item or service (Ye et al., 2013). Therefore, reputation usually serves as a proxy for quality in much research (Shapiro, 1983; Shapiro and Varian, 1999; Strader and Ramaswami, 2002). As the positive correlation between price and quality is caused by vertical differentiation, consumers may willing to pay more money to purchase from sellers who have a good reputation (Jones and Leonard, 2008; Ye et al., 2009, 2013). As shown in Ye et al. (2013), the majority of studies have demonstrated that reputation has a significant positive impact on price premium in online retailing (Ba and Pavlou, 2002; Depken and Gregorius, 2010; Jin and Kato, 2006; Kim and Xu, 2007). From the viewpoint of risk perception, this is because consumers value trust in the seller over price (Biswas and Biswas, 2004; Tan, 1999; Ye et al., 2013).

In addition to the reputation scores which are published by each e-commerce site (Grosskopf and Sarin, 2010; Fan et al., 2013), shoppers evaluate a seller's reputation through reviews and eWoM (i.e., word of mouth). Substantial research in the last 5 years shows the great interest in the volume and textual contents of customer reviews and eWoM (Archak et al., 2011; De Maeyer, 2012; Gruen et al., 2006; Gu et al., 2012; King et al., 2014). Most of them suggested that customer reviews and e-WoM are important determinants of consumer choices (Doh and Hwang, 2009; Park et al., 2007; Zhang et al., 2010). Based on the textual contents of the reviews and eWoM, many studies indicated that positive content is positively related to consumer purchases, while bad content has negative effects on the demand (Archak et al., 2011; De Maeyer, 2012; Park and Lee, 2009). Furthermore, Gu et al. (2012) found that a retailer's internal eWoM has a limited influence on its sales of high-involvement products, while external eWoM sources have a significant impact on the retailer's sales.

2.4.3 Seller Types

In the last decade, consumer-oriented e-commerce is one of the main development directions of the Internet because it has received increased attention (Ariely et al., 2005; Laudon and Traver, 2007; Martinsons, 2008; Piao et al., 2010). In the theory of consumer marketing, online markets are usually separated into B2C types and C2C types. As the name suggests, the distinction between these two types is the form of the seller. B2C sellers are officially registered commercial companies. By contrast, C2C sellers are individual agents, or even just curiosity shops, with occasional sales practices and short-term (Laudon and Traver, 2007; Wigand, 1997).

In form, B2C (Business to Consumer) e-commerce is also known as online retailing. The most representative of B2C platforms in the e-commerce environment include Amazon, Rakuten, Jingdong, and Tmall, in which companies sell their online goods to consumers who are the end users of their products or services (Laudon and Traver, 2007). The C2C (Consumer-to-Consumer) marketing model for e-commerce involves electronically facilitated transactions between consumers through some third party, where a consumer sells his or her goods online to other consumers, like eBay and Taobao (Li and Liu, 2007).

Prior studies related to seller type usually focused on their characteristics, which involve industry level, sales performance, business size, resources, competition, reputation level, growth and survival (Coad et al., 2013; Madden et al., 2013; Oh, 2002; Wang et al., 2013).

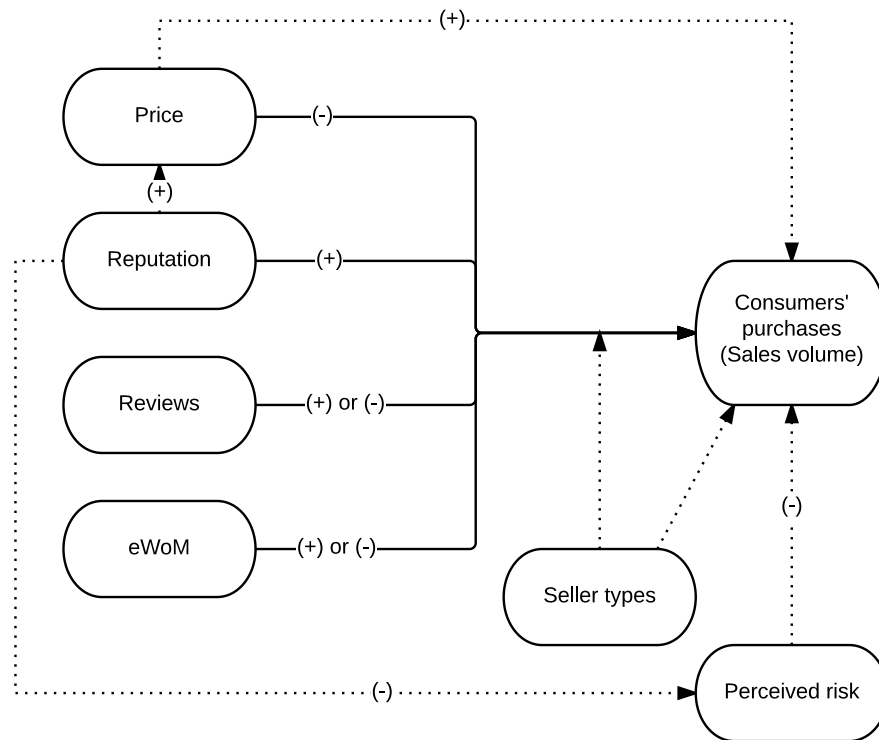
First, at the industry level, although B2C and C2C platforms are both retailing e-marketplaces, they are distinct in nature and have notable differences. The number of sellers in C2C markets is higher than in B2C markets. For instance, in China only, there are more than 12 million C2C online sellers but only 30 thousand B2C business firms (CECRC, 2014¹). Since a huge number of C2C sellers exist in online markets, the market, especially for C2C markets, tends to perfect competition. Compared with B2C sellers, C2C sellers in online markets are highly homogeneous and face relatively high inter-type competition (Jie, 2012; Mileti et al., 2011). In addition, many studies suggested that the price of an item is set lower by C2C sellers than by B2C sellers (Westland and Clark, 1999).

The second focus in prior literature related to seller types is resources. A number of studies have discussed the difference in resources between B2C and C2C sellers. Compared with B2C sellers, C2C sellers are relatively young, and the scale of their businesses is also very small (Brenner and Schimke, 2014; Haltiwanger et al., 2013; Madden et al., 2013). Meanwhile, C2C sellers also seem to be more resource constrained than B2C sellers in online markets (Jeon et al., 2008; Ruta et al., 2007). Most of the research showed that C2C sellers suffer more heavily from insufficient financial, human, and channel resources, and also a lack of experience and formal management training (Jeon et al., 2008). Specifically, the financial constraints make them less able to afford to expand their stores, diversify their product lines, or participate in promotions. The shortfall in human capital and experience embarrasses the sellers with poorer customer service and bad delivery. Since those sellers have no established experience, they do not know how to operate on that platform and this learning process costs much effort (Chen et al., 2007). The lack of business sense might lead to wrong operation decisions, and a failure to catch opportunities (Brenner and Schimke, 2014). All these factors result in less potential grow and expansion of sales volume.

Finally, from the perspective of reputation level, the reputation of sellers is an important factor that impacts the success of e-commerce (Kamari and Kamari, 2012; Strader and Ramaswami, 2002;

¹http://www.100ec.cn/zt/upload_data/down/2013ndbgqw.pdf

Figure 2.4: The relationship between seller attributes and consumer purchase



Zhang and Zhang, 2011). Almost all B2C sellers have brick-and-mortar stores and since B2C sellers may have developed an off-line reputation (Fan et al., 2013), they are more trustful in the eyes of online consumers and are believed to offer high-quality products and reliable services (Corbitt et al., 2003; Gefen and Straub, 2004; McKnight et al., 2002). Therefore, the B2C sellers gain product identity and seller identity, which enhances consumer satisfaction when buying. Compared with B2C merchants, C2C sellers are trapped in a game of “losing to win”, but only a lucky few race to the top (Fan et al., 2013; Jones and Leonard, 2008). Most of them may have spent too many resources to survive to next stage (Coad et al., 2013; Wang et al., 2013).

Although the relationship between seller types and consumer online purchases has not been directly discussed by the literature, given the characteristics of different types of seller, it is posited that seller type may directly affect consumer online purchases, and also moderate the relationship between other seller attributes and consumer purchases.

On the basis of the above literature review, figure 2.4 outlines the relationship between seller attributes and consumer online purchases.

Chapter 3

In-depth Analysis of the Relationship between Product Classes and Online Patronage Intentions

In this essay, the author posits that product class (i.e., search, experience, service, and credence products) significantly affects consumer online patronage intentions. To explore the relationship between product class and patronage intentions, this essay empirically examines the differences in patronage intentions among the four classes of product. On the basis of analysis performed on data gleaned from an Internet-based survey, this study demonstrates that consumer online patronage intentions are the highest for search and service products, followed by experience products, and lowest for credence products. In addition, this essay examines the reason for the difference of intentions by discussing the relationship between risk perceptions and product class. Management implications are also presented at the end.

3.1 Introduction

Customer patronage preference is significantly influenced by product type and attributes (Girard and Dion, 2010; Sheth, 1983). A number of studies in the literature have discussed what types of product are most likely to be purchased online (Chiang and Dholakia, 2003; Girard et al., 2002; Levin et al., 2005; Peterson and Merino, 2003). However, most of the discussions focused on whether product attributes can be determined over the Internet or whether they need to be experienced (e.g., Chiang and Dholakia, 2003; Lynch et al., 2001). In recent years, although the SEC-product classification framework has been evolving and tested in the context of online patronage (Girard et al., 2002; Girard and Dion, 2010), the studies are limited and the results are still felt to be somewhat weak. In addition, the reason why

the difference in online patronage intentions occurs across SEC-products is seldom explored in the prior studies. To fill those research gaps, the goals of this essay is to investigate the relationship between product class and consumer online patronage intentions, and to examine the reasons for the difference in patronage intentions by discussing the degree of consumer risk perceptions for each product class.

Earlier studies usually focused on whether the key attributes of a product can be determined on the Internet (Levin et al., 2005). The studies have shown that “low-touch” products where the key attributes of a product can be determined on the Internet are likely to be bought online (Grewal et al., 2004; Levin et al., 2005), while “high touch” products which consumers need to touch or experience are mostly purchased in physical stores (Chiang and Dholakia, 2003; Levin et al., 2003; Lynch et al., 2001). However, the finding is considered too general and lacks theories to support it (Girard and Dion, 2010; Levin et al., 2005).

Based on the high touch-low, touch distinction, the proposal of the SEC-product classification framework makes up for the deficiency of the theory (Ford et al., 1988). In this product classification theory, products in previous studies are subdivided into three classes according to the complexity of their information collection; i.e., search, experience, and credence (Dimoka et al., 2012; Ekelund et al., 1995; Girard and Dion, 2010). However, it is seldom introduced in the context of online and offline shopping (Girard and Dion, 2010). In Girard and Dion (2010), service products were mixed into search and credence products, rather than an independent group. With the widespread popularity of e-commerce service products, such as insurance and tourism, are also purchased frequently on the Internet, in addition to physical products (Pi et al., 2012; Rajamma et al., 2007). Meanwhile, service products have the characteristics of intangibility, simultaneity, and variability, which are not available in other products (Cho and Park, 2003; Levitt, 1981). Therefore, this essay claims that service products can be regard as a separate class in addition to SEC-products, to explore consumer online patronage intentions.

Previous studies found that customer online patronage intentions are the highest for search products, followed by experience products, and lowest for credence products (Girard and Dion, 2010). However, the reasons for this conclusion need further discussion. Most of the literature shows perceived risk negatively affects online patronage intentions (e.g., Forsythe and Shi, 2003). According to the definitions of the SEC-products, the relationship between SEC-products and consumer online patronage intentions was rooted in the theory of perceived risk (Girard and Dion, 2010; Kim et al., 2008; Nicolaou and McKnight, 2006). Hence, the author considers that differences in online patronage intentions among product classes are mainly caused by consumer risk perceptions. On the other hand, prior research mainly focused on consumers in the United States, which makes the conclusion biased by culture and economic policy.

This essay empirically examines the differences in consumer online patronage intentions among four classes of products (i.e., search, experience, credence, and service), and explores the reasons for the differences from the perspective of risk perceptions. To control for bias, the author conducts surveys in

the United States, China, and Japan, which are three of world's largest online markets with different cultures and economic policies. In this essay, first, the author discusses the relationship between the four product classes and consumer online patronage intentions, and finds that the intentions for online shopping are the highest for search and service products, but lowest for credence products. Second, to explain the reasons for the finding, the study compares the amount of six types of perceived risk (i.e., vendor, product performance, financial, psychological, time, and privacy) in the four product classes. As a result, the mean of the overall-risk is perceived as the lowest for search and service products, while it is perceived as the highest for credence products.

The main contribution of this essay is to further investigate the relationship between consumer online patronage intentions and the four product classes. Compared with the existing research, this study adds service product as a separate class into SEC-product classification, and discusses the levels of perceived risks in the different classes of products through a horizontal and vertical comparative analysis.

The remainder of this essay is organized as follows. Section 2 reviews the literature related to the product classification framework and perceive risk, and builds hypotheses. Section 3 presents research the methodology, including data collection and descriptive statistics on the collected data. Section 4 presents the data analyses and the results. Section 5 concludes the essay with a discussion of the managerial implications of the findings and suggestions for future research.

3.2 Reviews and Hypotheses

Prior studies identified that product attributes are a significant influential factor for consumer patronage intentions (Girard and Dion, 2010; Sheth, 1983). Compared with most of the earlier studies (Chiang and Dholakia, 2003; Levin et al., 2003), recent studies adopt the SEC-product classification framework instead of the high touch-low touch distinction to examine the influence of product class on preference for shopping on the Internet (Girard et al., 2002; Girard and Dion, 2010). In addition, this influence is also rooted in the theory of perceived risk (Chaudhuri, 1998; Girard and Dion, 2010). Therefore, this essay follows the existing literature (Girard and Dion, 2010), and incorporates SEC-products and perceived risk in product class into a model of consumer online patronage intentions.

3.2.1 Product Classes

The conventional product-classification framework – Convenience, Shopping, and Specialty (CSS), which has been used to explain consumer choices for different types of physical retail outlet (Copeland, 1923), is no longer used to explain their choices for online shopping (Girard and Dion, 2010). Instead of the CSS-framework, many studies have focused on a relatively new product-classification framework, which is called Search, Experience, and Credence (SEC), to determine consumer patronage intentions for the

Internet and local stores (Girard and Dion, 2010; Wan et al., 2012). However, discussions on the saliency of its operationalization in the context of online and offline shopping are still limited in the literature (Girard and Dion, 2010; Viswanathan and Childers, 1999).

Girard and Dion (2010) summarized that the definitions of SEC-products include the levels of availability of information, uncertainty, and the cost/difficulty consumers encounter in obtaining and evaluating the attribute information of products.

The characteristics of search products are that most of the information on product attributes (price, quality, performance, size, color, style, safety, etc.) can be easily obtained from the Internet, which means consumers can confidently evaluate the quality before they purchase (Wan et al., 2012). The typical products for the “search” class are things such as books and CDs.

Experience products are identified as those whose relevant attribute information cannot be easily found from the Internet, which means that consumers can only evaluate the quality once they are consumed or serviced (Girard and Dion, 2010; Nelson, 1974; Wan et al., 2012).

Credence products are defined as those whose relevant attribute information is not available until a considerable period of time after the use of the product/service, which means that consumers cannot evaluate the quality even a long time after the purchase. Some typical products for the “credence” class in many prior studies involve vitamins, auto insurance (Wan et al., 2012), and supplements (Girard and Dion, 2010).

For the relationship between SEC-products and consumer patronage intentions for Internet and local stores, existing literature shows that the degree of customer preference for shopping online is the highest for search products, followed by experience products, and the lowest for credence products (Alba et al., 1997; Girard et al., 2002; Girard and Dion, 2010; Wan et al., 2012).

However, due to only having considered the complexity of information obtainment, service products were mixed into search and credence products in many prior studies. For instance, in Girard and Dion (2010), flight ticket booking was assigned to search products, while insurance was assigned to credence products. This is because consumers are afraid that they paying money for insurance but not getting it. With the development of e-commerce, many service firms provide their services through an online channel in addition to the traditional channels. This leads to service products being purchased frequently on the Internet, as well as physical products (Pi et al., 2012; Rajamma et al., 2007).

As service products have intangibility, variability, and simultaneity which are different from physical products (Cho and Park, 2003; Levitt, 1981), this essay decides to serve service products as a separate product class on a par with SEC-products.

Given the intangibility and variability in service products, it is posited that the relevant attribute information is more difficult to obtain for service products than for search products. The hypothesis in this essay, therefore, is stated as follow:

H1-1. Consumer online patronage intentions are significantly lower for service products than for search products.

On the other hand, because of the simultaneity, the author considers that consumers can evaluate the quality of the service immediately after the purchase. Considering these likely influences, the essay has the following hypothesis:

H1-2. Consumer online patronage intentions are significantly higher for service products than for credence products.

3.2.2 Perceived Risk and Product Classes

Girard and Dion (2010) indicated that the relationship between product class and customer patronage preference is rooted in the theory of perceived risk. Most of the prior studies suggested that consumer risk perceptions of online shopping come from the uncertainty and asymmetry of information (Dimoka et al., 2012; Luo et al., 2012; Pavlou and Fyngenson, 2006). Because SEC-products are defined by the uncertainty and difficulty consumers encounter in obtaining and evaluating the attribute information of products (Girard and Dion, 2010; Wan et al., 2012), it is considered that SEC-products moderate the relationship between perceived risk and consumer online patronage intentions.

In the literature, perceived risk negatively related to consumer patronage intentions (Forsythe and Shi, 2003; Ganesh et al., 2010). Recent studies have suggested that perceived risks in e-commerce include vendor, product performance, financial, psychological, time loss, and privacy risks (Forsythe and Shi, 2003; Girard and Dion, 2010; Lim, 2003). According to the literature, vendor risk refers to the trust between shoppers and sellers; product risk is reflected in consumer worries about the quality of the product; financial risk in e-commerce represents the possibility of monetary loss arising from online shopping; psychological risk refers to disappointment and mental stress because of the unsuccessful experienced; time loss risk represents the uncertainty that consumers spend more time for waiting the shipping than they expected; and privacy risk is reflected in the possibility that a consumer's personal information will be inappropriately used (Forsythe and Shi, 2003; Kim et al., 2008; Lim, 2003; Salam et al., 2003).

Chaudhuri (1998) indicated that the level of overall risk perception in the product is determined by product class. Girard and Dion (2010) found that the amount of overall risk consumers perceive in product classes is the lowest for search, followed by experience, and the highest for credence products. This finding theoretically explains the result that customer online patronage intentions are the highest for search products, followed by experience products, and the lowest for credence products. This essay posits that the relevant attribute information of service products is more difficult to obtain than search products, while it is much easier to evaluate than for credence products. Therefore, the hypothesis is

proposed as follow:

H1-3. Overall-risk perception in service products is significantly higher than that of search products, while it is lower than that of credence products.

Due to the characteristics of search products, in that complete information can be obtained from the Internet, they are the easiest to evaluate of the classes of products. Mitra et al. (1999) demonstrated that the level of risk perception gradually increased from search to experience to credence products. Girard and Dion (2010) found that all types of risk, including financial, product performance, social, psychological, physical, and time loss, are perceived as significantly higher for search products than for experience and credence products. Since the intention of online patronage is posited as being higher for search products than it for service products in this essay, based on the literature, the hypothesis is thus stated as follow:

H1-4. For search products, all six types of risks are perceived as being lower than for service, experience, and credence products.

Relevant attribute information for experience products is more difficult and costly to obtain than search products (Chaudhuri, 1998; Li et al., 2002; Nelson, 1974). Because of the uncertainty, perceived financial and product performance risks are relatively high for experience products (Girard et al., 2002; Levin et al., 2005). Li et al. (2002) suggested that consumers would be more willing to take time to confirm the relevant information before making a purchase. By contrast, Girard and Dion (2010) found that for experience products, the amount of risk in product performance, finance, and time loss is perceived to be higher than others.

Based on the findings of the prior studies, this essay proposes the following hypothesis:

H1-5. For experience products, the amount of product performance and financial risk is perceived to be higher than that of other risks.

Service products have not been discussed as a separate class in the literature. Because of the characteristics of intangibility and variability, in principle most service products are not allowed to be returned (Kim et al., 2006). Consumers in online shopping are afraid that they are paying money for a service but the quality of the service is unsatisfactory, or that they are not even getting it (Pires et al., 2004). Therefore, it is considered that the amount of financial and psychological risk is perceived as being relatively high for service products. Meanwhile, compared with physical products, service products are more likely to involve consumer privacy (Featherman et al., 2010; Kim et al., 2006). This is because the majority of services require consumers to provide their true information. In contrast, time loss risk is perceived as being relatively low for service products because of the characteristics of simultaneity. Hence, the author offers the following hypothesis related to the relationship between perceived risks and service products:

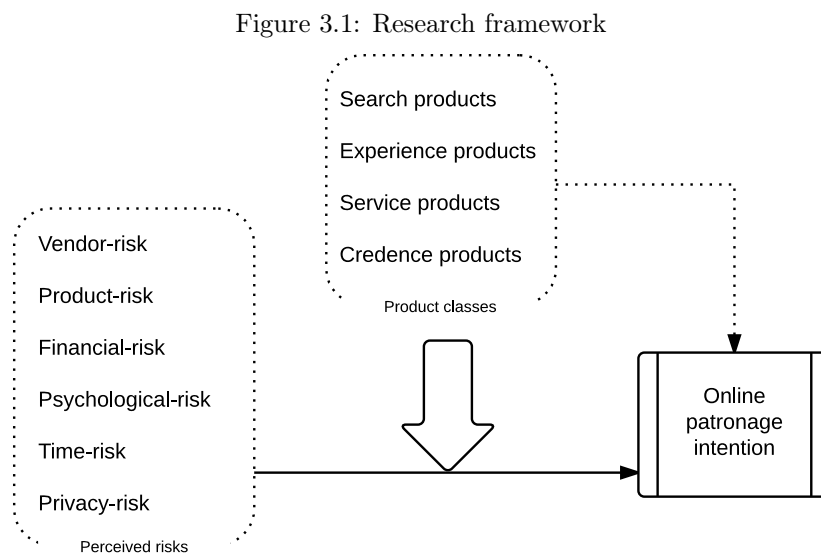
H1-6a. For service products, the amount of financial, psychological, and privacy risk is perceived as being higher than that of other risks.

H1-6b. For service products, the amount of time loss risk is perceived as being lower than that of other risks.

Given the characteristics of credence products, in contrast to experience goods, consumers cannot evaluate the quality even a long time after purchase (Darby and Karni, 1973; Nelson, 1974; Wan et al., 2012). Mitra et al. (1999) revealed that the perceived financial, social, and psychological risks are much higher for credence products than for other products. This is because the utility gain or loss of credence goods is difficult to measure after consumption as well. In light of the level of uncertainty being the highest for credence products (Hsieh et al., 2005; Mitra et al., 1999), Girard and Dion (2010) extend Mitra et al. (1999)'s study, and found that all types of risk, involving financial, product performance, social, psychological, physical, and time loss are perceived to be significantly higher for credence products than for search and experience products. Meanwhile, since consumers can evaluate the quality of service products much more easily than credence products, this essay also considers that the perceptions of all six types of risks are higher for credence products than for services products. Thus, a hypothesis is proposed as follow:

H1-7. For credence products, all six types of risks are perceived as being higher than for search, service, and experience products.

Figure 3.1 represents the research framework for this essay.



3.3 The Data

To collect data for this essay, the author decided to design and employ an experimental survey to determine the relationship between product class and consumer online patronage intentions. The survey is administered from April 2010 to June 2012 by Google consumer survey and Sojump.com¹.

After reviewing the literature related to product classes and attributes (Girard and Dion, 2010; Wan et al., 2012), a total of twelve products with four classes (i.e., search, experience, service, and credence products) were defined in the survey. Search products include books, music-CDs, and game software; experience products include shoes, cookies, and cosmetics; service products include online meal ordering, travel booking, and air insurance; and credence products include supplements, diet food, and hair-restorer. To avoid order bias, the target products in the survey will be given randomly from each class.

The survey is constructed in a number of interrelated parts as follow:

Part 1: Contents, objectives, notes, and term explanations.

Part 2: Items related to participant profiles, including gender, age, country, education, and experience with online shopping.

Part 3: Items related to consumer online patronage intentions. In this part, participants are required to respond with their online patronage intentions for four product classes. The intentions are measured on a 5-point scale (1=Very unlikely to 5=Very likely) by asking “How likely do you feel purchasing this product from the Internet is?”

Part 4: Items related to the degree of risk perception. In this part, participants are required to respond with the degree of risk they perceived, including vendor, product performance, financial, psychological, time, and privacy risks. Similarly, the degree of risk perception was also measured on a 5-point scale by asking “How risky do you feel shopping this products from the Internet is?” which is from 1=Not risky at all to 5=Very risky.

A total of 1074 responses are collected in this survey. After deleting invalid data with missing values, the effective response sample is 829 copies which accounts for an effective rate of 77.2%.

Table 3.1 provides the distribution related to the characteristics of participants. As shown in the table, respondents are nearly evenly split between males and females. The modal age categories are 20s and 30s. Also, most of the participants seem to have a relatively high education and a certain degree of online shopping experience. In addition, about half of the respondents are Chinese, the rest are nearly evenly split between Japanese and American. The author checked sample bias by comparing the sample in the present study to those used in the extent research in this domain (Bellman et al., 1999; Levin et al., 2005; Swinyard and Smith, 2003). Through this comparison, it is found that the sample used in

¹See the appendix for specific details of the survey.

this study is similar to those used in prior studies.

Table 3.1: Distribution of participants' profiles

	Freq.	Percent (%)
Gender		
1 = Male	399	48.13
2 = Female	430	51.87
Age		
1 = Under 20	136	16.41
2 = 20 -- 29	240	28.95
3 = 30 -- 39	249	30.04
4 = 40 -- 49	161	19.42
5 = Over 50	43	5.19
Country		
1 = China	422	50.90
2 = Japan	206	24.85
3 = USA	201	24.25
Education		
1 = Under high school	252	30.40
2 = College	418	50.42
3 = Graduate	159	19.18
Frequency of shop online per month		
1 = Less than 3 times	182	21.95
2 = 3 times to 9 times	378	45.60
3 = 10 times or above	269	32.45

Table 3.2 provides the distribution related to the target products. Table 3.3 provides the distribution related to the target products. Based on this outcome, the author notes that the standard deviations are less than 1, and the means of online patronage intentions have no obvious difference for each product class. Therefore, the statistical results confirm the sample is without bias caused by product.

3.4 Analysis

To investigate the relationship between product classes and consumers' online patronage intentions, paired-sample t-tests² are performed. Table 3.4 represents the results of the t-test for H1-1 and H1-2.

Consistent with the conclusion in Girard and Dion (2010), the results in the essay also reveal that online patronage intentions are significantly higher for search products than that for experience products ($t = 27.25$, $p < 0.01$) and credence-products ($t = 43.36$, $p < 0.01$), meanwhile the intentions for experience products are higher than for credence products ($t = 15.37$, $p < 0.01$).

H1-1 predicts that consumer online patronage intentions are significantly lower for service products than for search products. However, the results of the t-test show the difference in online patronage intentions between search and service products is non-significant ($t = 1.45$, $p = 0.15$), which means that

²See the appendix for the principle of statistics.

Table 3.2: Distribution of target products

Product classes	Freq.	Percent (%)
Search products		
book	270	32.57
music-CD	259	31.24
game soft	300	36.19
Experience products		
shoes	253	30.52
cookies	275	33.17
cosmetic	301	36.31
Credence products		
supplements	268	32.33
diet food	278	33.53
hair-restorer	283	34.14
Service products		
online meal ordering	245	29.55
travel booking	292	35.22
air insurance	292	35.22

the findings in this essay fail to support H1-1.

H1-2 states that consumer online patronage intentions are significantly higher for service products than for search products. As shown in table 3.3, the mean of the intentions for service products is 4.19, while for credence product it is only 2.68. As expected, the results of the t-test indicate that the online patronage intentions are significantly higher for service products than for credence products ($t = 38.17$, $p < 0.01$). Therefore, H1-2 is supported.

In addition, a further insight is gained from the finding is that the patronage intentions for the Internet are significantly lower for experience products than for service products ($t = -23.61$, $p < 0.01$).

Prior studies indicated that perceived risk negatively related to consumer online patronage intentions (Bhatnagar et al., 2000; Forsythe and Shi, 2003). To explore the relationship between the six types of risks and patronage intentions for overall product classes, an ANOVA is performed.

Table 3.5 provides the statistical correlation among the perceived risk variables and online patronage intentions. All correlation coefficients are negative confirming that a negative relationship occurs between perceived risk and patronage intentions (Girard and Dion, 2010). Table 3.6 reveals the results of the ANOVA. As shown in table 3.6, almost all variables for the perceived risk are significant ($p < 0.01$) except for the financial-risk ($F_{(4,3291)} = 0.18$, $p = 0.95$), demonstrating that the levels of all types of risks (except for financial-risk) have significant impacts on consumer online patronage intentions.

H1-3 proposes that overall-risk perception of service products is significantly higher than that of search products, while it is lower than that of credence products. Following the literature, overall-risk perception in this essay is measured by averaging all six types of risk. The differences in overall-risk perception among the four product classes were tested using paired-sample t-tests. Table 3.7 shows the testing

Table 3.3: Descriptive statistics of intentions (N=829)

Product classes	Obs.	Mean	Std.Dev.	Min	Max
Search products		4.24	0.61	3	5
book	270	4.19	0.63	3	5
music-CD	259	4.26	0.60	3	5
game soft	300	4.25	0.58	3	5
Experience products		3.29	0.79	2	5
shoes	253	3.21	0.75	2	5
cookies	275	3.42	0.82	2	5
cosmetic	301	3.24	0.79	2	5
Credence products		2.68	0.84	1	4
supplements	268	2.75	0.85	1	4
diet food	278	2.64	0.86	1	4
hair-restorer	283	2.66	0.82	1	4
Service products		4.19	0.75	2	5
online meal ordering	245	4.10	0.78	2	5
travel booking	292	4.18	0.79	2	5
air insurance	292	4.27	0.66	2	5

Table 3.4: t-test results for H1-1 and H1-2

Product-class (A)	Product-class (B)	Mean-diff. (A-B)	Std.Err.	t statistics
Search	Experience	0.95	0.03	27.25 ***
	Service	0.05	0.03	1.45
	Credence	1.55	0.04	43.36 ***
Experience	Service	-0.90	0.04	-23.61 ***
	Credence	0.61	0.04	15.37 ***
Service	Credence	1.51	0.04	38.17 ***

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

results. All t statistics are significant. The service product class has the lowest overall-risk perception ($\mu = 2.33$). Overall-risk perception in search products is the second lowest (2.39), a little higher than that in service products. Nevertheless, the difference of overall-risk perception between service and search products is very small. Overall-risk perception in experience products (2.73) is significantly higher than that in search products ($p < 0.01$), which is consistent with the findings in Girard and Dion (2010). Finally, the credence product class has the highest overall-risk perception (3.11). Although the findings show that overall-risk perception of service products is lower than that of credence products, the search products class has a higher overall-risk perception than the service product class, which is different to expectations. Hence, H1-3 is only partially supported.

H1-4 states that all six types of risks are perceived as being lower for search products than for service, experience, and credence products. Table 3.8 provides paired-sample t-tests to verify the hypothesis. Girard and Dion (2010) suggested that all types of risk³ are perceived as lower for search products than

³In Girard and Dion (2010), the types of perceived risk involve financial, product performance, social, psychological, physical, and time risk.

Table 3.5: Correlation coefficients among the perceived risk variables and online patronage intentions

	[1]	[2]	[3]	[4]	[5]	[6]	[7]
[1] Vendor-risk	1.00						
[2] Product-risk	0.19	1.00					
[3] Financial-risk	-0.00	-0.00	1.00				
[4] Psychological-risk	0.10	0.18	-0.00	1.00			
[5] Time-risk	0.10	0.08	0.01	0.03	1.00		
[6] Privacy-risk	0.15	0.20	-0.01	0.19	-0.01	1.00	
[7] Online intention	-0.24	-0.31	-0.00	-0.29	-0.08	-0.22	1.00

Table 3.6: Results of the ANOVA

Risks	F-statistics	Search (N=829)		Experience (N=829)		Credence (N=829)		Service (N=829)	
		Mean	Std.Dev	Mean	Std.Dev	Mean	Std.Dev	Mean	Std.Dev
Vendor-risk	22.91 ***	2.31	0.66	2.84	1.01	2.99	1.15	2.06	0.88
Product-risk	42.57 ***	2.22	0.76	2.78	1.05	3.44	1.03	2.03	0.83
Financial-risk	0.18	2.89	1.05	2.82	1.06	2.90	1.06	2.76	1.11
Psychological-risk	38.41 ***	2.31	0.64	2.87	1.09	3.64	1.07	2.70	0.99
Time-risk	7.07 ***	2.31	0.68	2.43	0.88	2.36	0.86	1.92	0.71
Privacy-risk	16.81 ***	2.33	0.65	2.67	1.05	3.34	1.14	2.51	0.81

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

for experience and credence products. A similar result is also found in this essay (with the exception of the financial risk). However, compared with the risk perceptions of service products, the author notes that the perceived risks in vendor ($t = 6.62, p < 0.01$), product performance ($t = 4.76, p < 0.01$), finance ($t = 2.53, p < 0.05$), and time loss ($t = 11.27, p < 0.01$) are relatively high for search products, while the psychological ($t = -9.34, p < 0.01$) and privacy ($t = -5.03, p < 0.01$) risks are significantly lower. Therefore, H1-4 is not supported.

H1-5 predicts that the amount of product performance and financial risk for experience products is perceived to be higher than that of other risks. Table 3.9 shows the results of the hypothesis testing. The mean of the perceived risk in product performance (2.78) is significantly ($p < 0.05$) higher than the risks in time loss (2.43) and privacy (2.67). Similarly, the mean of the financial risk (2.82) is also significantly ($p < 0.01$) higher than time loss and privacy risks. However, both of the two perceived risks do not significantly differ from the vendor (2.84) and psychological (2.87) risks. By contrast, the author found that the amount of time loss risk for experience products is perceived to be significantly lower than other risks ($p < 0.01$). Therefore, H1-5 is not supported by the findings.

H1-6a and H1-6b state that the amount of financial, psychological, and privacy risk for service products is perceived to be higher than that of other risks, while the amount of time loss risk is perceived to be lower than that of the others. Table 3.10 reports the test results. As expected, the means of the financial (2.76), psychological (2.70), and privacy (2.51) risk variables are significantly ($p < 0.01$) higher than the means of the perceived risks in vendor (2.06), product performance (2.03) and time loss (1.92). In addition, the mean of the time loss risk is significantly lower than those of the vendor and product

Table 3.7: t-test results for H1-3

Product-class (A)	Product-class (B)	Mean-diff. (A-B)	Std.Err.	t statistics
Search	Experience	-0.34	0.02	-18.59 ***
	Service	0.06	0.02	3.68 ***
	Credence	-0.72	0.02	-39.38 ***
Experience	Service	0.40	0.02	21.34 ***
	Credence	-0.38	0.02	-17.99 ***
Service	Credence	-0.78	0.02	-39.46 ***

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 3.8: t-test results for H1-4

Perceived-risks	Product-class (A)	Product-class (B)	Mean-diff. (A-B)	Std.Err.	t statistics
Vendor-risk	Search (2.31)	Experience (2.84)	-0.54	0.04	-12.60 ***
		Service (2.06)	0.24	0.04	6.62 ***
		Credence (2.99)	-0.69	0.05	-14.53 ***
Product-risk	Search (2.22)	Experience (2.78)	-0.56	0.05	-12.18 ***
		Service (2.03)	0.19	0.04	4.76 ***
		Credence (3.44)	-1.22	0.04	-27.48 ***
Financial-risk	Search (2.89)	Experience (2.82)	0.07	0.05	1.43
		Service (2.76)	0.13	0.05	2.53 **
		Credence (2.90)	-0.00	0.05	-0.05
Psychological-risk	Search (2.31)	Experience (2.88)	-0.56	0.04	-12.68 ***
		Service (2.70)	-0.39	0.04	-9.34 ***
		Credence (3.64)	-1.33	0.04	-31.23 ***
Time-risk	Search (2.31)	Experience (2.43)	-0.13	0.04	-3.37 ***
		Service (1.92)	0.38	0.03	11.27 ***
		Credence (2.35)	-0.05	0.04	-1.38
Privacy-risk	Search (2.33)	Experience (2.67)	-0.34	0.04	-8.00 ***
		Service (2.51)	-0.18	0.04	-5.03 ***
		Credence (3.34)	-1.02	0.05	-22.27 ***

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

performance risks. Therefore, H1-6a and H1-6b are supported.

H1-7 proposes that all six types of risk are perceived as being higher for credence products than for search, service, and experience products. To test the hypothesis, paired-sample t-tests were performed. Table 3.11 represents the results of the testing. For the credence product class, almost all of the six types of risk perception are significantly ($p < 0.05$) higher than for search, experience, and service products, except for the time loss risk. By contrast, the mean of the time loss risk for experience products (2.43) is significantly ($p < 0.1$) higher than the mean for credence products (2.36). Therefore, H1-7 is partially supported.

Table 3.12 represents the summary of hypotheses testing. “S” means the hypothesis is supported, “PS” means partially supported, and “NS” means not supported.

Table 3.9: t-test results for H1-5

Risk perception (A)	Risk perception (B)	Mean-diff. (A-B)	Std.Err.	t statistics
Product-risk	Vender-risk	-0.07	0.05	-1.39
	Psychological-risk	-0.09	0.05	-1.70 *
	Time-risk	0.34	0.05	7.19 ***
	Privacy-risk	0.11	0.05	2.07 **
Financial-risk	Vender-risk	-0.03	0.05	-0.49
	Psychological-risk	-0.05	0.05	-0.91
	Time-risk	0.39	0.05	8.15 ***
	Privacy-risk	0.15	0.05	2.79 ***

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 3.10: t-test results for H1-6a and H1-6b

Risk perception (A)	Risk perception (B)	Mean-diff. (A-B)	Std.Err.	t statistics
Financial-risk	Vender-risk	0.70	0.05	14.22 ***
	Product-risk	0.73	0.05	14.93 ***
	Time-risk	0.84	0.05	18.15 ***
Psychological-risk	Vender-risk	0.63	0.05	13.43 ***
	Product-risk	0.66	0.05	14.71 ***
	Time-risk	0.77	0.04	18.32 ***
Privacy-risk	Vender-risk	0.45	0.04	10.84 ***
	Product-risk	0.48	0.04	12.27 ***
	Time-risk	0.59	0.04	15.48 ***
Time-risk	Vender-risk	-0.14	0.04	-3.58 ***
	Product-risk	-0.11	0.04	-2.85 ***

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

3.5 Conclusions and Discussion

In this essay, the author investigates the relationship between product classes and consumer online patronage intentions, and examines the differences in six types of risk perceptions among four product classes (i.e., search, experience, service, and credence products). Specifically, this study performs this examination through the development and administration of an Internet survey, of which 829 valid responses are returned. On the basis of the analysis the author performs on this survey data, the main conclusion is shown that patronage intentions for the Internet are the highest for search and service products, followed by experience products, and lowest for credence products.

Prior studies focused on the SEC-products, and found that the intentions for shopping online are particularly strong for search products, while the credence products are most likely to be purchased in shops (Girard et al., 2002; Girard and Dion, 2010; Levin et al., 2005). As an extension, this essay examines not only the online patronage intentions for SEC-products, but also the intentions for service products. The relationship between SEC-products and online patronage intentions is consistent with the literature. As a new finding, service products seem more likely to be purchased from the Internet than

Table 3.11: t-test results for H1-7

Perceived-risks	Product-class (A)	Product-class (B)	Mean-diff. (A-B)	Std.Err.	t statistics
Vendor-risk	Credence	Search	0.69	0.05	14.53 ***
		Experience	0.15	0.05	2.77 ***
		Service	0.93	0.05	18.62 ***
Product-risk	Credence	Search	1.22	0.04	27.48 ***
		Experience	0.67	0.05	13.04 ***
		Service	1.41	0.05	30.47 ***
Financial-risk	Credence	Search	0.00	0.05	0.05
		Experience	0.08	0.05	1.42
		Service	0.14	0.05	2.49 **
Psychological-risk	Credence	Search	1.33	0.04	31.23 ***
		Experience	0.78	0.05	14.31 ***
		Service	0.95	0.05	18.76 ***
Time-risk	Credence	Search	0.05	0.04	1.38
		Experience	-0.07	0.04	-1.72 *
		Service	0.43	0.04	11.10 ***
Privacy-risk	Credence	Search	1.02	0.05	22.27 ***
		Experience	0.67	0.05	12.26 ***
		Service	0.83	0.05	17.28 ***

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 3.12: Results of hypotheses testing

H1-1	H1-2	H1-3	H1-4	H1-5	H1-6a	H1-6b	H1-7
NS	S	PS	NS	NS	S	S	PS

experience and credence products. Given the strict management in online markets and the third party guarantee (e.g., Alipay and PayPal) in e-commerce, more and more consumers prefer buying service items from the Internet, because it helps them to save time (Rajamma et al., 2007). Since service products do not need shipping, consumers can obtain the service quickly through the Internet. By contrast, despite the characteristics of intangibility and variability in service products, online patronage intentions do not significantly differ between search and service products. One possibility is that most of the online service products are provided by official flagship stores, which reduces consumer risk perceptions.

To explain the reasons for the difference in patronage intentions among the four classes of products, this essay examines the risk perceptions (i.e., vendor, product performance, financial, psychological, time loss, and privacy risk) in those four classes. Through an ANOVA procedure, the author finds that almost all of the risks are significantly and negatively related to online patronage intentions except for financial risk. A possible explanation for this finding is that the development of information encryption technology (e.g., SSL, SET) and the third party guarantee enhance consumer trust of payment in e-commerce (Chen et al., 2010). In addition, a further insight gained from the analysis is that the overall risk perception is the lowest for service and search products, followed by experience, and highest for credence products. This finding supports the main conclusion from the side of risk perception.

For the four classes of products, although most of the risk perceptions are significantly lower for search products than for other the classes, perceived risks in vendor, product performance and time loss for search products are higher than for service products. One reason for this is that service products bought online do not need shipping. Another is that most of the vendors of service products are identified by e-commerce platforms. Compared with search products, trust in vendor, finance, and psychology seem to be significantly more important for experience products, while the risk perception of time loss is the lowest. This is because of the uncertainty in experience products, leading consumers to be more willing to take time to experience the product before purchase (Girard and Dion, 2010; Li and Zhang, 2002). By contrast, for service products, financial, psychological, and privacy risks are perceived as being higher than other risks, while the time loss risk is the lowest. This is because most service products bought online require consumers to provide their true information, which leads it to involve consumers' privacy more (Kim et al., 2006). Finally, previous studies suggested that the level of uncertainty is the highest for credence products (e.g., Girard and Dion, 2010). Consistent with that conclusion, the finding in this essay shows that most of the risks are perceived as being higher for the credence class of products than that for other classes. This is because the relevant attribute information for credence products is the most difficult to evaluate by consumers (Darby and Karni, 1973; Mitra et al., 1999).

This essay contributes to the existing literature in three ways. The first contribution is that the author adds service products into the product classes as a separate product class, and examines the relationship between consumer online patronage intentions and the four product classes (i.e., search, experience, service, and credence products). In the literature, service products were mixed in the search and credence classes of products. This study attempts to serve service products as a separate product class on a par with SEC-products, and demonstrates that the intentions for shopping online are higher for service products than that for experience and credence products. The second contribution of this essay is that the author discusses the differences in risk perception among the four product classes to explain the relationship between product classes and patronage intentions. Different to the literature, this essay investigates both horizontal and vertical difference in risk perceptions, i.e., one risk in different classes of product and different perceived risks in one product class. The third contribution is that compared with the majority of studies which are mainly focused on the United States, the data in this essay refers to the United States, China, and Japan, which are three of world's largest online markets with different cultures and economic policies. The author claims that this can help to control for bias from culture and economic policy, and to draw a relatively general conclusion.

In light of the findings, several important managerial implications can be gleaned from this essay. First, sellers of search products should pay more attention to online markets. With the rapid growth of e-commerce, some physical stores of search products, like book shops and flower shops, may be replaced by online shops such as Amazon.com. Second, sellers of experience and credence products could

consider building an O2O commerce model, and explore both online and offline channels to expand sales performance. Especially for sellers of experience products, though the likelihood of in-shop purchase is relatively high because product attribute information cannot be easily obtained from the Internet, a single offline channel also seems to be somewhat negative due to the effects of showrooming⁴. Third, since risk perceptions are highest for credence products, it requires the sellers of credence products to enhance their reputations to reduce consumer perceived risk levels. Also, the effects of word of mouth should also be given attention by sellers who sell credence products. Lastly, although the online patronage intentions are relatively high for service products, sellers need to pay more attention to protect the customer privacy.

Inevitably, the study has two major limitations. First, the author serves services as an independent class and discusses the online patronage intentions across four classes of products (i.e., search, experience, service, and credence products). However, in the study, products in each class are enumerated insufficiently (i.e., three products per class), which causes the existence of product bias in the essay. Second, because the research is based on a cross-section of data which was collected by survey, it cannot reflect the continuous relationship of patronage intentions with the class of product, and may cause the analysis results to be unstable and underestimated. Given these possibilities, the author suggests that it is better to repeat the examination on the relationship between product class and patronage intentions by using different products.

⁴Showrooming is that the practice of examining merchandise in a traditional store, and then buying it online, sometimes at a lower price.

Appendix

1. Questionnaires of Internet Survey

Dear everyone,

I appreciate your participation in my survey as it helps me to collect data for my research on the topic “Product classes and online patronage intentions.” To complete the survey takes only about 5 minutes. Your information will be used strictly confidential. If you have further questions, you are welcomed to contact me via email (lzhen0205@gmail.com). Thank you a lot for your support and best regards.

— Zhen Li from Kobe University

(1). About Participants’ Profiles

1). What is your gender?

— A. Male; B. Female

2). How old are you?

— A. Under 20; B. 20 – 29; C. 30 – 39; D. 40 – 49; E. Over 50

3). Where are you from?

— A. China; B. the United States; C. Japan; D. Others

4). What’s your educational background at present?

— A. Under high school; B. College; C. Graduate (include MBA and Ph.D.)

5). How many times do you shop online per month?

— A. Less than 3 times; B. 3 times to 9 times; C. 10 times or above

(2). Online Patronage intentions and Perceived Risk

Part 1

Assume that you decided to buy an item A

1). How likely do you feel purchasing this product from the Internet is? Could you choose your answer from 1=very unlikely to 5=very likely.

Item A	1	2	3	4	5
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2). Read the following type of perceived risks, and answer “How risky do you feel shopping on the Internet is for buying the item A?” from 1= Not risky at all to 5=Very risky.

Vendor-risk	1	2	3	4	5
Product-risk	1	2	3	4	5
Financial-risk	1	2	3	4	5
Psychological-risk	1	2	3	4	5
Time-risk	1	2	3	4	5
Privacy-risk	1	2	3	4	5

Part 2

Assume that you decided to buy an item B

1). How likely do you feel purchasing this product from the Internet is? Could you choose your answer form 1=very unlikely to 5=very likely.

Item B	1	2	3	4	5
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2). Read the following type of perceived risks, and answer “How risky do you feel shopping on the Internet is for buying the item B?” from 1= Not risky at all to 5=Very risky.

Vendor-risk	1	2	3	4	5
Product-risk	1	2	3	4	5
Financial-risk	1	2	3	4	5
Psychological-risk	1	2	3	4	5
Time-risk	1	2	3	4	5
Privacy-risk	1	2	3	4	5

Part 3

Assume that you decided to buy an item C

1). How likely do you feel purchasing this product from the Internet is? Could you choose your answer form 1=very unlikely to 5=very likely.

Item C	1	2	3	4	5
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2). Read the following type of perceived risks, and answer “How risky do you feel shopping on the Internet is for buying the item C?” from 1= Not risky at all to 5=Very risky.

Vendor-risk	1	2	3	4	5
Product-risk	1	2	3	4	5
Financial-risk	1	2	3	4	5
Psychological-risk	1	2	3	4	5
Time-risk	1	2	3	4	5
Privacy-risk	1	2	3	4	5

Part 4

Assume that you decided to buy an item D

1). How likely do you feel purchasing this product from the Internet is? Could you choose your answer form 1=very unlikely to 5=very likely.

Item D	1	2	3	4	5
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2). Read the following type of perceived risks, and answer “How risky do you feel shopping on the Internet is for buying the item D?” from 1= Not risky at all to 5=Very risky.

Vendor-risk	1	2	3	4	5
Product-risk	1	2	3	4	5
Financial-risk	1	2	3	4	5
Psychological-risk	1	2	3	4	5
Time-risk	1	2	3	4	5
Privacy-risk	1	2	3	4	5

Note: Item A is randomly given from book, music-CD, and game soft; Item B is randomly given from shoes, cookies, and cosmetic; Item C is randomly given from supplements, diet food, and hair-restorer; Item D is randomly given from meal ordering, travel booking, and air insurance.

2. Paired-sample t-test

$$t = \frac{\bar{X} - \bar{Y}}{s\sqrt{\frac{1}{m} + \frac{1}{n}}}$$

where

\bar{X} and \bar{Y} are sample mean for $\{X_1, X_2, \dots, X_m\}$ and $\{Y_1, Y_2, \dots, Y_n\}$, respectively.

s can be calculated as

$$s^2 = \frac{\sum_{i=1}^m (X_i - \bar{X})^2 + \sum_{j=1}^n (Y_j - \bar{Y})^2}{m + n - 2} = \frac{(m-1)s_1^2 + (n-1)s_2^2}{m + n - 2}$$

Test statistic t obeys a Student's t-distribution with the degrees of freedom $(m + n - 2)$, i.e.,

$$t \sim t(m + n - 2)$$

Chapter 4

In-depth Analysis of the Relationship between Consumer Characteristics and Online Patronage Preference

Personal characteristics of online shoppers are vital to detect their patronage preference. However, previous studies have made inconsistent conclusions on the theoretical relationships. To further clarify the mechanism, this essay performs a longitudinal survey to investigate the direct effects of consumer characteristics (i.e., gender, income, age, education, work status, experience of online shopping, and risk perception) on online patronage preference and the moderating effects of those socioeconomic factors on the relationship between two goals (saving money and saving time) and consumer patronage preference. The findings in this essay suggest that personal characteristics (except for age and online experience) mainly impose indirect effects through interactions with money consciousness and time consciousness respectively, rather than directly influencing consumer patronage preference. In addition, the study also examines the difference in risk perception among consumers with different patronage preferences. Management implications and future research directions are also presented at the end.

4.1 Introduction

Personal characteristics of online shoppers are vital to detect their patronage preference (Sheth, 1983), and thus facilitate managers with insight to target consumers and position their product market. Many studies sought to understand what types of consumers are more likely to purchase online (Levin et al., 2005; Lohse et al., 2000; y Monsuwé et al., 2004). However, most prior research focused on the statistical correlation between consumer characteristics and patronage preference, and the conclusions were some-

what inconsistent. In addition, the discussions of the indirect effects (i.e. moderating effects) of consumer characteristics on patronage preference are also limited in the literature. The purpose of this essay is thus to fill in the research gap by examining the direct effects of consumer characteristics on online patronage, and by investigating the moderating effects of these characteristic factors on the relationship between the goals of saving money and time and consumer patronage preference.

Typical studies have identified that online consumers are younger, wealthier, better educated, more computer literate, and more likely to spend time on the computer than offline shoppers (e.g., Bellman et al., 1999; Levin et al., 2005; Swinyard and Smith, 2003). In contrast, after controlling for experience with online shopping, Hernández et al. (2011) found that the effects of an individual's socioeconomic characteristics¹ on that consumer's online purchase behavior to be somewhat tenuous. For these mixed results, one possible methodological cause is the heterogeneity in sample and time period. Another reason is that the prior studies fail to control for the effects of some factors that matters to consumer patronage preference, which may nullify the importance of socioeconomic characteristics. Therefore, the author claims that merely checking the statistical correlation cannot confirm the relationship between consumer characteristics and online patronage preference.

On the other hand, substantial evidence has suggested that saving money (Kim et al., 2008; Li and Zhang, 2002; Pavlou and Fygenon, 2006) and saving time (Childers et al., 2002; Ganesh et al., 2010; Rohm and Swaminathan, 2004) are two of the most important goals of online purchasing, which are significantly related to customer patronage preference for the Internet. Money consciousness and time consciousness vary with the change of consumer characteristics (Bakewell and Mitchell, 2006; Seock and Bailey, 2008). However, only a handful of studies have examined the moderating effects of consumer characteristics on the relationship between these two goals and patronage preference (Chiu et al., 2005; Hansen and Jensen, 2009; Punj, 2012; Li and Huang, 2014). Among them, Punj (2012) explored income effects on the importance of saving money and saving time for online purchase, and indicated that income relates positively to saving time as an online purchase goal, but the effects from other consumer characteristic factors were not considered in that study. By contrast, whereas Li and Huang (2014) focused on most socioeconomic characteristics, which involve consumer demographics and lifestyle, the study only explored their moderating effects on the relationship between time-related factors and consumer online patronage preference.

In this essay, to draw a relatively general conclusion, the author performs an Internet survey in three of world's largest online markets with different cultures and economic policies – the United States, Japan, and China. First, this essay re-examines the association between consumer characteristics and patronage preferences for Internet and local stores on the basis of Bellman et al. (1999) and Swinyard and Smith (2003). Second, the author discusses the direct effects of consumer characteristics on the likelihood of

¹In Hernández et al. (2011), socioeconomic characteristics refer to age, gender and income.

online patronage preference after controlling for other potential cross-impacts. Third, to investigate the moderating effects of consumer characteristics, this study adds three explanatory variables of money saved, time saved, and delivery time, which all significantly affect customer patronage preference, into the logit model, and examines the interactions between these three variables and the socioeconomic characteristic variables. Based on the analysis, the author finds that consumer characteristics (except for age and online experience) mainly impose indirect effects through their interactions with money consciousness and time consciousness respectively, rather than directly influencing patronage preference.

The rest of the essay is organized as follows: Section 2 features a review of the literature that grounds the key hypotheses. Section 3 reports the data collection practices, and includes descriptive statistics on the collected data. Section 4 presents the econometric analyses and explicates the key findings that can be generated thereof. Finally, the author offers the conclusions, and describes the implications in Section 5.

4.2 Reviews and Hypotheses

Sheth (1983) has indicated that customer patronage preference will be influenced by the personal characteristics of shoppers, including demographics and lifestyles. In addition, Chaudhuri (1998) has pointed out that the level of risk perception is also an important factor in affecting purchase preference due to the risk-taking nature in consumer behavior decisions (Bauer, 1960). Although these studies are primarily for consumer behavior in traditional markets, the conclusions apply to online shopping behavior as well (Girard and Dion, 2010; Swinyard and Smith, 2003). In this section, the author reviews the literature related to the impacts of the above factors – demographics, lifestyles, and risk perceptions on patronage preference and offers hypotheses.

As noted above, while studies on the relationships between consumer characteristics and their patronage preferences for the Internet or local retailers have been extensively explored, the conclusions were inconsistent. Assuming the rigor method is employed, it may be rooted in fact that the relationship is differently modeled (e.g., Bellman et al., 1999; Hernández et al., 2011). In existing researches, the author notes that although the related literature has discussed the attitudes of different types of consumer towards online purchase, most of them only focused on the statistical correlation between consumer characteristics and patronage preference (Levin et al., 2005; Swinyard and Smith, 2003). In addition, the moderating effects of consumer characteristics on the impacts of saving money and saving time on patronage preferences for the Internet and local stores have also been investigated little in the literature. Prior studies have mentioned that saving money and saving time are two major merits for consumer online purchases (e.g., Ganesh et al., 2010; Kim et al., 2008; Punj, 2012). Punj (2012) has indicated that saving money and saving time are two relatively important goals that most consumers

identify when shopping online, a channel which normally enables consumers to save money and time compared with shopping in traditional retail outlets (Bellman et al., 1999; Rohm and Swaminathan, 2004). Therefore, this study decides to explore the direct effects of consumer characteristics on patronage preferences for Internet and local stores and investigates the moderating effects of socioeconomic factors on the relationship between the two goals of saving money and time and consumer patronage preference.

4.2.1 Demographics

Gender difference has been largely discussed as an important factor to explain online shopping behavior (e.g., Rodgers and Harris, 2003; Chang et al., 2004; Chiu et al., 2005). Unlike traditional in-store shopping, which is performed by females, a number of studies have identified that males are more likely to make a purchase decision on the Internet (Bae and Lee, 2011; Slyke et al., 2002; Yang and Wu, 2006). Comber et al. (1997) demonstrated that males, rather than females, have greater experience with and more positive attitudes toward computers and the Internet. Garbarino and Strahilevitz (2004) found that women perceive a higher level of risk in online purchasing than men do. Li and Huang (2014) suggested that male consumers are inclined to make an online purchase decision because of time consciousness. These findings also indicate that as well as in the high street, whereas men may make purchases out of need, women have an innate love for shopping that incites them to ignore the time they spend shopping on the Internet. Some other empirical studies also indicated that men value time more than women do because men are results-oriented (Chang et al., 2004; Sebastianelli et al., 2008; Zhou et al., 2007). In addition, a survey reported by the “Ministry of Economy, Trade and Industry” (METI) in Japan showed that the importance of cost saving is stronger in males than in females, while females pay more attention to service and satisfaction. Therefore, the hypotheses related to gender difference in online purchase are offered as follows:

H2-1a. Compared with females, males have a greater patronage preference for Internet shopping.

H2-1b. The importance of saving money and saving time in online patronage preference is more pronounced for men.

In consumer behavior theory and economic theory, income is always regarded as an important factor to predict consumer demand (Bouis, 1994; Kagel et al., 1981). Despite Internet shopping being more economical as suggested (e.g., Okada and Hoch, 2004), some studies, like Bellman et al. (1999) and Swinyard and Smith (2003), found Internet shoppers to be wealthier. In addition to this direct impact, income also moderates the valuations of cost and time due to the difference in its opportunity cost (Ratchford et al., 2003; Goolsbee and Klenow, 2006). Besides this, Punj (2012) found that income positively affects a customer’s preference to save time in purchasing activities but negatively relates

to the preference to save money. The finding means high-income consumers preferred time, while the low-income group treasures money. Li and Huang (2014) stated that the effect of delivery time on patronage preference for the Internet is positively moderated by income level, though the difference in the effect of time saved is weak. One possible economic explanation attributes this to the law of the diminishing marginal rate of substitution that drives higher-income consumers to tend to have more interest in the time-saving characteristics of Internet shopping, while lower-income consumers tend to have more interested in saving money. Therefore, a rise in income level could increase the likelihood of patronage preference for the Internet, and moderate the impacts of saving-money and saving-time on online purchase, leading to the following hypotheses:

H2-2a. Income level has a positive direct effect on patronage preference for the Internet.

H2-2b. A rise in income level intensifies the effect of saving time on online patronage preference, but weakens the effect of saving money.

Youth are more likely to purchase online (Bhatnagar et al., 2000; Korgaonkar and Wolin, 1999; Rohm and Swaminathan, 2004). Young people use e-commerce much earlier and longer, and prefer to get information from the Internet (Chiou-Wei and Inman, 2008). In addition, consumers of such an age trusted e-commerce more than seniors do (Hernández et al., 2011; Rohm and Swaminathan, 2004). On the other hand, because of the important generational differences in the use of the Internet, age potentially moderates the effect of mental accounts on online purchase goals (i.e. saving money and saving time) of interest (Punj, 2012). On the basis of Punj's study, Li and Huang (2014) demonstrated that time consciousness in online shopping is more pronounced for consumers who are relatively young. Hence, the hypotheses related to income are stated as follows:

H2-3a. Age has a negative direct effect on patronage preference for the Internet.

H2-3b. Young consumers exhibit a greater tendency toward saving money and time, which indirectly leads to their dominant position in online shopping.

Similar to gender and age, Internet shoppers tend to be better educated (Bellman et al., 1999; Liao and Cheung, 2001). Related studies demonstrated that more educated consumers are more capable of processing information in their shopping (Henry, 1980; Hult et al., 2004). Besides, as has been reviewed by Punj (2012), consumers with better education seem to be more likely to engage in an extended search for information and make greater use of price information (Beatty and Smith, 1987; Russo et al., 1975). In addition to these reasons, education level also has significant correlation with income (Li et al., 1999; Susskind, 2004). Hence, it can be considered that education may affect customer patronage preference, and also moderate consciousness with respect to saving money and saving time in Internet shopping, which lead to the following two hypotheses:

H2-4a. Education level is positively related to a consumer patronage preference for the Internet.

H2-4b. Education level intensifies the effects of saving money and saving time on online patronage preference.

4.2.2 Lifestyles

Internet usage is considered the most important factor to predict consumer patronage preferences for the Internet and local stores (Bellman et al., 1999; Liao and Cheung, 2001; Lohse et al., 2000). In the literature, typical Internet shoppers experience a more “wired lifestyle” and are more time-constrained than those who have less experience of online shopping (Levin et al., 2005; Lohse et al., 2000). According to Moe and Fader (2004), “Wired lifestyle” is regarded as a critical predictor of consumer perceptions of risk related to Internet shopping, characterizing consumers who frequently and expertly use the Internet. On the other hand, in addition to the finding that experience acquired with online shopping nullifies the influence of socioeconomic characteristics (Hernández et al., 2011), experience of online purchases is positively related to online shopping tendency but negatively related to the likelihood to abort an online transaction (Brown et al., 2003; Zhou et al., 2007). This means that shoppers who have extensive online experience are more likely to make an online purchase decision because such consumers have a relatively high ability to process information from the Internet (Levin et al., 2005). Furthermore, the experience helps consumers to reduce their risk perceptions of e-commerce (Nysveen and Pedersen, 2004). Relatedly, Li and Huang (2014) found that having engaged in online shopping can attenuate consumer perceptions of risk related to delivery time. Therefore, the hypotheses related to the relationship between online purchase experience and patronage preference are offered as follows:

H2-5a. Experience of online shopping positively relates to consumer patronage preference for the Internet.

H2-5b. Experience of online shopping reduces the level of perceived risk in delivery time, improving the likelihood of online purchase.

Time constraint is rooted in the negative effect of learning about products in physical stores. Hence, time-starved people, as well as those living a wired lifestyle, are more likely to make an online purchase (Swinyard and Smith, 2003; y Monsuwé et al., 2004). Additionally, consumers who have more time and less income exhibit a greater tendency toward saving money by purchasing online, while those who are “income rich and time poor” show interest in saving time (Punj, 2012). Economic theory stipulates that consumers will balance time-related costs on the basis of the economic value they place on that time (Leclerc et al., 1995; Okada and Hoch, 2004; Punj, 2012), which indicates that time-starved people tend to value their time more than those with extensive time resources. Thus, hypotheses are proposed as follows:

H2-6a. Time-starved consumers are more likely to shop online than those who have more discretionary time.

H2-6b. Discretionary time availability relates positively to saving money as an online purchase goal, while negatively to saving time.

4.2.3 Risk Perceptions

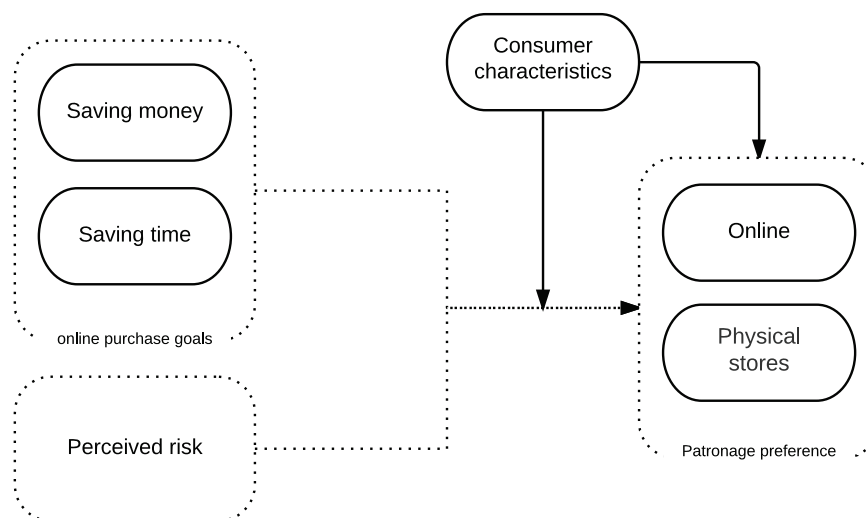
The degree of risk perception is regarded as a critical indicator to predict consumer patronage since a consumer's decision involves risk-taking (Chaudhuri, 1998; Forsythe and Shi, 2003; Bauer, 1960). In an e-commerce context, perceived risk involves in vendor, product performance, financial, psychological, time-loss, and privacy (Forsythe and Shi, 2003; Girard and Dion, 2010; Lim, 2003). It deteriorates trust, reduces patronage intentions for the Internet and hinders the development of e-commerce (Lu et al., 2005; Kim et al., 2008). However, Swinyard and Smith (2003) found that online shoppers are more likely to find online shopping easy and entertaining, and feel less fearful about financial loss resulting from online transactions. Lohse et al. (2000) pointed out that Internet shoppers are less concerned with the awareness of security and privacy than non-Internet shoppers. This conclusion is drawn because consumers who prefer buying online are becoming more confident and feel less fearful about financial loss resulting from online transactions, which makes online shoppers actually seem more confident in the Internet than offline shoppers (Belanche et al., 2012).

H2-7a. Perceived risk negatively relates to consumer online patronage preference.

H2-7b. The degree of risk is perceived as significantly lower by consumers who prefer purchasing online.

With Figure 4.1, the author offers a visual representation of the research framework for this essay.

Figure 4.1: Research framework



4.3 Data Collection

The data is collected through a longitudinal anonymous Internet survey², which is administered in the United States, Japan, and China from April 2010 by Google consumer survey and Sojump.com. The survey contains 13 questions in total. Six questions ask about the respondents' demographics, six questions ask about the degree of perceived risk related to online purchase, and one question asks about experience of online shopping. The respondents are required to respond with their purchase preference, based on the given purchase information of goods including the costs in money and time on both the Internet and in physical stores. The goods are randomly given from a category of clothing because the sales volume of this category is high in both traditional and Internet markets. In this study, the author utilizes stated preference data instead of revealed preference data because the latter is typically inaccessible (Huang et al., 1997; Swait, 1994).

The questions related to demographics include gender, age, education, income level, work status, and respondents' nationality. In this part, the item of "income level" asks the the respondents' personal average annual income, and the item of "work status" asks how many days a respondent works in a week. Similarly, a lifestyle question asks about previous experience concerning online shopping, denoting the frequency with which the respondent engages in online shopping per month. The questions related to the perceived risk include vendor, product performance, financial, psychological, time loss, and privacy risks. Referencing the study of Girard and Dion (2010), the degree of each perceived risk in this essay is measured on a 5-point scale by asking, "How risky do you feel shopping on the Internet is?" from 1 (Not risky at all) to 5 (Very risky).

The study strengthens the validity of its findings by collecting the data in two stages. Table 4.1 outlines the description of the sample information. The initial sample is obtained by October 2012. A total of 2,348 people participated in the survey, and 1,595 of valid samples are collected (67.9% efficient). The responses are comprised of 789 (49.47%) respondents for "purchase online," 524 (32.85%) respondents for "purchase in-shop," and 282 (17.68%) respondents for "either."

The first stage sample is comprised of 904 males (56.7%) and 691 females (43.3%). As shown in table 4.1, the percentage of males in the online purchase group skews slightly higher than it does in the in-shop purchase group. The respondents in the group of online purchase are mainly in their 20s to 40s, while those who chose in-shop purchase are mainly aged over 30. This distribution of age is consistent with the literature (Hernández et al., 2011; Wan et al., 2012; Zhou et al., 2007). For the distributions of education and income, the ratio variations between the two groups (i.e. online and in-shop) are less marked. The majority of the respondents have a college degree or above and have an annual income of \$15,000 to \$50,000. However, due to the income differences between countries, the author notes that the modal category for income was \$5,000 to \$30,000 annually in China, while it is \$30,000 and \$80,000

²See the appendix for specific details of the survey.

Table 4.1: Description of the sample information

	Choice in 1st stage			Choice in 2nd stage			Choice in total		
	online	in-shop	either	online	in-shop	either	online	in-shop	either
Gender									
1 = Male	476	269	159	665	283	244	1141	552	403
2 = Female	313	255	123	407	262	233	720	517	356
Age									
1 = Under 20	47	22	28	134	28	47	181	50	75
2 = 20 -- 29	194	98	64	347	96	113	541	194	177
3 = 30 -- 39	258	195	80	216	103	123	474	298	203
4 = 40 -- 49	213	112	48	266	201	113	479	313	161
5 = Over 50	77	97	62	109	117	81	186	214	143
Education									
1 = Under high school	182	139	76	191	131	131	373	270	207
2 = College	374	212	104	559	228	186	933	440	290
3 = Graduate	233	173	102	322	186	160	555	359	262
Income									
1 = Less than \$5,000	69	40	28	96	39	45	165	79	73
2 = \$5,000 to \$15,000	150	85	43	209	97	66	359	182	109
3 = \$15,000 to \$30,000	228	127	61	289	117	109	517	244	170
4 = \$30,000 to \$50,000	128	118	64	186	123	93	314	241	157
5 = \$50,000 to \$80,000	132	98	42	178	103	97	310	201	139
6 = More than \$80,000	82	56	44	114	66	67	196	122	111
Country									
1 = China	285	183	97	422	194	152	707	377	249
2 = Japan	240	159	95	345	176	177	585	335	272
3 = USA	264	182	90	305	175	148	569	357	238
Working days per week									
1 = Less than 3 days	76	97	49	114	111	103	190	208	152
2 = 3 days to 4 days	254	191	84	348	192	142	602	383	226
3 = 5 days or above	459	236	149	610	242	232	1069	478	381
Frequency of shop online per month									
1 = Less than 3 times	67	214	103	105	203	142	172	417	245
2 = 3 times to 9 times	416	229	121	563	243	232	979	472	353
3 = 10 times or above	306	81	58	404	99	103	710	180	161
Total	789	524	282	1072	545	477	1861	1069	759

annually in Japan and the United States. The status of employment demonstrates that 52.8% of the participants in this stage work five days or more per week. Still, it is also shown that the respondents who chose purchase online are more time-constrained than those who chose purchase in-shop from the relative proportions. For the experience of online shopping, approximately 52.7% of the respondents in the online purchase group shop online 3 to 10 times a month, and 38.8% of them shop more than 10 times a month. By contrast, the percentages of online shopping experience for the in-shop group are 43.7% and 15.5%, respectively.

The second stage is up to March 2013. Of the 2,779 responses returned, 2,094 (75.4%) are valid. Among them, 1,072 (51.2%) respondents chose online purchase, 545 (26.0%) of respondents chose in-shop purchase, and 477 (22.8%) of respondents chose either.

In the second stage, the ratios of males (51.2%) and females (48.8%) are nearly evenly split. However, the proportion of males in the online purchase group seems to be somewhat higher, the same as with

the result in the first stage. The modal category for age in the online purchase group is 20s, while in the in-shop group it is 40s. Similar to the summary in the first stage, most of the respondents have received a college education or higher and work five days or more in a week. The modal income category is \$15,000 to \$30,000 for the all respondents, while it is \$5,000 to \$15,000 in China. Compared with the participants that prefer shopping at physical stores, the respondents in the online purchase group seem to have more experience in Internet shopping.

The author checks for sample bias by contrasting the sample distribution in the two stages and by comparing the consistency between our sample and those used in extant studies (Girard and Dion, 2010; Hausman and Siekpe, 2009; Punj, 2012). Through the comparison, the author finds that the sample distribution in the two stages aligns fairly well and closely matches the samples used in the literature and survey reports in terms of demographics and regional characteristics. Thus, in this study, the author decides to use the entire data set collected in both of the two stages.

4.4 Analysis

To clarify the relationship between consumer characteristics and patronage preference, this essay focuses on the sample of 2,930 respondents who did not choose “either.”

The author follows previous studies and carries out a contingency table analysis³ on the relationship between consumer characteristics and patronage preference (see table 4.1).

Table 4.2: Results of contingency table analysis

Variables	Chi-square	Cramer's V	Kendall's tau-b
Gender	26.05 ***	0.09	0.09
Age	108.86 ***	0.19	0.16
Education	23.16 ***	0.09	-0.01
Income	23.89 ***	0.09	0.06
Country	3.07	0.03	0.03
Work status	66.03 ***	0.15	-0.14
Experience of online shopping	410.60 ***	0.37	-0.33

Note: The column variable in this table is “1 = purchase online” and “2 = purchase in-shop.”

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Consistent with the results in prior studies (Bellman et al., 1999; Levin et al., 2005; Luo et al., 2012), through chi-square tests, the author notes that most of the characteristics except for country are significant for the relationship with consumer’s online patronage preference. Specifically, the variables for education ($\chi^2 = 23.16$, $\tau_b = -0.01$), work status ($\chi^2 = 66.05$, $\tau_b = -0.14$), and the experience of online shopping ($\chi^2 = 410.60$, $\tau_b = -0.33$) are positively correlated with online patronage preference, while female gender ($\chi^2 = 26.05$, $\tau_b = 0.09$), age ($\chi^2 = 108.86$, $\tau_b = 0.16$), and income ($\chi^2 = 23.89$, $\tau_b = 0.06$) are negative. However, the coefficients of Cramer’s V, a measure of association between two

³See the appendix for the principle of the statistics.

nominal variables, is very close to zero for all variables, which implies the association between online patronage and those consumer characteristics is weak.

Given that the relationship between online patronage and those consumer characteristics is weak in the contingency table analysis, the author applies the econometric method with a binary choice model.

Suppose that the respective total costs of in-shop and online purchases are $C(1)$ and $C(2)$. According to the cost minimization principle, consumer patronage preferences for shopping online and in-shop in this essay can be calculated as follows:

- Preference for shopping online: $C(1) - C(2) + \epsilon > 0$
- Preference for shopping in-shop: $C(1) - C(2) + \epsilon \leq 0$

The ϵ in the formula represents residual error. Given these, consumer preferences for the Internet and local stores are more easily identifiable when $C(1)$ and $C(2)$ are more substantially different.

The present study assumes that there exists a probability p_{1i} that consumer i will make an online purchase. Similarly, it is assumed that there is a probability p_{0i} that consumer i will make an offline purchase. In this model, the error term ϵ_i obeys a logistic distribution. The probability of online purchase can be expressed as:

$$p_{1i} = \frac{1}{1 + \exp(-\mathbf{X}_i \mathbf{b}_i)} = \frac{\exp(\mathbf{X}_i \mathbf{b}_i)}{1 + \exp(\mathbf{X}_i \mathbf{b}_i)}$$

Furthermore, \mathbf{X}_i and \mathbf{b}_i respectively represent the vectors for exogenous explanatory variables and unknown parameters for consumer i .

Given the above definitions, this study builds the following logit model to re-examine the direct effects of consumer characteristics on patronage⁴.

$$\ln \left(\frac{p_{1i}}{p_{0i}} \right) = \beta_0 + \beta_1 sav_mon_i + \beta_2 sav_tim_i + \beta_3 deli_i + \mathbf{H}_i \mathbf{B} + u_i$$

In this model, subscript of i indicate consumer i ; p_1 and p_0 represent the probabilities of patronage preferences for the Internet and local stores; \mathbf{H} denotes the vector for the variables of consumer characteristics; sav_mon and sav_tim , respectively, indicate the values of shopping-cost saved for money and time for online purchase compared with in-shop purchase; and $deli$ signifies the delivery time after an online purchase. Furthermore, the u in the model represents the error term. The author standardizes the variable of income by country because the mean and standard deviation of income is different in each country.

⁴See the appendix for the principle of estimation.

Table 4.3: Regression results (1)

Variables	Coef.	Std. Err.	P-value	dy/dx
<i>sav_mon</i>	4.84 ***	1.32	0.00	11.75%
<i>sav_tim</i>	3.20 ***	0.76	0.00	7.77%
<i>deli</i>	-3.51 ***	0.76	0.00	-8.53%
Gender				
Female	-0.88 *	0.50	0.08	-2.14%
Age				
20 -- 29	1.86	1.95	0.34	4.51%
30 -- 39	1.35	1.56	0.39	3.27%
40 -- 49	-2.57 *	1.35	0.06	-6.24%
Over 50	-8.86 ***	1.88	0.00	-21.53%
Education				
College	1.03	1.41	0.46	2.50%
Graduate	0.75	1.49	0.61	1.83%
Standardized income	-1.33 ***	0.42	0.00	-3.23%
Work status				
3 days to 4 days	1.08	1.41	0.44	2.63%
5 days or above	3.68	2.80	0.19	8.95%
Experience of online shopping				
3 times to 9 times	3.39 ***	1.14	0.00	8.23%
10 times or above	7.59 ***	1.33	0.00	18.44%
_cons	-3.01 **	1.45	0.04	
Likelihood Ratio = 3796.92				
Number of obs = 2930				
Pseudo R2 = 0.86				

Note: The benchmarks for each explanatory variable are Male, Under 20, Under high school, Less than 3 days, and Less than 3 times, respectively.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 4.3 summarizes the estimated results of the logit models and shows the marginal effects at the mean. Consistent with the literature, the results indicate that the characteristics of being young and having experience of online shopping, have strong direct positive significant ($p < 0.01$) effects on the preference for online purchase. In contrast, income is shown to be negatively significant ($\beta = -1.33$, $p < 0.01$) for the likelihood of purchasing online, which is in striking disagreement with previous studies (Bellman et al., 1999; Lohse et al., 2000; Swinyard and Smith, 2003). One possible explanation for this finding is that with the continuous development of the e-commerce, online shopping attracts more lower-income consumers because it enables consumers to save money (Punj, 2012). In addition to these variables, the coefficients for education and work status are positive as well as in the literature, but they fail to be significant. Although female gender is negative ($\beta = -0.88$) and also significant ($p < 0.1$), the impact of it is limited.

Therefore, these results provide support for hypotheses H2-3a and H2-5a. But hypotheses H2-1a, H2-2a, H2-4a, and H2-6a are not supported.

On the basis of the logit model, the present study adds three slope dummy vectors of consumer

characteristics into the model, and investigates the moderating effects of consumer characteristics by calculating the respective interactions between money-saved, time-saved, delivery time, and consumer characteristics. The model contains interactions that can be expressed in the following model:

$$\ln\left(\frac{p_{1i}}{p_{0i}}\right) = \beta_0 + (\beta_1 + \mathbf{H}_i\mathbf{B}_1^*) sav_mon_i + (\beta_2 + \mathbf{H}_i\mathbf{B}_2^*) sav_tim_i + (\beta_3 + \mathbf{H}_i\mathbf{B}_3^*) deli_i + \mathbf{H}_i\mathbf{B} + \epsilon_i$$

In order to verify the hypotheses proposed in section 2, this essay develops corresponding models from H2-1b to H2-6b. Table 4.4 shows the regression results of these models. All the coefficients of shopping-cost-saved are positive, while the coefficients of delivery time are negative. It suggests that the preference for reducing shopping costs causes a consumer to be more likely to engage in online shopping.

H2-1b predicts that the variable for male gender positively moderates the effects of saving money and saving time on online patronage. As expected, the interactions between being female and shopping-cost-saved for money ($\beta = -2.77$) and time ($\beta = -1.39$) are negatively significant ($p < 0.05$). Meanwhile, the interaction between being female and delivery time is revealed as positively significant ($p < 0.05$) in model H2-1b (see table 4.4). These results indicate that men pay more attention to saving money and saving time than women when shopping online. Therefore, H2-1b is supported.

H2-2b states that income relates negatively to saving money but relates positively to saving time in online shopping. To test H2-2b, the variable of age is used as an ordinal variable. After calculating the coefficients of the interactions, the results in model H2-2b demonstrate that income negatively moderates the effects of money-saved ($\beta = -0.72$) and delivery ($\beta = -0.58$) on online patronage preference but positively moderates the effect of shopping-time-saved ($\beta = 0.65$). Hence, H2-2b is supported.

H2-3b and H2-4b focus on the respective interactions between age, education, and the two online purchase goals. In model H2-3b, the author finds that the interactions between age and money-saved and time-saved are negative ($p < 0.1$), while the interaction between age and delivery time is positive ($p < 0.01$) as well as the results in model H2-1b. This finding shows that young consumers exhibit a greater tendency toward saving money and time in online shopping. However, no significant interactions are observed for education in model H2-4b, signifying that education failed to emerge as a significant moderator. Therefore, H2-3b is supported, but H2-4b is not supported.

H2-5b and H2-6b refer to the relationship between consumer lifestyle and their attitude toward delivery time in Internet shopping. As shown in table 4.4, both the interactions between lifestyle (i.e., experience of online shopping and work status) and delivery time are significant. The coefficient of online shopping experience is positive ($\beta = 0.57$, $p < 0.1$), while the coefficient of work status is negative ($\beta = -0.81$, $p < 0.01$). It reflects that the negative effect of delivery time on online patronage preference

Table 4.4: Regression results (2)

Variables	Model H2-1b		Model H2-2b		Model H2-3b		Model H2-4b		Model H2-5b		Model H2-6b	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
<i>sav_mon</i>	5.38 ***	2.09	4.02 ***	0.88	6.10 ***	2.17	4.18 **	1.82	3.26 **	1.48	8.25 **	3.76
<i>sav_mon * female</i>	-2.77 **	1.20	-0.72 ***	0.26	-0.86 *	0.49	0.80	0.72	0.42	0.86	-1.55 ***	0.55
<i>sav_mon * income</i>												
<i>sav_mon * age</i>												
<i>sav_mon * education</i>												
<i>sav_mon * experience</i>												
<i>sav_mon * workstatus</i>												
<i>sav_tim</i>	2.54 **	1.25	2.55 ***	0.53	5.14 ***	1.98	3.39 **	1.71	2.56 **	1.31	4.08 ***	1.58
<i>sav_tim * female</i>	-1.39 **	0.60	0.65 ***	0.25	-0.91 **	0.42	0.56	0.66	0.87	0.75	0.75 ***	0.22
<i>sav_tim * income</i>												
<i>sav_tim * age</i>												
<i>sav_tim * education</i>												
<i>sav_tim * experience</i>												
<i>sav_tim * workstatus</i>												
<i>deli</i>	-2.06 **	1.06	-2.13 ***	0.53	-3.41 ***	1.29	-3.62 **	1.65	-2.25 ***	0.43	-4.89 ***	1.77
<i>deli * female</i>	0.83 **	0.36	-0.58 ***	0.22	0.86 ***	0.35	0.24	0.69	0.57 *	0.32	-0.81 ***	0.31
<i>deli * income</i>												
<i>deli * age</i>												
<i>deli * education</i>												
<i>deli * experience</i>												
<i>deli * workstatus</i>												
...
Likelihood Ratio	3781.57		3777.90		3782.28		3777.81		3784.69		3780.74	
Number of obs	2930		2930		2930		2930		2930		2930	
Pseudo R2	0.70		0.68		0.62		0.70		0.69		0.62	

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

is amplified by a busy work status but attenuated by experience of online shopping, providing support for H2-5b and H2-6b.

Table 4.5: ANOVA and t-test results for perceived risks

Perceived risks	F-statistics	Purchase online (N=1861)		Purchase in-shop (N=1069)		t-statistics
		Mean	Std.Dev.	Mean	Std.Dev.	
Vendor-risk	89.26 ***	2.45	1.02	3.64	1.12	-29.46 ***
Product-risk	101.66 ***	2.49	1.04	3.65	1.11	-28.38 ***
Financial-risk	69.50 ***	2.45	1.03	3.51	1.12	-25.86 ***
Psychological-risk	84.75 ***	2.42	1.00	3.58	1.14	-28.70 ***
Time-risk	79.19 ***	2.44	1.01	3.56	1.13	-27.76 ***
Privacy-risk	110.15 ***	2.45	1.01	3.63	1.10	-29.35 ***

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

H2-7a and H2-7b state that there is a negative relationship between perceived risk and patronage preference for the Internet. Because of the 5-point scale used to measure all six of the perceived risks separately in this study, the author tests for the difference in risk perception between in-shop and online patronage by using ANOVA and t-test. As shown in table 4.5, all variables for perceived risk are significant ($p < 0.01$) in ANOVA, demonstrating that the levels of all six risks in two groups (i.e., online and in-shop) have significant differences. After comparing the means of the six perceived risks across the two groups at mean by t-test, the author finds that all the levels of the six risks for the online purchase group are perceived as being significantly lower than for the in-shop purchase group. These findings are consistent with many previous studies (Connolly and Bannister, 2008; Samadi and Nejadi, 2009; Swinyard and Smith, 2003), and support hypotheses H2-7a and H2-7b.

Table 4.6 represents the summary of the hypotheses testing. “Yes” means the hypothesis is supported, while “No” means it is not supported.

Table 4.6: Results of hypotheses testing

	H2-1	H2-2	H2-3	H2-4	H2-5	H2-6	H2-7
a	No	No	Yes	No	Yes	No	Yes
b	Yes	Yes	Yes	No	Yes	Yes	Yes

4.5 Conclusions and Discussion

To alleviate the arguments on the relationship between consumer characteristics and shopping channel choice, this essay performs a longitudinal survey to investigate the direct effects of consumer characteristics on online patronage preference and the moderating effects of those socioeconomic factors on the relationship between the two online purchase goals (i.e., saving money and saving time) and consumer patronage preference. Through this study, the author finds that only consumer age and online experience have a direct effect on their own patronage preference. Besides this, consumer characteristics mainly

impose indirect effects through their interactions with money consciousness and time consciousness respectively.

Despite the existence of gender difference in patronage preference in prior discussion (Bae and Lee, 2011; Hernández et al., 2011; Rodgers and Harris, 2003), the direct impact of gender on patronage preference is shown to be limited. That means that this difference primarily relies on male consumers' greater tendency toward saving money and saving time, indicating that males are more likely to shop online when online shopping enables consumers to save money and time. One possible explanation for this finding is that men just want to buy things that they need as cheaply and quickly as possible, while women have an innate love for the shopping experience, which incites them to ignore the time they spend on shopping.

Although early research suggested that consumers who prefer shopping online are wealthy (Bellman et al., 1999; Swinyard and Smith, 2003), the regression results in this essay show some distinction. Instead, the author finds that consumers with a higher income pay more attention to time, signifying that they are attracted to online shopping because it saves time (Punj, 2012). The rule behind this result might be the law of the diminishing marginal rate of substitution, which also leads lower-income consumers to exhibit a greater tendency toward saving money.

In addition, younger people are more prone to making an online purchase decision. This is because these consumers are relatively computer literate and deem e-commerce more credible. Meanwhile, just like males, younger shoppers also have a greater interest in saving money and time. So they lead in online shopping.

What's more, online patronage preference is not found to be directly associated with education or work status as hypothesized in H2-4a and H2-6a. As a complement to previous studies, the conclusions in the literature that online shoppers tend to be more time-constrained is mainly because online shopping provides the benefit of saving time. Consistent with the results in Punj (2012), the author also finds that a consumer with a relatively busy work status gives more consideration to time spent in shopping behavior than those who have more discretionary time. This is likely due to the opportunity costs associated with lost time being high.

Furthermore, consumers with experience of shopping online have a higher probability to make an online patronage decision. This suggests that the number of online shoppers and online buying behavior will increase gradually along with the popularization of Internet usage. Moreover, the author notes that having engaged in online shopping can attenuate consumer perceptions of risk related to delivery time.

Finally, the results in ANOVA demonstrated that the effects of perceived risks on Internet patronage preference are significantly negative. It provides additional support for the conclusion that perceived risk is a useful context to explain barriers to online shopping (Forsythe and Shi, 2003). In addition, the level of perceived risk is significantly lower for consumers who prefer to shop online, showing the

negative relationship between consumer risk perceptions and online patronage preference. This finding also highlights the importance of reducing the level of risk perception in online shopping.

This study contributes to the existing literature in four ways. First, as the results in previous literature are inconsistent, the author re-checks the correlation between consumer characteristics and online patronage preference. As a result, the association in this study seems to be weak. Second, this essay contributes by investigating both the direct and indirect effects of consumer characteristics on patronage preferences for Internet and local stores. Compared with much of the prior research, which focused on the statistical correlation between consumer characteristics and patronage preference (Bellman et al., 1999; Swinyard and Smith, 2003; y Monsuwé et al., 2004), this study not only explores the direct effects of consumer characteristics (i.e., gender, income, age, education, work status, experience of online shopping, and risk perception) on patronage preferences for the Internet and local stores through rigor methods, but also investigates the moderating effects of these socioeconomic factors on the relationships between the two goals of saving money and time, and consumer patronage preference. Third, this essay concludes relatively general results, through its usage of an Internet survey delivered in three of the world's largest online markets with different cultures and economic policies – the United States, Japan, and China. The fourth contribution relates to the method of data collection. Taking the difficulty of collecting data into consideration, the author improves the possibilities of data collection through experimental investigation and using stated preference data.

A few managerial insights can be drawn in light of the findings. First, managers of online markets and traditional markets should all make clear their own target consumers and adjust their managerial strategy for different market segments. Second, when tailoring their advertising strategies for males, online sellers should provide a relatively low price for goods and emphasize high efficiency in delivery. In contrast, it may be more effective to advertise shopping environment and product assortment to females. Third, Internet retailers should also provide more descriptions (e.g., performance of goods, specification, usage, and after service) for goods to reduce the level of consumer risk perception caused by information asymmetry. Lastly, managers in the online retail market need to enhance their reputations to reduce consumer perceived risk about vendor, attracting consumer patronage. Considering this tendency, e-commerce platforms should publish a reputation score of each store to consumers to boost their confidence.

Inevitably, this essay suffers from two key limitations. First, the author explores the indirect effects of consumer characteristics on patronage preference by analyzing the interactions with two online purchase goals – saving money and saving time. However, according to the study of Scarpi (2012), the hedonic orientation is also an important indicator that may influence consumer decision to buy. In light of the importance of hedonic orientation for consumer behavior, the author suggests that future research could add the moderating effects of consumer heterogeneity on hedonic orientation in online shopping into

consideration. The second limitation in this essay is that it focuses on only one product (i.e. clothing) to investigate the relationship between consumer characteristics and patronage preferences for the Internet and local stores but gives no consideration to the influence of product attributes. Therefore, it is also necessary to discuss the differences in the relationship between consumer characteristics and patronage preference across different product classes in future research.

Appendix

1. Questionnaires of Internet Survey

Dear everyone,

I appreciate your participation in my survey as it helps me to collect data for my research on the topic “Consumers’ patronage preferences for the Internet and local stores.” To complete the survey takes only about 5 minutes. Your information will be used strictly confidential. If you have further questions, you are welcomed to contact me via email (lzhen0205@gmail.com). Thank you a lot for your support and best regards.

— Zhen Li from Kobe University

(1). Demographics

1). Where are you from?

— A. China; B. the United States; C. Japan; D. Others

2). What is your gender?

— A. Male; B. Female

3). How old are you?

— A. Under 20; B. 20 – 29; C. 30 – 39; D. 40 – 49; E. Over 50

4). What’s your educational background at present?

— A. Under high school; B. College; C. Graduate (include MBA and Ph.D.)

5). What’s your level of monthly income at present?

— A. Less than \$5,000; B. \$5,000 to \$15,000; C. \$15,000 to \$30,000; D. \$30,000 to \$50,000; E. \$50,000 to \$80,000; F. More than \$80,000

6). How many days do you work per week?

— A. Less than 3 days; B. 3 days to 4 days; C. 5 days or above

(2). Perceived Risk

Read the following type of perceived risks, and answer “How risky do you feel shopping on the Internet is?” from 1= Not risky at all to 5=Very risky.

How risky do you feel shopping on the Internet is?					
Vendor-risk	1	2	3	4	5
Product-risk	1	2	3	4	5
Financial-risk	1	2	3	4	5
Psychological-risk	1	2	3	4	5
Time-risk	1	2	3	4	5
Privacy-risk	1	2	3	4	5

(3). Experience with Online Shopping

1). How many times do you shop online per month?

— A. Less than 3 times; B. 3 times to 9 times; C. 10 times or above

(4). Choice

Assume that you decided to buy an item. The total spendings and total shopping time are S_1 and T_1 for purchasing from a local store, while they are S_2 and T_2 for purchasing from the Internet. In addition, the delivery time for purchasing online is D_2 . Thus, which purchase pattern will you choose?

— A. Purchase from the Internet; B. Purchase from local store; C. Either

Note: The item is randomly given from a category of clothing; The costs of money and time in the Internet and physical stores are given by random stated preference data, whose ranges are based on the related information in Amazon.com.

2. Contingency Table Analysis

(1). Chi-square

$$\chi^2 = \sum_{i=1}^r \sum_{j=1}^c \frac{(f_{ij} - e_{ij})^2}{e_{ij}}$$

r is the total number of row; c is the total number of column; f_{ij} is the actual frequency in row i and column j ; e_{ij} is the expected frequency in row i and column j .

The degrees of freedom for χ^2 is $(r - 1)(c - 1)$.

(2). Coefficient of Contingency

1). φ Coefficient

$$\varphi = \sqrt{\frac{\chi^2}{n}}$$

2). C Coefficient

$$C = \sqrt{\frac{\chi^2}{\chi^2 + n}}$$

3). Cramer's V Coefficient

$$V = \sqrt{\frac{\chi^2}{n \cdot \min[(r - 1), (c - 1)]}}$$

4). Kendall Tau-b coefficient

$$\tau_b = \frac{n_c - n_d}{\sqrt{(n_0 - n_1)(n_0 - n_2)}}$$

where

$$n_0 = n(n - 1)/2$$

$$n_1 = \sum_i t_i (t_i - 1) / 2$$

$$n_2 = \sum_j u_j (u_j - 1) / 2$$

n_c = Number of concordant pairs

n_d = Number of discordant pairs

t_i = Number of tied values in the i^{th} group of ties for the first quantity.

u_j = Number of tied values in the j^{th} group of ties for the second quantity.

3. Choice Model and The Parameter Estimation with ML

(1). Choice Model

As it was said in Chapter 4 that suppose the respective total costs of in-shop and online purchases are $C(1)$, $C(2)$, and decisions of in-shop and online purchase depend on the difference between $C(1)$ and $C(2)$. Assumed that the total costs of in-shop and online purchases are defined as shown below respectively:

$$C(1) = X_1\beta_1 + \epsilon_1$$

$$C(2) = X_2\beta_2 + \epsilon_2$$

On the basis of the cost minimization principle, the decisions of online purchase can be calculated as:

$$C(1) - C(2) = X_1\beta_1 + \epsilon_1 - X_2\beta_2 - \epsilon_2 = (X_1\beta_1 - X_2\beta_2) + (\epsilon_1 - \epsilon_2) > 0$$

Assumed

$$C(\cdot) = C(1) - C(2)$$

$$X\beta + \epsilon = (X_1\beta_1 - X_2\beta_2) + (\epsilon_1 - \epsilon_2)$$

It means the cost function can be defined as:

$$C(\cdot) = X\beta + \epsilon$$

and the probability of online purchase can be written as:

$$\begin{aligned} \Pr(\text{online}) &= \Pr(X\beta + \epsilon > 0) \\ &= \Pr(\epsilon > -X\beta) \\ &= 1 - F(-X\beta) \end{aligned}$$

In this thesis, the error term ϵ obeys a standard logistic distribution. The respective probabilities of online and offline purchase can be expressed as:

$$F(-X\beta) = \frac{1}{1 + \exp\{X\beta\}}$$

$$\Pr(\text{online}) = 1 - F(-X\beta) = \frac{\exp\{X\beta\}}{1 + \exp\{X\beta\}}$$

(2). Maximum Likelihood Estimation (MLE)

Set y_0 means consumer make a in-shop purchase decisions, and y_1 means consumer make an online purchase decisions. Thus, the likelihood function can be expressed as:

$$\begin{aligned} L(\beta) &= \prod [\Pr(y_i)] \\ &= \prod_{y_0} [\Pr(y_0)] \prod_{y_1} [\Pr(y_1)] \\ &= \prod_{y_0} [F(-X\beta)] \prod_{y_1} [1 - F(-X\beta)] \\ &= \prod_{y_1} [1 - F(-X\beta)]^{y_1} [F(-X\beta)]^{1-y_1} \end{aligned}$$

Taken log of the likelihood function,

$$\log L(\beta) = \sum y_1 \log [1 - F(-X\beta)] + \sum (1 - y_1) \log [F(-X\beta)]$$

parameter β can be predicted as:

$$\frac{\partial \log L(\beta)}{\partial \beta} = 0$$

Chapter 5

In-depth Analysis of the Relationship between Seller Attributes and Consumer Online Purchases

Despite the importance of seller attributes on consumer buying behavior, the literature lacks an empirical study that examines the relationship between seller attributes and consumer online purchases. To investigate this relationship, in this study the author applies an estimation of GMM with dynamic models, and discusses the effects of seller attributes, which involve sales volume, the number of reviews, sales price, seller reputation, and seller types, on the quantities of consumer online purchases by using objective panel data collected from Taobao China. The findings in this essay suggest that 1). buyers are inclined to buy an item from a seller who sets lower prices in online shopping; 2). seller sales volume and the number of reviews in the current period relate positively to the quantity of consumer purchases in the next period; 3). reputation is positively related to consumer purchases in an online market; and 4). *Ceteris paribus*, online shoppers prefer buying items from B2C sellers rather than from C2C sellers. In addition, this study also finds that the relationship between seller attributes and the quantity of consumer purchases differs across product classes and seller types.

5.1 Introduction

In addition to the factors of product classes and consumer characteristics, consumer online purchases are significantly affected by seller types and attributes (Girard and Dion, 2010; Sheth, 1983). Despite the substantial discussions on seller attributes, prior studies usually focus on their characteristics (Eastlick and Feinberg, 1999; Girard et al., 2002; Reynolds, 1974). Although Mitchell (2001) suggested

that seller attributes may relate to consumer needs and motives, there is only a handful of empirical research on the effects of seller attributes on consumer online purchases (e.g., Utz et al., 2009; Ye et al., 2013). Therefore, the purpose of this essay is to attempt to further investigate the relationship between seller attributes and consumer online purchases.

While the relationship between seller attributes and consumer online purchases has received increased attention from many researchers in recent years, the discussions are still limited. Prior studies have discussed the effects of sales prices (Ellis-Chadwick et al., 2009), reputation ratings (Ye et al., 2009, 2013), reviews (Archak et al., 2011; Gu et al., 2012), and eWoM (i.e., word of mouth) (King et al., 2014) on consumer online purchases. However, because most of them only rely on surveys, analyses of the effects of seller attributes on consumer purchases also rest on a static stage. According to the study of Chevalier and Mayzlin (2006), the influences, in fact, should be dynamic. In addition, Becker (1991) has indicated that the demand of a typical consumer is related to the quantities demanded by other consumers. But the theory of network externality has not been introduced in the context of online shopping.

On the other hand, previous studies have not examined the moderating effects of product class and seller type on the relationship between seller attributes and consumer online purchases. The literature has identified the influential factors for consumer buying behavior as product class and seller attributes (Girard and Dion, 2010; Sheth, 1983). Meanwhile, the evidence has suggested that both of these two factors are linked to risk perceptions (Chaudhuri, 1998; Girard and Dion, 2010). Due to the difference in risk perception towards different product classes ¹, it is considered that the relationship between seller attributes and consumer online purchases may be moderated by the class of product. Additionally, most of the prior studies related to online shopping focused on a single market (i.e., the B2C market or the C2C market) (Chen and Chou, 2012; Dash and Saji, 2008; Jones and Leonard, 2008; Strader and Ramaswami, 2002; Ye et al., 2013). Nonetheless, the characteristics of seller attributes (e.g., seller size, resource, reputation, etc.) are different in the two online markets (Fan et al., 2013; Resnick and Zeckhauser, 2002; Wang et al., 2013). Therefore, the author claims that the influence of seller attributes on consumer online purchase are also related to seller type.

This essay explores the relationship between seller attributes and consumer online purchases by using Taobao's transaction data. Specifically, this study examines the effects of seller previous sales volume, number of reviews, price, and reputations on consumer online purchases, and investigates the differences in these effects among different product classes and seller types. In the essay, the author collects a total of 12 types of product and monthly transaction data for 5797 sellers from Taobao China for the period from May, 2014 to November, 2014, and builds a dynamic model to discuss the empirical issue. The results statistically show that 1). Buyers are inclined to buy a search or experience product from a seller

¹This conclusion has been confirmed in essay 1.

who sets lower prices in online shopping; 2). Seller sales volume and review numbers in the current period are positively related to the quantity of consumer purchases in the next period; 3). Reputation has a positive effect on consumer purchases, especially in C2C markets; and 4). Online shoppers prefer buying an item from B2C sellers rather than from C2C sellers.

The main contributions of this essay are reflected in four points. First, this research introduces the theory of network externality to an online shopping context. Second, the author investigates the differences in the relationship between seller attributes and consumer purchases across product classes and seller types. Third, the author applies a dynamic model to examine the relationship between seller attributes and consumer online purchases. Finally, compared to the prior studies that mainly rely on surveys, the data used in the essay is objective panel data, which can truly reflect consumer buying behavior in Internet shopping.

This essay is structured as follows: Section 2 reviews the literature and proposes related hypotheses. Section 3 describes the research methodology, including data collection, variable measurement, and modeling techniques. Section 4 introduces the techniques of GMM models, and explains the estimated results. Finally, Section 5 summarizes the findings, and describes the implications of the current research.

5.2 Reviews and Hypotheses

Consumer purchases are significantly influenced by retail outlet type and attributes (Sheth, 1983). Although Sheth's study primarily focused on traditional shopping behavior, the conclusions apply to the context of online shopping behavior as well (Ellis-Chadwick et al., 2009; Li and Liu, 2007; Ye et al., 2013). In addition, although the differences in seller attributes between different classes of product (Girard et al., 2002; Lynch et al., 2001) and types of seller (Fan et al., 2013; Wang et al., 2013) are well-established by many studies, the moderating effects of product class and seller type on the relationship between seller attributes and consumer online purchases have been more or less ignored in the literature. Therefore, in this section, the author reviews the effects of seller attributes on consumer online purchases first, and then decides to incorporate the factors of product class and seller type as two moderating roles into the model.

5.2.1 Seller Attributes

In the literature related to seller attributes, most of the studies focus on the characteristics of price (Brynjolfsson and Smith, 2000; Goel et al., 2010), sales volume (Li and Liu, 2007; Resnick and Zeckhauser, 2002; Ye et al., 2013), customer reviews (Archak et al., 2011; De Maeyer, 2012; Zhu and Zhang, 2010), and seller reputation (Ba and Pavlou, 2002; Hou, 2007; Ye et al., 2009, 2013).

Price competition easily occurs in the online market (Chevalier and Goolsbee, 2003). Since the

entry barrier to an online market is lower than that of a traditional market, online markets are nearly perfect in terms of competition (Brynjolfsson and Smith, 2000; Forman et al., 2009; Goolsbee, 2001). Previous studies have identified that most of the commodities in an online market accord with the law of demand, which means the price is negatively related to consumer demand (Degeratu et al., 2000). Because consumer buying decisions in online shopping are price-oriented, Ellis-Chadwick et al. (2009) found that most of online sellers prefer to adopt a low-price strategy to attract consumer patronage. Therefore, a hypothesis is stated as follow:

H3-1: Price relates negatively to consumer online purchases, which makes buyers more inclined to buy an item from a seller who sets low prices in online shopping.

An observation shows that consumers in online markets are more likely to buy from a seller who has a high sales volume. For instance, Li and Liu (2007) noted that shoppers in Taobao China prefer ranking the online stores by the accumulated sales volume in the previous 30 days before they purchase. According to the theory of network externality, the demand by a typical consumer is positively related to the quantity demanded by other consumers (Becker, 1991). Because of asymmetric information and uncertainty in the online market, these social influences relate positively to consumer demand (Liebowitz and Margolis, 1994; Katz and Shapiro, 1985), and enhance the trust between buyers and sellers (Lin and Lu, 2011). Hence, this essay has the following hypothesis:

H3-2: In online shopping, seller sales volume in the current period is positively related to the quantity of consumer purchases in the next period.

The volume and textual contents of product reviews are important determinants of consumer choice (De Maeyer, 2012; Zhu and Zhang, 2010). A number of studies regard the number of reviews as a surrogate for trade volume, and discuss the effects they have on consumer online shopping behavior (Chatterjee, 2001; Lee et al., 2011). Because the reviews can only be written by consumers who have already bought an item on e-commerce platform, it can intuitively reflect user evaluations, and help other consumers to reduce their psychological risks. In addition, prior research pointed out that positive content in the reviews related positively to consumer purchase decision, while negative content related negatively (Archak et al., 2011). Thus, a hypothesis is offered as follow:

H3-3: The number of reviews is positively related to the quantity of consumer online purchases.

Reputation is an invisible asset to a firm especially on electronic markets, where asymmetry of information and uncertainty blocks trust between buyers and sellers (Ba and Pavlou, 2002). This construct has long been related to seller sales performance (Standifird, 2001). Many e-commerce sites feature public online reputation systems to relieve trust problem and boost consumer confidence (Bolton et al., 2004; Grosskopf and Sarin, 2010; Rice, 2012). This is because a seller's reputation reduces consumer risk

perceptions (Jones and Leonard, 2008; Li and Zhang, 2002), and enhances the trust between buyers and sellers (Ba and Pavlou, 2002; Utz et al., 2009). Some studies have indicated that buyers are willing to pay more to high-reputation sellers (Shapiro, 1983). Although there are mixed results for the relationship between reputation and price premium (Jin and Kato, 2006; Strader and Ramaswami, 2002), almost all of the studies have indicated that reputation positively related to a seller's sales volume, which usually served as the quantity of consumer purchases (Dewan and Hsu, 2004; Li and Liu, 2007; Ye et al., 2013). Hence, a hypothesis is proposed as follow:

H3-4: Reputation relates positively to the quantity of consumer online purchases.

5.2.2 Seller Attributes and Product Classes

Perceived risks in e-commerce relate negatively to consumer purchase decisions (Forsythe and Shi, 2003). Girard and Dion (2010) reviewed the literature and indicated that the relationship between seller attributes and consumer purchases is rooted in the theory of perceived risk. Previous studies demonstrated that perceived risk is positively related to the effect of reputation on consumer purchase decisions (Kauffman and Wood, 2006; Utz et al., 2009), while it is negatively related to the relationship between price and demand (Depken and Gregorius, 2010; Ghose and Ipeiritis, 2009; Shapiro and Varian, 1999). This is because the degree of perceived risk attenuates the impact of price on demand. In essay 1, the author followed the study of Girard and Dion (2010), and confirmed that the levels of risk perception are significantly lower for service and search products compared with that for experience and credence products. Based on the conclusion related to the product difference in risk perception, this essay offers the following hypotheses:

H3-5a: The effect of price on consumer online purchases is higher for service and search products than for experience products.

H3-5b: The effect of reputation on consumer online purchases is lower for service and search products than for experience products.

5.2.3 Seller Attributes and Seller Types

Sellers in online consumer markets include B2C types (i.e., Business to Consumer) and C2C types (i.e., Consumer to Consumer). The difference in seller attributes between B2C sellers and C2C sellers has been established in the literature. As the name suggests, B2C sellers are officially registered commercial companies, while C2C sellers are individual agents (Laudon and Traver, 2007; Wigand, 1997). Compared with B2C sellers, C2C sellers are small in size but large in number. Some studies thus found that C2C sellers in online markets are highly homogeneous and face higher inter-type competition than B2C sellers (Jie, 2012; Mileti et al., 2011). In addition, trust and reputation differ between B2C and C2C sellers. A

number of studies found that the quality of items and services is found to be more trusted in B2C sellers than in C2C sellers (Corbitt et al., 2003; Fan et al., 2013; Gefen and Straub, 2004; McKnight et al., 2002).

Although the relationship between seller type and consumer online purchases has not been directly discussed by the literature, the present study posits that seller type directly affects consumer online purchases, and also moderates the relationship between other seller attributes and consumer purchases.

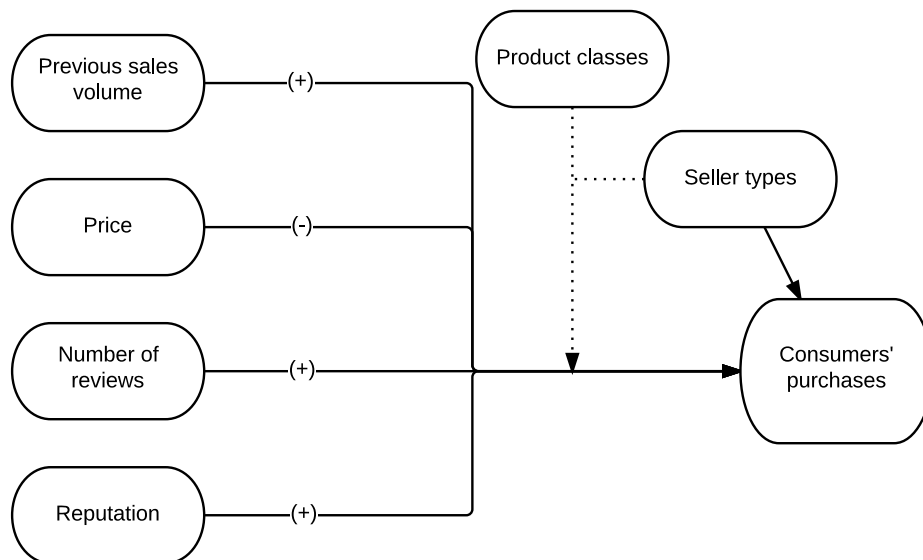
Considering these likely influences, hypotheses are proposed as follows:

H3-6a: Ceteris paribus, online shoppers prefer buying an item from B2C sellers rather than from C2C sellers.

H3-6b: The relationship between seller attributes and the quantities of consumer purchases differs significantly between B2C and C2C sellers.

Figure 5.1 represents the research framework for this essay.

Figure 5.1: Research framework



5.3 Method

The author presents the process of data collection, and constructs model for the data analysis in this section.

5.3.1 The Data

To verify the hypotheses above, the author focuses the study on the relationship between seller attributes and consumer online purchases by using Buy-It-Now (BIN) panel data. The data for the entire analysis is retrieved from Taobao China by using a net crawler program for the period from May, 2014 to November, 2014. Because the BIN data is objective, it can ensure the authenticity and validity of the conclusions drawn from the data.

Taobao was China’s largest and the world’s second largest online shopping destination in terms of gross merchandise volume in 2013, having both B2C markets (i.e., T-mall) and C2C markets (i.e., Taobao marketplace). By the end of 2013, Taobao had 370 million registered participants, 2.6 million online shops, and exceeded \$248 billion in annual sales (CECRC, 2014).² According to the three month Alexa traffic rankings, Taobao is ranked 11th worldwide. Therefore, this study thinks the data from Taobao China has a certain credibility, and can truly reflect consumer buying behavior in Internet shopping.

Twelve categories of products among the “Search”, “Experience”, and “Service” classes have been selected for this essay. Based on the literature (Girard et al., 2002; Girard and Dion, 2010; Wan et al., 2012), “Search” products in this study include books, flowers, movie tickets, and iPhones; “Experience” products include t-shirts, jeans, canvas shoes, hats, handbags, and storage boxes; “Service” products include mobile recharge, and travel visas. A total of 5797 sellers’ monthly transaction records for the whole period were crawled. After deleting any invalid data caused by system error (e.g, missing values), the sample size and time period are shown in the following table (table 5.1).

Table 5.1: Product classifications and sample size

	Product	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Total
Search	books	159	155	156	154	159	159	159	1101
	flowers	165	157	160	157	162	164	165	1130
	movie tickets	528	520	522	519	521	526	527	3663
	iPhones	90	87	86	87	89	89	90	618
Experience	t-shirts	586	554	560	569	574	579	584	4006
	jeans	703	689	692	694	694	698	701	4871
	shoes	614	597	601	605	601	606	611	4235
	hats	717	703	700	704	706	712	716	4958
	handbags	620	596	596	605	605	615	618	4255
	storage boxes	787	762	775	772	776	779	785	5436
Service	mobile recharge	723	710	713	712	708	720	721	5007
	travel visas	96	96	95	95	96	96	96	670
	Total	5788	5626	5656	5673	5691	5743	5773	39950

²“Data Monitoring of China’s E-commerce Market in 2013”, China Electronic Commerce Research Center. http://www.100ec.cn/zt/upload_data/down/2013ndbgqw.pdf

5.3.2 Measurement and Descriptive Statistics

5.3.2.1 Variables

After checking the monthly transaction records which are crawled from Taobao China, seller attributes in this study are measured by monthly sales volume, cumulative number of reviews, commodity price, express fee, several indicators related to seller reputation, and seller type.

(1). Sales volume

In economic theory, sales volume represents the demand for a given item. According to the “Howard and Sheth Model” (Howard and Sheth, 1969), consumers make purchase decisions based on acquired information. In consumer markets, these responses or decisions of consumer buying behavior are directly reflected in the volume of sales (Howard, 1977). In the transaction records which crawled from Taobao, this measurement denotes the accumulated sales volume in the previous 30 days for the given item. However, the total demand of the item and the number of sellers are different across product types and times, which cause a difference in the mean and standard deviation of sales volume for each item. To avoid this difference, therefore, this essay calculates the a standard score for sales volume by product type and time period. The calculation formula is processed as follow:

$$Std_Sales_{i,t} = \frac{Sales_{i,j,t} - \overline{Sales}_{j,t}}{Std.Dev(Sales_{j,t})}$$

The subscripts of i , j , and t indicate the identification of seller, product category, and period.

(2). Number of reviews

In addition to sales volume, the number of reviews is another indicator to show the results of consumer buying behavior in Internet shopping. Since the reviews can only be written by consumers who have already bought the item on the e-commerce platform, many studies regard the number of reviews as a surrogate for trade volume, and discuss the effects of them on consumer online shopping behavior (Chatterjee, 2001; Lee et al., 2011). Empirically, because of imperfect information in online shopping, it can be observed that buyers will sort the goods by the number of reviews before making a purchase decision. In Taobao, this measurement reflects the accumulated review numbers for a given item. Similar to sales volume, this study standardized the variable of review numbers as follow:

$$Std_Reviews_{i,t} = \frac{Reviews_{i,j,t} - \overline{Reviews}_{j,t}}{Std.Dev(Reviews_{j,t})}$$

(3). Price

Price directly affects the demand of the market. In an online market, with the huge number of sellers and the serious homogeneity of competition, most of the sellers adopt a low-price strategy to attract

customers (Ellis-Chadwick et al., 2009; Wang et al., 2013). Price information for a given item in Taobao includes the usual price and promotion price. Because the promotions occur depending on the time, the author chooses the final sales price to measure the variable of “Price” (Bell and Lattin, 1998; Chiang and Dholakia, 2003), which means the values of “Price” for the same item which was crawled from monthly records may differ across the time period. Similarly, the standard score of price was calculated to avoid bias from the product type and time period.

$$Std_Price_{i,t} = \frac{Price_{i,j,t} - \overline{Prices_{j,t}}}{Std.Dev(Price_{j,t})}$$

(4). Reputation

In an online market, asymmetry of information and uncertainty blocks trust between buyers and sellers (Ba and Pavlou, 2002). According to the literature, reputation is an invisible asset to reduce risk perception for buyers, and contribute to better sales performance for sellers (Utz et al., 2009; Ye et al., 2009, 2013). Therefore, most of the e-commerce platforms feature public online reputation systems to relieve the trust problem (Bolton et al., 2004). Taobao provides many indicators to show seller reputation.

Firstly, in both the B2C market and the C2C market, three 5-point scale scores, namely *Item Score*, *Service Score*, and *Shipping Score*, are provided to indicate the levels of overall reputation. These three scores respectively denote the average rating on a 5 point scale detailed seller ratings for “Item as Described”, “Service”, and “Shipping time.”

Secondly, three additional reputation indicators are provided in the C2C market, where sellers and their products need not be certified before entering the market. *Shop Level* identifies the scale and reputation rating of a seller. It is calculated based on the accumulated reputation score of the seller. *Feedback* represents the amount of “Positive”, “Neutral”, and “Negative” feedback from customers from “Last week”, “Last month”, “Last 6 months”, and “6 months ago.” *Feedback Rate* indicates the percentage of positive feedback ratings, which is processed by the following equation.

$$FeedbackRate_{i,t} = \frac{Num.of\ Positive\ feedback_{i,t}}{Num.of\ Total\ feedback_{i,t}}$$

Following the previous studies, this study measures seller reputation by three 5-point scale scores (Zhang and Zhang, 2011), *Shop Level*, *Feedback Rate*, and the number of positive ratings, which is named *Feedback Num* (Ba and Pavlou, 2002). The author calculates the natural logarithm of *Feedback Num* and add one cent to avoid taking the logarithm of zero, i.e., $\ln(FeedbackNum_{i,t} + 1)$

(5). Seller type

Due to the differences in industry, resource level, and reputation level between B2C and C2C seller types, consumers that consider purchasing from B2C sellers are attracted mainly by the greater trust in

quality, while those who choose to buy from C2C sellers seemed to be attracted by the low price (Fan et al., 2013; Yoo et al., 2007). Therefore, the author posits that consumer buying behavior may present different states across the two seller types. A dummy variable $B2C_seller$ is proposed to measure the difference in buying behavior, which takes the value of 1 if the seller is a “B2C-seller.”

$$B2C_seller_i = \begin{cases} 1, & \text{if seller is a B2C seller} \\ 0, & \text{if seller is a C2C seller} \end{cases}$$

(6). Control Variables

Furthermore, this study introduces two control variables, express fee and product classification dummies, denoted Fee and $D_ClassName$ (i.e., D_Search , $D_Experience$, and $D_Service$) respectively. Fee represents the express fee for a purchase; D_Search , $D_Experience$, and $D_Service$ are three dummies which indicate the product classifications of each item (i.e., search product, experience product, and service product).

5.3.2.2 Descriptive Statistics

Table 5.2 provides the descriptive statistics of the above variables for the overall sample and for different types of markets; Table 5.3 outlines a correlation matrix related to the variables; Table 5.4 shows the differences in primary indicators between B2C and C2C sellers using t-tests.

As expected, the results of the t-tests are significant. B2C sellers have a significantly higher performance with respect to monthly sales volume ($t = 6.72$, $p < 0.01$) and total number of reviews ($t = 42.77$, $p < 0.01$) than C2C sellers. This indicates that B2C sellers are more effective in attracting customer patronage in an online market. Indicators related to reputation, $Item\ Score$ ($t = 43.08$, $p < 0.01$) and $Shipping\ Score$ ($t = 13.24$, $p < 0.01$), for B2C sellers are also significantly higher than for C2C sellers. In contrast, compared with B2C sellers who have relatively high reputations, C2C sellers seemed to have relatively low prices ($t = -41.89$, $p < 0.01$). These findings are consistent with the conclusions of Fan et al. (2013) and Yoo et al. (2007), which demonstrate that customers are attracted to buying from B2C sellers by high quality and reputation, while they are attracted to C2C sellers because of the low price.

5.3.3 Model

By looking up the literature and dataset character of Taobao, the author notes that in the Taobao market, buyer purchase decisions in period t are determined by seller attributes provided in the same period; their purchase results are directly shown in the seller sales volumes in the next period (i.e., $t+1$). In other words, the sales volumes in period t are affected by seller attributes including sales volumes in period $t-1$. Secondly, given that reviews can only be written by customers who have bought the item

Table 5.2: Descriptive statistics

	Search Products (Obs.= 6512)					Experience Products (Obs.= 27761)					Service Products (Obs.= 5677)				
	Median	Mean	Std.Dev	Min	Max	Median	Mean	Std.Dev	Min	Max	Median	Mean	Std.Dev	Min	Max
<i>Std_Sales</i>	-0.17	0.00	1.00	-1.09	19.84	-0.31	0.00	1.00	-1.23	18.90	-0.28	0.00	1.00	-0.53	15.06
<i>Std_Reviews</i>	-0.26	0.00	1.00	-0.78	14.01	-0.25	0.00	1.00	-0.48	18.35	-0.27	0.00	1.00	-0.84	11.29
<i>Std_Price</i>	0.17	0.00	1.00	-19.84	1.09	-0.25	0.00	1.00	-1.53	12.50	-0.13	0.00	1.00	-1.13	9.05
<i>Fee [CNY]</i>	0.00	0.99	2.86	0.00	10.00	0.00	0.85	2.56	0.00	10.00	0.00	0.04	0.61	0.00	10.00
<i>Item Score</i>	4.90	4.82	0.10	4.60	4.90	4.80	4.76	0.12	4.50	4.90	4.90	4.85	0.08	4.60	4.90
<i>Service Score</i>	4.90	4.82	0.10	4.60	4.90	4.80	4.77	0.12	4.60	4.90	4.90	4.81	0.11	4.60	4.90
<i>Shipping Score</i>	4.90	4.82	0.10	4.60	4.90	4.80	4.76	0.12	4.60	4.90	4.90	4.83	0.10	4.60	4.90
<i>B2C_seller</i>	0.00	0.13	0.34	0.00	1.00	0.00	0.32	0.47	0.00	1.00	1.00	0.98	0.14	0.00	1.00

	C2C Seller (Obs.=24594)					B2C Seller (Obs.=15356)				
	Median	Mean	Std.Dev	Min	Max	Median	Mean	Std.Dev	Min	Max
<i>Std_Sales</i>	-0.27	-0.03	0.96	-1.14	19.84	-0.28	0.04	1.06	-1.23	15.94
<i>Std_Reviews</i>	-0.27	-0.17	0.53	-0.84	14.01	-0.20	0.26	1.42	-0.80	18.35
<i>Std_Price</i>	-0.24	-0.16	0.84	-19.84	12.50	-0.06	0.26	1.17	-7.16	11.33
<i>Fee [CNY]</i>	0.00	1.13	2.96	0.00	10.00	0.00	0.17	1.05	0.00	10.00
<i>Item Score</i>	4.80	4.76	0.13	4.50	4.90	4.90	4.81	0.11	4.60	4.90
<i>Service Score</i>	4.80	4.79	0.12	4.60	4.90	4.80	4.79	0.11	4.60	4.90
<i>Shipping Score</i>	4.80	4.77	0.12	4.60	4.90	4.80	4.79	0.12	4.60	4.90
<i>D_Search</i>	0.00	0.23	0.42	0.00	1.00	0.00	0.06	0.23	0.00	1.00
<i>D_Experience</i>	1.00	0.77	0.42	0.00	1.00	1.00	0.58	0.49	0.00	1.00
<i>D_Service</i>	0.00	0.00	0.07	0.00	1.00	0.00	0.36	0.48	0.00	1.00
<i>Shop Level</i>	11.00	11.57	2.81	6.00	20.00	.	.	.	.	.
<i>Feedback Rate [%]</i>	98.53	97.98	2.30	74.56	100.00	.	.	.	.	.
<i>ln(Feedback Num+1)</i>	7.72	7.94	1.95	1.79	13.57	.	.	.	.	.

Note: units in brackets.

Table 5.3: Correlation coefficient results

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
[1] <i>Std_Sales</i>	1.00									
[2] <i>Std_Reviews</i>	0.31	1.00								
[3] <i>Std_Price</i>	-0.32	-0.12	1.00							
[4] <i>Fee</i>	-0.01	-0.01	-0.03	1.00						
[5] <i>Item Score</i>	-0.02	0.02	0.16	0.06	1.00					
[6] <i>Service Score</i>	-0.02	0.01	0.14	0.05	0.41	1.00				
[7] <i>Shipping Score</i>	-0.03	0.02	0.15	0.06	0.45	0.39	1.00			
[8] <i>Shop Level</i>	0.08	0.08	-0.17	0.33	-0.07	-0.06	-0.07	1.00		
[9] <i>Feedback Rate</i>	-0.01	0.03	0.18	0.09	0.23	0.21	0.22	0.04	1.00	
[10] $\ln(\text{Feedback Num}+1)$	0.12	0.05	-0.19	0.28	-0.15	-0.12	-0.14	0.86	-0.02	1.00

Table 5.4: t-test results

	t-statistics	C2C Seller (Obs.=24594)		B2C Seller (Obs.=15356)	
		Mean	Std. Dev.	Mean	Std. Dev.
<i>Std_Sales</i>	-6.72 ***	-0.03	0.96	0.04	1.06
<i>Std_Reviews</i>	-42.77 ***	-0.17	0.53	0.26	1.42
<i>Std_Price</i>	-41.89 ***	-0.16	0.84	0.26	1.17
<i>Item Score</i>	-43.08 ***	4.76	0.13	4.81	0.11
<i>Service Score</i>	-1.60	4.79	0.12	4.79	0.11
<i>Shipping Score</i>	-13.24 ***	4.77	0.12	4.79	0.12

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

on Taobao, and that review number in period $t-1$ shows the cumulative number of reviews for a given item from the initial period to period $t-1$, it indicates that the review number in period $t-1$ will also be affected by the cumulative number of reviews in $t-2$. Therefore, this essay confirms the correlation between sales volume and the number of reviews (see table 5.5), and posits that review numbers are an endogenous variable. In addition, since Taobao is a perfectly competitive market with a huge number of buyers and sellers (Ye et al., 2013), sales prices for each seller can be seen as an exogenous variable.

Therefore, this study forms the following simultaneous equations to explore the relationship between seller attributes and consumer buying behavior in online shopping, and tests the hypotheses which are proposed in section 2.

[Model 1]

$$\text{Std_Sales}_{i,t} = \beta_0 + \beta_1 \text{Std_Sales}_{i,t-1} + \beta_2 \text{Std_Reviews}_{i,t-1} + \beta_3 \text{Std_Price}_{i,t-1} + \beta_4 \text{Fee}_{i,t-1} + \text{score}_{i,t-1} \mathbf{b}_5 + \text{reputation}_{i,t-1} \mathbf{b}_6 + \beta_7 \text{B2C_seller}_i + \text{product_dummy} + \text{month_dummy} + u_{i,t} + e_i$$

[Model 2]

$$\text{Std_Reviews}_{i,t-1} = \alpha_0 + \alpha_1 \text{Std_Reviews}_{i,t-2} + \epsilon_{i,t-1} + \delta_i$$

(for $i = 1, 2, \dots, N$ and $t = 1, 2, \dots, T$ in both two models)

Table 5.5: Correlation between reviews number and sales volume

	Std_Sales_t	Std_Sales_{t-1}	$Std_Reviews_{t-1}$	$Std_Reviews_{t-2}$
Std_Sales_t	1.000			
Std_Sales_{t-1}	0.916***	1.000		
$Std_Reviews_{t-1}$	0.374***	0.374***	1.000	
$Std_Reviews_{t-2}$	0.374***	0.349***	0.973***	1.000

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

In model 1, \mathbf{score}_i represents the vector of seller i 's 5-point scale scores, including *Item Score*, *Service Score*, and *Shipping Score*; $\mathbf{reputation}_i$ represents the vector of seller i 's other reputation factors, which include *Shop Level*, *Feedback Rate*, and *Feedback Num*, if seller i is a C2C seller.

Two points are worth noting in the above simultaneous equations. The first point is that the explained variable in model 2 is an explanatory variable in model 1, which means the variable of $Std_Reviews_{i,t-1}$ can be regarded as an endogenous variable in model 1 in statistical theory. Thus, it causes the equations to need to be estimated by instrumental variables methods, or the estimated results of the parameter will not meet criteria for unbiasedness and consistency (Vella and Verbeek, 1999). The second point is that the models are dynamic. Specifically, in both model 1 and model 2, the lag of each explained variable enters the model as an explanatory variable. It makes the within estimator inconsistent in the case that it is analyzed using a static panel estimation with fixed effects³ (Wooldridge, 2012). Given these two reasons, the author decided to estimate the models by using GMM⁴ (i.e., Generalized Method of Moment).

In the next stage of econometric analysis, the author will demonstrate the analysis results estimated by GMM, and explore the effects of seller attributes on consumer buying behavior in Internet shopping.

5.4 Analysis

Because the coefficients of variables which will not change with time series (e.g., product classes, and seller types) cannot be estimated in a difference GMM model (Roodman, 2009), the author adopts a system GMM model to estimate the relationship between seller attributes and consumer buying behavior in online shopping. According to the nature of system GMM, it includes both difference equations and level equations, which can improve the efficiency of the estimator (Cameron and Trivedi, 2009).

The analysis in this section is divided into two stages. In first stage, the author explores the relationship between seller attributes and consumer online purchases, and compares the relationship across the classes of product. In the second stage, the author subdivides seller types into B2C and C2C types, and compares the relationship between seller attributes and consumer online purchases across product

³See the appendix for the proofs.

⁴See the appendix for the principle of estimation.

classes and seller types.

5.4.1 Estimated Results Across Product Classes

In the first stage, the author discusses the difference in the effects of seller attributes on consumer online buying behavior across the three product classes, i.e., search products, experience products, and service products. Table 5.6 summarizes the estimated results of the GMM models grouped by product class. As mentioned above, $Std_Sales_{i,t-1}$ and $Std_Reviews_{i,t-1}$ are endogenous variables, while others are exogenous. Model (1) uses the second to the third lags of endogenous variables as additional instruments; model (2) adopts the second to fifth lags of endogenous variables as additional instruments.

As shown in the table, the tests of Arellano-Bond for AR(1) in all of the models are significant ($p < 0.01$). This means using the first lag of the dependent variable is reasonable. Meanwhile, the tests of Arellano-Bond for AR(2) and the tests of Hansen for over-identification are non-significant ($p < 0.05$), though model (1) in search products and model 2 in experience products are significant at Difference-in-Hansen IV (both of them at $p = 0.09$). According to Hansen (1982) and Roodman (2009), the author believes that the estimated results in analysis are consistent.

(1). Sales volume

In all six models, the coefficients of the variable Std_Sales_{t-1} are positive and significant ($p < 0.01$). These results suggest that the sales volume in the Taobao market will be significantly affected by itself in the previous period. In other words, consumers prefer to buy an item from a store which many consumers bought from in previous periods. This conclusion supports the hypothesis that consumers make a buying decision based on the previous sales volume. Additionally, by using F-tests, the effect of Std_Sales_{t-1} is significantly higher for experience product than for search products ($F_{(1,5772)} = 3.88, p < 0.05$), while this effect does not significantly differ between experience and service products ($F_{(1,5772)} = 0.78, p = 0.38$).

(2). Number of reviews

Similar to the estimated results of Std_Sales_{t-1} , the coefficient of the variable $Std_Reviews_{t-1}$ is positive and significant for all three classes of the products ($p < 0.1$). This finding means that in addition to the sales volume, the cumulative number of reviews also significantly affects the sales volume in the next period. Hence, the hypothesis that customers are more likely to purchase from a seller who has a relatively high number of reviews is supported. However, the results performed by F-statistics show the differences in the effect of $Std_Reviews_{t-1}$ on Std_Sales_t across the three types of products are non-significant.

(3). Price

As revealed in the table, the sales price enters the demand function as an exogenous variable with significant negative effects on search products ($p < 0.05$) and experience products ($p < 0.01$). However,

Table 5.6: Estimated results of GMM across product classes

<i>Std_Sales_t</i>	Search		Experience		Service	
	(1)	(2)	(1)	(2)	(1)	(2)
<i>Std_Sales_{t-1}</i>	0.674*** (7.06)	0.683*** (6.88)	0.705*** (29.34)	0.748*** (31.00)	0.788*** (25.27)	0.797*** (23.37)
<i>Std_Reviews_{t-1}</i>	0.105* (1.70)	0.099* (1.76)	0.090*** (3.63)	0.073*** (3.33)	0.117*** (4.59)	0.113*** (4.38)
<i>Std_Price_{t-1}</i>	-0.666*** (-8.58)	-0.670*** (-8.81)	-0.029*** (-6.61)	-0.025*** (-6.34)	-0.003 (-0.92)	-0.003 (-0.85)
<i>Fee_{t-1}</i>	-0.012** (-2.21)	-0.012** (-2.18)	-0.002 (-1.34)	-0.001 (-1.31)	-0.002 (-1.28)	-0.002 (-1.22)
<i>Item Score_{t-1}</i>	0.027 (0.47)	0.029 (0.50)	0.062** (2.48)	0.058** (2.32)	0.059 (1.08)	0.065 (0.19)
<i>Service Score_{t-1}</i>	0.098* (1.72)	0.100* (1.71)	0.055** (2.33)	0.071*** (2.97)	0.143*** (2.67)	0.148*** (2.73)
<i>Shipping Score_{t-1}</i>	0.034 (0.60)	0.029 (0.51)	0.043* (1.80)	0.038 (1.58)	0.073 (1.40)	0.076 (1.45)
<i>B2C_seller</i>	0.092* (1.95)	0.092** (2.00)	0.114*** (7.20)	0.062*** (4.35)	0.116*** (7.27)	0.118*** (7.11)
<i>Category Dummies</i>	...	...	...	...	...	...
<i>Month Dummies</i>	...	...	...	...	...	...
<i>_cons</i>	-0.767 (-1.56)	-0.758 (-1.52)	0.353* (1.94)	0.340* (1.88)	-0.309 (-0.63)	-0.366 (-0.74)
Number of groups	939	939	4018	4018	816	816
F-statistics	38.41***	41.04***	127.37***	153.27***	393.66***	403.66***
Number of instruments	43	53	45	55	41	51
Arellano-Bond test for AR(1)	-5.63***	-5.51***	-2.04***	-2.02***	-7.39***	-7.40***
Arellano-Bond test for AR(2)	1.27	1.23	1.86	1.85	-0.12	-0.10
Hansen test (Chi ²)	35.23	45.59	34.08	46.38	32.11	45.90
Diff-in-Hansen GMM (Chi ²)	13.63	15.64	14.67	13.93	13.42	10.51
Diff-in-Hansen IV (Chi ²)	21.54*	20.24	23.46	25.17*	10.03	13.27
Lag Intervals for Endogenous	2-3	2-5	2-3	2-5	2-3	2-5

Note: t statistics in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

it fails to emerge as a significant influencing factor on service products. This finding indicates that in search and experience product markets, online sellers can attract consumers to purchase their items with low prices. By contrast, a low-price strategy may not be effective for sellers who provide service products in an online market. One possibility is that the number of sellers who mainly deal with service products is much fewer than the number of those who mainly deal with search or experience products in an online market. Therefore, the hypothesis which denotes buyers are inclined to buy an item from a seller who sets lower prices is partially supported. In addition, the difference in the effect of price on consumer purchases between search and experience products is performed by F-test. The price effect is more significantly pronounced for search products than for experience products ($F_{(1,5772)} = 11.24$, $p < 0.01$).

(4). Fee

As expected, express fee appears significant only in search products. Given that a feature of search products is standardization, product performance of the same item will not differ much between different online stores, which makes the market fall into low-price competition much more easily. As a result, cost saving has become the highest concern for consumers in online shopping when they buy search products. Also, this result can be regarded as a complementary explanation to the findings related to the effects of price on consumer online buying behavior.

(5). Seller scores

Since the analysis in a one dimensional comparison does not discuss the difference between B2C and C2C sellers, reputation factors here denote the three 5-point scale scores for each seller, which include *Item Score*, *Service Score*, and *Shipping Score*. The estimated results demonstrate that *Item Score* significantly affects consumer buying only for experience products, while the significance of *Shipping Score* nearly disappears in all three classes of product. By contrast, the coefficients of *Service Score* are shown to be significant for all three classes. For search products, because a consumer can easily obtain detailed information about an item before transacting, consumer risk perceptions of product performance seems to be marginal (Girard et al., 2002; Girard and Dion, 2010). For service products, since the characteristics of service with intangibility and perishability, the ratings for "Item as Described" are most visible on the lever of service. Two F-tests are performed to check the difference in the effects of Service Score on customer buying across the three classes of products ($F_{(1,5772)} = 7.35$, $p < 0.01$), but does not significantly differ between search and experience products ($F_{(1,5772)} = 0.85$, $p = 0.36$).

(6). Seller type

Finally, estimated results for the dummy variable of B2C sellers demonstrate that all of the coefficients are positive and significant. This finding points out that compared to purchasing from individual agents,

buyers exhibit a greater tendency towards purchasing from a seller who is an official flagship store or has official authorization. Therefore, the hypothesis which states *ceteris paribus*, that online shoppers prefer to buy an item from B2C sellers rather than from C2C sellers is supported.

5.4.2 Estimated Results Across Product Classes and Seller Types

In the second stage, the author discusses the differences in the effects of seller attributes on consumer online buying behavior across the product classes and seller types by using GMM. Similar to the estimations in one dimensional comparison, number of reviews is regarded as an endogenous variable in addition to the first lags of sales volume, while others are considered as exogenous variables. Table 5.6 demonstrates the results of the estimations. However, the sample number of groups for service products for C2C sellers is only 16, which may cause the estimated results to be statistically weak. Because there is more perceived risk about vendors in service products, the sellers need to complete complex certification processes before entering the Taobao market, which results in the smaller number of C2C sellers.

Similarly, the rationality of the models is checked through Arellano-Bond and Hansen tests. The results of these statistical tests show that Arellano-Bond for AR(1) are significant (at $p < 0.01$) in all of the models. In contrast, the statistics of AR(2) and the tests of Hansen for over-identification are non-significant. Therefore, the models are proved to be effective and consistent.

(1). Sales volume

Estimated results demonstrate that the effect of sales volume in the previous period on customer buying is positive and significant in all of the models. This finding is consistent with the estimated results across product classes (Subsection 5.4.1), which indicates that consumers are more likely to make a purchase from a seller who has a better previous sales volume. After checking through F-statistics, the difference in sales volume between B2C and C2C sellers for each class of product is non-significant.

(2). Reviews number

For the effect of the cumulative number of reviews on consumer online buying behavior, the coefficient in all of the models is revealed as positive and significant, in addition to the estimated results of sales volume. In other words, besides purchasing from a seller with a better sales volume, consumers also prefer to buy an item from an online store which has a relatively large number of reviews. One interesting finding is that while the effect of review numbers does not significantly differ between B2C and C2C sellers for search products, the seller difference in the estimated results for experience ($F_{(1,4017)} = 8.92$, $p < 0.01$) and service products ($F_{(1,815)} = 4.67$, $p < 0.05$) is strongly significant. This means that for experience and service products with a relatively high perceived risk, consumers are more concerned with the cumulative number of reviews for C2C sellers than for B2C sellers.

(3). Price

Table 5.7: Estimated results of GMM across product classes and seller types

<i>Std_Sales_t</i>	Search				Experience				Service			
	B2C Seller		C2C Seller		B2C Seller		C2C Seller		B2C Seller		C2C Seller	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
<i>Std_Sales_{t-1}</i>	0.596*** (8.39)	0.656*** (11.05)	0.664*** (6.55)	0.669*** (6.43)	0.722*** (13.99)	0.776*** (14.80)	0.622*** (23.12)	0.649*** (22.33)	0.788*** (25.29)	0.798*** (23.38)	0.395*** (3.81)	0.430*** (4.29)
<i>Std_Reviews_{t-1}</i>	0.117** (2.10)	0.097** (2.03)	0.116* (1.81)	0.117** (2.05)	0.072*** (3.17)	0.049*** (2.67)	0.657*** (3.03)	0.707*** (2.77)	0.117*** (4.58)	0.113*** (4.38)	0.642*** (3.35)	0.585*** (3.08)
<i>Std_Price_{t-1}</i>	-0.848*** (-16.84)	-0.858*** (-17.89)	-0.629*** (-7.28)	-0.639*** (-7.38)	-0.029*** (-3.75)	-0.025*** (-3.55)	-0.022*** (-3.69)	-0.019*** (-3.14)	-0.003 (-0.92)	-0.003 (-0.86)	0.001 (0.02)	-0.002 (-0.04)
<i>Fee_{t-1}</i>	-0.032** (-2.25)	-0.029** (-2.33)	-0.007** (-2.25)	-0.007** (-2.21)	-0.004 (-0.94)	-0.003 (-0.89)	-0.002 (-0.78)	-0.001 (-0.40)	-0.002 (-1.26)	-0.001 (-1.19)		
<i>Item Score_{t-1}</i>	0.027 (0.172)	0.027 (0.17)	0.017 (0.29)	0.022 (0.36)	0.061 (1.28)	0.060 (1.23)	0.063** (2.12)	0.062** (2.07)	0.030 (0.53)	0.036 (0.65)	0.030 (0.38)	0.024 (0.29)
<i>Service Score_{t-1}</i>	0.366** (2.32)	0.352** (2.34)	0.157*** (2.60)	0.154** (2.49)	0.080* (1.84)	0.076* (1.74)	0.109*** (3.72)	0.119*** (3.97)	0.145*** (2.67)	0.150*** (2.73)	0.158** (2.29)	0.177** (2.51)
<i>Shipping Score_{t-1}</i>	0.159 (0.98)	0.148 (0.92)	0.039 (0.68)	0.027 (0.48)	0.045 (1.01)	0.043 (0.95)	0.022 (0.75)	0.022 (0.76)	0.042 (0.80)	0.045 (0.84)	0.121 (0.90)	0.116 (0.87)
<i>Shop Level_{t-1}</i>			0.022** (2.42)	0.022** (2.49)			0.027*** (5.33)	0.027*** (4.89)			0.000 (0.01)	0.000 (0.02)
<i>Feedback Rate_{t-1}</i>			0.002 (0.49)	0.001 (0.44)			0.000 (0.26)	0.000 (0.22)			0.005 (0.83)	0.005 (0.75)
<i>ln(Feedback Num_{t-1}+1)</i>			0.037*** (2.71)	0.036*** (2.69)			0.044*** (6.30)	0.039*** (5.43)			0.006 (0.21)	0.007 (0.24)
<i>Category Dummies</i>	...	...	...	...	...	...	...	...	...	...	...	...
<i>Month Dummies</i>	...	...	...	...	...	...	...	...	...	...	...	...
<i>_cons</i>	2.693** (2.06)	2.475* (1.97)	-0.981* (-1.68)	-0.937 (-1.62)	0.249 (0.74)	0.258 (0.76)	0.333 (1.17)	0.383 (1.31)	-0.272 (-0.56)	-0.330 (-0.67)	1.872 (1.44)	1.787 (1.38)
Number of groups	126	126	813	813	1293	1293	2725	2725	800	800	16	16
F-statistics	101.74***	115.13***	24.28***	26.66***	50.51***	69.49***	113.46***	121.01***	325.81***	325.28***	123.33***	133.27***
Number of instruments	42	52	45	55	44	54	47	57	40	50	41	51
Arellano-Bond test for AR(1)	-2.35**	-2.32**	-3.04***	-3.04***	-11.43***	-11.43***	-5.28***	-5.94***	-7.37***	-7.38***	-2.87***	-2.91***
Arellano-Bond test for AR(2)	1.28	1.24	1.62	1.51	1.39	1.43	1.58	1.55	-0.11	-0.10	-0.94	-0.92
Hansen test (Chi ²)	34.41	45.40	31.66	39.08	35.28	43.23	29.28	35.54	32.48	42.68	0.88	1.11
Diff-in-Hansen GMM (Chi ²)	13.66	15.97	14.13	14.56	13.69	11.97	15.35	13.44	14.37	15.18	0.32	0.12
Diff-in-Hansen IV (Chi ²)	21.00	18.94	24.50	23.97	18.97	17.60	23.46	21.85	9.02	13.62	1.17	1.15
Lag Intervals for Endogenous	2-3	2-5	2-3	2-5	2-3	2-5	2-3	2-5	2-3	2-5	2-3	2-5

Note: t statistics in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

The analysis shows that the coefficients of price are negative in all of the models, while they are significant in the models for search and experience products, which is in agreement with the estimated results in the comparisons across product classes. This finding indicates that for search and experience products, price competition is very dramatic in online markets, which makes both B2C and C2C sellers expand their sales volume by small profits but quick turnover. Therefore, it can be considered that consumers tend to be price-oriented when they buy search or experience products in an online market. Furthermore, two F-tests are performed to explore the difference in the effect of price on consumer purchases between B2C sellers and C2C sellers for search and experience products. As a result, significant differences have been confirmed in the models for both search products ($F_{(1,938)} = 9.12, p < 0.01$) and experience products ($F_{(1,4017)} = 2.81, p < 0.1$). This difference suggests that the price effect on online purchases is more pronounced when consumer buy from B2C sellers than when they buy from C2C sellers.

(4). Fee

The same as the results in the one dimensional comparison, express fee is negative and significant only in models for search products. Compared to the effect of express fee on customer buying in C2C sellers, the effect on B2C sellers is significantly higher ($F_{(1,938)} = 2.78, p < 0.1$). This is because B2C sellers are relatively well trusted by consumers compared to C2C sellers, which means they gain better sales performance through price-off promotions. This finding also indicates that buyers are inclined to buy an item from an online seller who sets prices lower, especially when they buy search products.

(5). Reputation

Reputation here includes 2 parts, common components of the 5-point scale scores, and additional reputation ratings for C2C sellers.

For the 5-point scale scores, similar to the results analyzed before, *Item Score* is significant and positive in the models for experience products, *Service Score* positively affects consumer purchases with a significant effect in all of the models, while *Shipping Score* fails to reveal any significant results. However, the discrepancy between the estimated results in the comparisons across product classes and seller types is caused by the significance of *Item Score* for experience products only occurring in a subset of C2C sellers. It also indicates that buyers pay more attention to seller ratings when they buy an item from C2C sellers, because of the higher trust gaps between buyers and sellers.

In order to fill in the trust gaps between buyers and C2C sellers, Taobao provides several additional indicators to show the reputations of C2C sellers. In this study, the additional reputation indicators include *Shop Level*, *Feedback Rate*, and *Feedback Num*. First, for service product C2C sellers, all coefficients related to reputation are non-significant. It may be largely due to the limited number of C2C sellers in this group. Second, the results show that shop level and monthly positive feedback numbers are positively related to subsequent consumer purchases for both search and experience products, while

the effect of *Feedback Rate*, which shows the percentage of positive feedback ratings, on subsequent consumer purchases are non-significant. Third, through two F-tests, the effects of shop level ($F_{(1,3537)} = 1.93$, $p = 0.16$) and feedback number ($F_{(1,3537)} = 0.04$, $p = 0.83$) on consumer purchases show no significant difference between search and experience products. On the basis of these findings, the author believes that in C2C online markets, buyers prefer to buy an item from a seller with a relatively high shop level and positive feedback number.

5.5 Conclusions and Discussion

In this study, the author has explored the relationship between seller attributes and consumer online purchases. Specifically, first, this essay explores the effects of seller attributes on consumer online buying behavior across the different classes of products, including search, experience, and service products. Second, this study also compares those seller attribute effects across product classes and seller types (i.e., B2C sellers and C2C sellers). To investigate the relationship between seller attributes and consumer purchases, this essay focuses on the variables of sales volume, the number of reviews, sales price, seller reputation, and seller types, and offers the following hypotheses.

1. In online markets, buyers are inclined to buy an item from a seller who sets low prices.
2. In online shopping, seller sales volume in the current period is positively related to the quantity of consumer purchases in the next period.
3. The number of reviews is positively related to the quantity of consumer purchases in online shopping.
4. Reputation relates positively to the quantity of consumer online purchases.
- 5a. The effect of price on consumer online purchases is higher for service and search products than that of experience products.
- 5b. The effect of reputation on consumer online purchases is lower for service and search products than for experience products.
- 6a. *Ceteris paribus*, online shoppers prefer buying an item from B2C sellers than from C2C sellers.
- 6b. The relationship between seller attributes and the quantity of consumer purchases differs significantly across product classes and seller types.

After collecting the monthly transaction record data from Taobao China for the period from May, 2014 to November, 2014 through a Java-based crawler, a total of 12 categories and 39950 records are used to test the hypotheses. Considering the characteristics of the dataset, this essay built a set of simultaneous equations, which include two endogenous variables (i.e., Std_Sales_{t-1} , and $Std_Reviews_{t-1}$), and estimated how seller attributes would be related to subsequent consumer purchases by using GMM models.

The essay proposes that buyers are inclined to buy an item from a seller who sets lower prices in an online market. Consistent with the conclusions of Chevalier and Goolsbee (2003) and Ellis-Chadwick et al. (2009), in this study, the results indicate that because of the perfect competition in online markets, a negative relationship occurs between price and the quantity of consumer online purchases for search and experience products. This finding is also in accord with the law of demand, which states that as the price of a product increases, quantity demanded falls. In contrast, although the price relates negatively to consumer purchases of service products, the significance of the price effect is not confirmed. This is because buying service products requires more trust in sellers. In addition, by exploring the difference of price effect across product classes and seller types, the author finds that the effect of price on consumer purchases is more pronounced for search products than for experience products. Similarly, the price effect also seems to be more pronounced for buying from B2C sellers than buying from C2C sellers. This is because the perceived risks in buying experience products and buying from C2C sellers are relatively high, which weakens the effect of price on consumer purchases.

Seller sales volume and the number of reviews in the current period are posited to be positively related to the quantity of consumer online purchases in the next period. The estimated results in the GMM models show that both the effects of sales volume and number of reviews in period $t-1$ on the quantities purchased by consumers in period t are positive and significant. These findings support the hypotheses, and indicate that consumer buying behavior in online shopping is easily influenced by other buyers' purchases. According to the literature, sales volume served as a proxy variable for seller scale and the number of reviews served as a surrogate for reputation (e.g., Frankish et al., 2012; Lee et al., 2011). Therefore, it can be considered that because of the asymmetry of information in online markets, consumers prefer purchasing from sellers with a large scale and high reputation, to reduce their perceived risks (Limayem et al., 2000; Zhou, 2011).

On the basis of the potential effects of previous sales volume and the number of reviews on subsequent consumer purchases, this study also discusses the differences in the effects of sales volume and number of reviews on consumer purchases across product classes and seller types. First, the author notes that consumers attach more importance to prior purchases made by other buyers when they buy experience or service products than when they buy search products, because it is difficult for buyers to obtain the relevant attribute information through Internet, which makes perceptions of psychological risk for experience and service products higher than that for search products (Girard and Dion, 2010). Second, compared with purchasing from B2C sellers, consumers seem to be more concerned about the cumulative number of reviews when they buy experience or service products from C2C sellers. This is because perceived risk about vendor is relatively higher for C2C sellers than it is for B2C sellers, which boosts consumer trust in B2C sellers (Fan et al., 2013; Forsythe and Shi, 2003).

For the relationship between seller reputation and consumer purchases, the author purposes that

reputation has a positive effect on consumer buying in online shopping. This study uses three 5-point scale scores respectively to represent item quality, seller service, and shipping to denote reputation of B2C sellers, and uses three additional factors, including shop level, positive feedback rate, and positive feedback numbers, to denote the reputation of C2C sellers. The results indicate that all three scores positively affect consumer purchases as supposed. First, item score is significant and positive for experience products. This is because the relevant attribute information is more difficult to get before transaction for experience products than for search products, which causes consumer risk perception in product performance to be much higher for experience products than for others. Second, the effects of service score on consumer online buying behavior are positive and significant for all three types of products. Due to the distance between sellers and buyers on the Internet, consumers are inclined to buy an item from a seller who provides a good service because of the perceived risk about vendors (Forsythe and Shi, 2003; Li and Zhang, 2002). In addition, this study indicates that consumers seem to be concerned for shop level and the volume of positive feedback when they buy an item from C2C sellers. All these findings support the conclusions in literature which demonstrated reputation can reduce consumer risk, enhance the trust between buyers and sellers, and contribute to better sales performance (Utz et al., 2009; Ye et al., 2013).

Last, it is proposed that *ceteris paribus*, online shoppers prefer buying an item from B2C sellers than from C2C sellers. In the first stage’s analysis (table 5.6), which examines the relationship between seller attributes and consumer purchases across the classes of the products, the result of the B2C seller dummy supports this hypothesis, and indicates that consumers are more likely to buy an item from an official flagship store than from an individual agent. According to the existing studies (Fan et al., 2013; Wigand, 1997), consumers are more willing to purchase from B2C sellers than to purchase from C2C sellers, due to their differences in seller numbers, shop size, entry barriers, and resources. Furthermore, the estimated results in this study also show that in addition to the importance of previous purchase records (i.e., sales volume and review numbers), consumers attach more importance to price when they decide to purchase from B2C sellers, while consumers seem to be more concerned for reputation when they purchase from C2C sellers. This finding is also consistent with the conclusion of Fan et al. (2013).

Table 5.8 represents the summary of hypotheses testing. “S” means the hypothesis is supported, “PS” means partially supported, and “NS” means not supported.

Table 5.8: Results of hypotheses testing

H3-1	H3-2	H3-3	H3-4	H3-5a	H3-5b	H3-6a	H3-6b
S	S	S	S	PS	PS	S	S

This study contributes to the existing literature in four ways. First, this study introduces the theory of network externality to an online shopping context. Becker (1991) has indicated that demand by a typical consumer is positively related to quantities demanded by other consumers. On the basis of this

economic theory, many studies discussed network externality in each context. In an online shopping context, much prior research focused on the effect of reviews on consumer buying behavior, but they were limited to considering the effects of previous purchase by other consumers. This study investigates the theory of network externality in an online shopping context from two perspectives – quantity of consumer purchases (i.e., sellers' sales volume) and number of reviews, and indicates the positive effects of these two factors in the current period on consumer purchases in the next period.

Second, this study contributes to investigating the differences in the relationship between seller attributes and consumer online purchases across product classes and seller types. Despite the existing studies on the relationships between seller attributes and consumer purchases in Internet shopping (Garbarino and Strahilevitz, 2004; Gu et al., 2012; Ye et al., 2009, 2013), the differences in the relationships mentioned above across product classes and seller types have been more or less ignored. However, it is necessary to discuss these differences. According to the literature, different classes of products have different attributes, which influence risk perception in consumer decision making (Girard and Dion, 2010). Similarly, seller types with different sales performance, resources, and managerial experience also indeed affect the trust between buyers and sellers (Fan et al., 2013). Therefore, this study examines the moderating effects of product classes and seller types on the relationship between seller attributes and consumer online purchases.

Third, although much prior research discussed the effects of seller attributes on consumer purchases and seller growth, most of them treated the influencing process as static and discussed the effects only in a cross section (e.g., Gu et al., 2012; Utz et al., 2009; Ye et al., 2013). By contrast, this study applies a dynamic model to the relationship between seller attributes and consumer online buying behavior, and has found the effects of seller attributes on customer purchases are continuous. In addition, compared with many previous studies that regarded the number of reviews as an exogenous variable in static models (King et al., 2014; Zhu and Zhang, 2010), the present study confirms its endogeneity in dynamic models.

Last, this study contributes to the literature by using objective data. Most of the prior studies only relied on survey (attitudes, intentions, etc.), which left the discussion static and caused predictions to differ from the real results (Forsythe and Shi, 2003; King et al., 2014; Mitchell, 2001). In comparison, the data in this study uses transaction records that were crawled from Taobao China (i.e., objective data), including both time series and cross-section. It truly reflects consumer buying behavior in Internet shopping being both long-term and dynamic.

Several implications arise from the conclusions. Overall, managers in online markets should improve shop reputation and expand the scale of sales, to attract customer patronage. Specifically, for online sellers who mainly sell search products, because of the complete information on products and the perfect competition in the market, it may be better for sellers to improve service levels, and attract consumer patronage through small profits but quick returns. In other words, for these sellers, it is important to

obtain the advantage on price (i.e., win in price).

Second, because of incomplete information on experience products, consumers perceive more risk in product performance when they purchase online. It suggests online sellers of experience product should enhance their ratings for “Item as Described” and “Service” to bridge the trust gaps with buyers, thus increasing their sales volume. Also, due to the distance gap between buyers and sellers, it is particularly important for those sellers to provide information about the item in more detail, and make customers understand the item clearly (Lee et al., 2008; Park and Kim, 2003).

Third, since the price effects on consumer online buying behavior were non-significant for service products, it suggests that online sellers of service products attract customers more effectively by employing service differentiation rather than by adopting a low price strategy.

Finally, in light of the difference in consumer attitudes towards different seller types, increasing the ratings of seller reputation is regarded as the primary objective for C2C sellers, while B2C sellers are better focusing on expanding their sales volume (Fan et al., 2013; Yoo et al., 2007). In addition, because the perceived risks in vendor and service are relatively high for service products (Featherman and Pavlou, 2003; Pires et al., 2004), individual sellers are not recommended to participate in service products.

The limitations of this essay are mainly in two areas. First, although the author uses objective data to improve the limitations caused by survey data, because of time constraints (i.e., only seven months in the study), this study is not able to discuss seasonal effects on online shopping. Since online shopping has obvious sales midseason and off-season that are caused by product attributes and seller sales promotions (e.g., Double 11 in China),⁵ the seasonal effect is also important enough on consumer online purchases that it is necessary to discuss it in future research. In addition, this study only focuses on the market of Taobao China, so does not examine other e-commerce platforms, such as Amazon, Rakuten, and eBay. Because the number of sellers and competition types may differ across e-commerce platforms, comparative analysis for the difference in consumer buying behavior across platforms should also be a research topic in future study.

⁵Double 11 (i.e., Nov. 11th), the Singles’ Day in China, has become the largest online shopping day in China, with sales in Tmall and Taobao at US\$5.8 billion in 2013 and US\$9.3 billion in 2014.

Appendix

1. Descriptive Statistics for Each Product

<i>book 1</i>	Obs	Median	Mean	Std.Dev	Min	Max
Sales	270	35.00	272.10	582.65	4.00	2926.00
Reviews	270	51.00	1627.94	4750.23	1.00	35344.00
Price [CNY]	270	29.88	29.09	1.94	20.50	30.00
Fee [CNY]	270	0.00	0.85	2.12	0.00	8.00
Item Score	270	4.80	4.78	0.12	4.60	4.90
Service Score	270	4.80	4.80	0.10	4.60	4.90
Shipping Score	270	4.80	4.76	0.12	4.60	4.90
Shop Level	161	12.00	11.52	1.48	8.00	15.00
Feedback Rate [%]	161	98.44	98.06	2.38	81.40	99.99
Feedback Num	161	5911.00	10188.17	12157.24	337.00	48200.00
B2C_seller	270	0.00	0.40	0.49	0.00	1.00

<i>book 2</i>	Obs	Median	Mean	Std.Dev	Min	Max
Sales	279	42.00	179.33	478.80	8.00	3857.00
Reviews	279	53.00	815.05	2675.38	1.00	23344.00
Price [CNY]	279	49.85	49.36	1.72	36.00	50.00
Fee [CNY]	279	0.00	1.08	2.17	0.00	6.00
Item Score	279	4.80	4.79	0.10	4.60	4.90
Service Score	279	4.80	4.76	0.11	4.60	4.90
Shipping Score	279	4.70	4.75	0.10	4.60	4.90
Shop Level	28	12.00	12.54	1.04	11.00	14.00
Feedback Rate [%]	28	99.31	98.34	2.41	89.79	99.99
Feedback Num	28	9658.00	16663.14	16299.37	3154.00	46390.00
B2C_seller	279	1.00	0.90	0.30	0.00	1.00

<i>book 3</i>	Obs	Median	Mean	Std.Dev	Min	Max
Sales	282	109.00	341.82	737.47	23.00	5853.00
Reviews	282	80.50	1157.84	4824.22	4.00	44263.00
Price [CNY]	282	54.68	54.00	2.16	37.80	55.00
Fee [CNY]	282	0.00	0.91	2.09	0.00	8.00
Item Score	282	4.80	4.80	0.11	4.60	4.90
Service Score	282	4.80	4.77	0.12	4.60	4.90
Shipping Score	282	4.80	4.75	0.12	4.60	4.90
Shop Level	131	12.00	11.58	1.66	9.00	14.00
Feedback Rate [%]	131	99.99	99.60	1.54	91.86	99.99
Feedback Num	131	12647.00	12437.84	12311.09	292.00	46307.00
B2C_seller	282	1.00	0.54	0.50	0.00	1.00

<i>book 4</i>	Obs	Median	Mean	Std.Dev	Min	Max
Sales	270	320.00	848.56	1700.33	77.00	9700.00
Reviews	270	172.00	916.17	2334.67	16.00	20140.00
Price [CNY]	270	49.62	49.00	2.00	38.50	50.00
Fee [CNY]	270	0.00	0.00	0.00	0.00	0.00
Item Score	270	4.80	4.77	0.12	4.60	4.90
Service Score	270	4.80	4.78	0.12	4.60	4.90
Shipping Score	270	4.80	4.76	0.12	4.60	4.90
Shop Level	195	12.00	11.74	1.37	9.00	14.00
Feedback Rate [%]	195	99.25	98.67	1.40	90.94	99.99
Feedback Num	195	8383.00	12773.30	11677.00	159.00	46568.00
B2C_seller	270	0.00	0.28	0.45	0.00	1.00

<i>flower 1</i>	Obs	Median	Mean	Std.Dev	Min	Max
Sales	525	151.00	189.40	145.45	34.00	1537.00
Reviews	525	162.00	521.43	1925.58	23.00	25183.00
Price [CNY]	525	193.96	192.42	5.82	138.50	199.00
Fee [CNY]	525	0.00	0.00	0.01	0.00	0.10
Item Score	525	4.80	4.80	0.11	4.60	4.90
Service Score	525	4.90	4.83	0.10	4.60	4.90
Shipping Score	525	4.90	4.83	0.10	4.60	4.90
Shop Level	439	9.00	8.45	1.40	6.00	12.00
Feedback Rate [%]	439	99.54	99.03	1.49	86.37	99.99
Feedback Num	439	233.00	325.84	281.94	37.00	1476.00
B2C_seller	525	0.00	0.16	0.37	0.00	1.00

<i>flower 2</i>	Obs	Median	Mean	Std.Dev	Min	Max
Sales	605	107.00	170.45	204.31	37.00	1981.00
Reviews	605	121.00	531.96	1853.76	0.00	24703.00
Price [CNY]	605	489.30	482.95	20.43	302.00	496.50
Fee [CNY]	605	0.00	0.00	0.02	0.00	0.10
Item Score	605	4.90	4.81	0.11	4.60	4.90
Service Score	605	4.90	4.83	0.09	4.60	4.90
Shipping Score	605	4.90	4.84	0.10	4.60	4.90
Shop Level	462	8.00	8.41	1.18	6.00	12.00
Feedback Rate [%]	462	99.62	99.23	1.28	89.68	99.99
Feedback Num	462	151.00	195.97	154.17	11.00	746.00
B2C_seller	605	0.00	0.24	0.43	0.00	1.00

<i>movie ticket</i>	Obs	Median	Mean	Std.Dev	Min	Max
Sales	3663	228.00	841.92	4683.30	30.00	147835.00
Reviews	3663	66.00	119.08	193.22	0.00	4115.00
Price [CNY]	3663	49.96	49.85	0.85	23.00	50.00
Fee [CNY]	3663	0.00	1.50	3.53	0.00	10.00
Item Score	3663	4.90	4.84	0.09	4.60	4.90
Service Score	3663	4.90	4.83	0.10	4.60	4.90
Shipping Score	3663	4.90	4.84	0.09	4.60	4.90
Shop Level	3642	11.00	10.66	1.80	6.00	14.00
Feedback Rate [%]	3642	99.71	99.26	1.63	84.32	99.99
Feedback Num	3642	793.00	1196.17	1076.94	14.00	5248.00
B2C_seller	3663	0.00	0.01	0.08	0.00	1.00

<i>iPhone</i>	Obs	Median	Mean	Std.Dev	Min	Max
Sales	618	1078.50	2435.56	4434.48	228.00	44791.00
Reviews	618	480.00	1244.36	2456.73	2.00	23836.00
Price [CNY]	618	3789.22	3775.64	44.34	3352.00	3798.00
Fee [CNY]	618	0.00	0.23	1.49	0.00	10.00
Item Score	618	4.90	4.84	0.09	4.60	4.90
Service Score	618	4.90	4.84	0.09	4.60	4.90
Shipping Score	618	4.90	4.84	0.09	4.60	4.90
Shop Level	597	10.00	10.17	1.78	6.00	14.00
Feedback Rate [%]	597	99.70	99.15	1.65	89.59	99.99
Feedback Num	597	918.00	2402.18	4676.23	50.00	29779.00
B2C_seller	618	0.00	0.03	0.18	0.00	1.00

<i>t-shirts</i>	Obs	Median	Mean	Std.Dev	Min	Max
Sales	4006	4171.50	5766.57	4811.48	1250.00	52527.00
Reviews	4006	927.00	2553.84	6524.91	0.00	161997.00
Price [CNY]	4006	29.00	35.00	21.11	10.00	199.00
Fee [CNY]	4006	0.00	0.44	1.87	0.00	10.00
Item Score	4006	4.70	4.73	0.13	4.50	4.90
Service Score	4006	4.80	4.76	0.12	4.60	4.90
Shipping Score	4006	4.70	4.74	0.13	4.60	4.90
Shop Level	2909	12.00	11.62	1.88	7.00	18.00
Feedback Rate [%]	2909	97.65	96.94	3.02	74.56	99.99
Feedback Num	2909	5468.00	13360.12	32807.33	32.00	362415.00
B2C_seller	4006	0.00	0.27	0.45	0.00	1.00

<i>jeans</i>	Obs	Median	Mean	Std.Dev	Min	Max
Sales	4871	2269.00	3902.08	5793.06	667.00	121663.00
Reviews	4871	1074.00	4885.33	17916.39	0.00	409088.00
Price [CNY]	4871	78.00	82.08	47.13	9.80	569.00
Fee [CNY]	4871	0.00	0.09	0.90	0.00	10.00
Item Score	4871	4.80	4.76	0.13	4.60	4.90
Service Score	4871	4.80	4.78	0.12	4.60	4.90
Shipping Score	4871	4.80	4.76	0.12	4.60	4.90
Shop Level	2588	10.00	10.42	1.73	6.00	17.00
Feedback Rate [%]	2588	98.14	97.30	2.81	77.59	99.99
Feedback Num	2588	1994.00	3625.50	6260.92	12.00	89810.00
B2C_seller	4871	0.00	0.47	0.50	0.00	1.00

<i>shoes</i>	Obs	Median	Mean	Std.Dev	Min	Max
Sales	4235	406.00	682.14	850.66	98.00	17053.00
Reviews	4235	300.00	1277.48	4373.02	0.00	92494.00
Price [CNY]	4235	55.00	60.49	42.35	13.00	539.00
Fee [CNY]	4235	0.00	0.51	2.06	0.00	10.00
Item Score	4235	4.70	4.74	0.13	4.60	4.90
Service Score	4235	4.80	4.75	0.12	4.60	4.90
Shipping Score	4235	4.70	4.74	0.13	4.60	4.90
Shop Level	2868	10.00	10.02	2.10	6.00	16.00
Feedback Rate [%]	2868	97.54	97.02	2.34	82.00	99.99
Feedback Num	2868	801.00	1767.24	2830.69	5.00	32132.00
B2C_seller	4235	0.00	0.32	0.47	0.00	1.00

<i>hat</i>	Obs	Median	Mean	Std.Dev	Min	Max
Sales	4958	1025.00	1599.99	2054.41	243.00	47794.00
Reviews	4958	354.00	1556.21	4416.09	0.00	81683.00
Price [CNY]	4958	22.00	27.22	18.68	3.70	111.00
Fee [CNY]	4958	0.00	1.04	2.93	0.00	10.00
Item Score	4958	4.80	4.77	0.12	4.60	4.90
Service Score	4958	4.80	4.79	0.11	4.60	4.90
Shipping Score	4958	4.80	4.78	0.12	4.60	4.90
Shop Level	3207	12.00	11.93	2.16	7.00	19.00
Feedback Rate [%]	3207	98.42	98.05	1.90	82.89	99.99
Feedback Num	3207	2846.00	11618.77	29295.66	88.00	358550.00
B2C_seller	4958	0.00	0.35	0.48	0.00	1.00

<i>handbag</i>	Obs	Median	Mean	Std.Dev	Min	Max
Sales	4255	1782.00	2610.85	2486.94	154.00	32131.00
Reviews	4255	805.00	2485.78	8019.88	0.00	188881.00
Price [CNY]	4255	55.00	77.44	78.17	13.50	550.00
Fee [CNY]	4255	0.00	0.42	1.88	0.00	10.00
Item Score	4255	4.80	4.76	0.13	4.60	4.90
Service Score	4255	4.80	4.78	0.12	4.60	4.90
Shipping Score	4255	4.80	4.76	0.12	4.60	4.90
Shop Level	3503	12.00	11.77	2.20	7.00	19.00
Feedback Rate [%]	3503	98.35	97.94	1.89	78.94	100.00
Feedback Num	3503	3149.00	8649.92	13652.07	32.00	143495.00
B2C_seller	4255	0.00	0.18	0.38	0.00	1.00

<i>storage box</i>	Obs	Median	Mean	Std.Dev	Min	Max
Sales	5436	1955.00	3691.12	5426.51	321.00	105657.00
Reviews	5436	1064.50	3611.48	10175.58	4.00	160535.00
Price [CNY]	5436	9.90	15.30	18.73	3.50	199.00
Fee [CNY]	5436	0.00	2.28	3.66	0.00	10.00
Item Score	5436	4.80	4.77	0.12	4.60	4.90
Service Score	5436	4.80	4.78	0.12	4.60	4.90
Shipping Score	5436	4.80	4.77	0.12	4.60	4.90
Shop Level	3752	15.00	14.70	3.65	6.00	20.00
Feedback Rate [%]	3752	98.46	98.10	1.82	81.15	99.99
Feedback Num	3752	21043.50	149883.80	209537.20	88.00	780867.00
B2C_seller	5436	0.00	0.31	0.46	0.00	1.00

<i>mobile recharge</i>	Obs	Median	Mean	Std.Dev	Min	Max
Sales	5007	58553.00	140718.50	266656.90	14526.00	5404928.00
Reviews	5007	119720.00	210937.60	302338.10	3167.00	4276412.00
Price [CNY]	5007	49.58	55.96	48.93	0.99	497.50
Fee [CNY]	5007	0.00	0.00	0.00	0.00	0.00
Item Score	5007	4.90	4.85	0.08	4.60	4.90
Service Score	5007	4.80	4.81	0.11	4.60	4.90
Shipping Score	5007	4.90	4.83	0.10	4.60	4.90
Shop Level	112	17.50	16.92	2.78	11.00	20.00
Feedback Rate [%]	112	99.63	99.31	1.50	89.95	99.99
Feedback Num	112	200163.00	239661.00	197694.40	20843.00	570957.00
B2C_seller	5007	1.00	0.98	0.15	0.00	1.00

<i>visa applying</i>	Obs	Median	Mean	Std.Dev	Min	Max
Sales	670	39.00	312.16	1214.45	2.00	11782.00
Reviews	670	64.50	655.96	2780.44	0.00	40577.00
Price [CNY]	670	150.00	301.03	749.65	90.00	5000.00
Fee [CNY]	670	0.00	0.31	1.74	0.00	10.00
Item Score	670	4.90	4.84	0.09	4.60	4.90
Service Score	670	4.90	4.82	0.10	4.60	4.90
Shipping Score	670	4.90	4.84	0.10	4.60	4.90
Shop Level	0	.	.	.	.	.
Feedback Rate [%]	0	.	.	.	.	.
Feedback Num	0	.	.	.	.	.
B2C_seller	670	1.00	1.00	0.00	1.00	1.00

Note: units in brackets.

2. Endogenous and Instrument Variable Method (IV)

In a statistical model, a parameter or variable is said to be endogenous when there is a correlation between the parameter or variable and the error term.

[Model 1]

$$Std_Sales_{i,t} = \beta_0 + \beta_1 Std_Sales_{i,t-1} + \beta_2 Std_Reviews_{i,t-1} + \beta_3 Std_Price_{i,t-1} + \beta_4 Fee_{i,t-1} + \mathbf{score}_{i,t-1} \mathbf{b}_5 + \mathbf{reputation}_{i,t-1} \mathbf{b}_6 + \beta_7 B2C_seller_i + \mathbf{product_dummy} + \mathbf{month_dummy} + u_{i,t} + e_i$$

[Model 2]

$$Std_Reviews_{i,t-1} = \alpha_0 + \alpha_1 Std_Reviews_{i,t-2} + \epsilon_{i,t-1} + \delta_i$$

(for $i = 1, 2, \dots, N$ and $t = 1, 2, \dots, T$ in both two models)

As mentioned in the text, in the above simultaneous equations,

First, $Std_Reviews_{i,t-1}$ has a correlation with δ_i in model 2. However, because $Std_Reviews_{i,t-1}$ also as an explanatory variable in model 1, the effect of δ_i on $Std_Sales_{i,t}$ will be estimated into the e_i . Thus, there is a correlation between $Std_Reviews_{i,t-1}$ and e_i in model 1. i.e.,

$$cov(Std_Reviews_{i,t-1}, e_i) \neq 0$$

Second, since the lag of explained variable enters the model as an explanatory variable in both model 1 and model 2, it cause $Std_Reviews_{i,t-2}$ has a correlation with δ_i , and $\beta_1 Std_Sales_{i,t-1}$ has a correlation with e_i because both error δ_i and e_i are irrelevant to time series. Therefore,

$$cov(Std_Sales_{i,t-1}, e_i) \neq 0, cov(Std_Reviews_{i,t-2}, \delta_i) \neq 0$$

The author explains the measurement error caused by endogeneity, and introduces the solution of instrument variable method with a simple example.

Suppose, a regression model that

$$\begin{aligned}\mathbf{y} &= \mathbf{X}\boldsymbol{\beta} + \mathbf{u}, \mathbf{u} \sim \text{iid}(\mathbf{0}, \sigma^2 \mathbf{I}) \\ E(\mathbf{X}'\mathbf{u}) &\neq 0\end{aligned}$$

(1). Proof 1: β is biased in OLS

$$\begin{aligned}\hat{\boldsymbol{\beta}} &= (\mathbf{X}'\mathbf{X})^{-1} \mathbf{X}'\mathbf{y} \\ &= (\mathbf{X}'\mathbf{X})^{-1} \mathbf{X}'(\mathbf{X}\boldsymbol{\beta} + \mathbf{u}) \\ &= (\mathbf{X}'\mathbf{X})^{-1} \mathbf{X}'\mathbf{X}\boldsymbol{\beta} + (\mathbf{X}'\mathbf{X})^{-1} \mathbf{X}'\mathbf{u} \\ &= \boldsymbol{\beta} + (\mathbf{X}'\mathbf{X})^{-1} \mathbf{X}'\mathbf{u} \\ E(\hat{\boldsymbol{\beta}}) &= E(\boldsymbol{\beta}) + E\left((\mathbf{X}'\mathbf{X})^{-1} \mathbf{X}'\mathbf{u}\right) \\ &= \boldsymbol{\beta} + E\left((\mathbf{X}'\mathbf{X})^{-1} \mathbf{X}'\mathbf{u}\right)\end{aligned}$$

because $E(\mathbf{X}'\mathbf{u}) \neq 0$, thus

$$E(\hat{\boldsymbol{\beta}}) \neq \boldsymbol{\beta}$$

Quod Erat Demonstrandum.

(2). Proof 2: β is inconsistent in OLS

$$\begin{aligned}\hat{\boldsymbol{\beta}} - \boldsymbol{\beta} &= (\mathbf{X}'\mathbf{X})^{-1} \mathbf{X}'\mathbf{u} \\ &= \left(\frac{1}{n} \mathbf{X}'\mathbf{X}\right)^{-1} \left(\frac{1}{n} \mathbf{X}'\mathbf{u}\right) \\ &= \left(\frac{1}{n} \sum_{i=1}^n \mathbf{x}_i \mathbf{x}_i'\right)^{-1} \left(\frac{1}{n} \sum_{i=1}^n \mathbf{x}_i \mathbf{u}\right)\end{aligned}$$

because $E(\mathbf{X}'\mathbf{u}) \neq 0$, thus

$$\begin{aligned}E\left(\frac{\mathbf{X}'\mathbf{u}}{n}\right) &\neq 0 \\ \text{plim}_{n \rightarrow \infty} \left(\frac{\mathbf{X}'\mathbf{u}}{n}\right) &\neq 0\end{aligned}$$

thus

$$\begin{aligned}\text{plim}_{n \rightarrow \infty} (\hat{\beta} - \beta) &= \left(\text{plim}_{n \rightarrow \infty} \left(\frac{\mathbf{X}'\mathbf{X}}{n} \right) \right)^{-1} \left(\text{plim}_{n \rightarrow \infty} \left(\frac{\mathbf{X}'\mathbf{u}}{n} \right) \right) \\ &= \Sigma_{\mathbf{X}\mathbf{X}}^{-1} \Sigma_{\mathbf{X}\mathbf{u}} \neq 0\end{aligned}$$

i.e.,

$$\text{plim}_{n \rightarrow \infty} (\hat{\beta}) \neq \beta$$

Quod Erat Demonstrandum.

(3). Testing for Endogeneity (Durbin-Wu-Hausman)

To illustrate, suppose in the following regression,

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + u \quad (5.1)$$

where x_1 and x_2 are exogenous. If there are two additional exogenous variables, z_1 and z_2 , which do not appear in the above regression (5.1). Whether x_3 is an endogenous variable (i.e., x_3 is correlated with u)?

First, assumed another regression model relates x_3 to a function of all endogenous variables and unknown parameters, as

$$x_3 = \alpha_0 + \alpha_1 x_1 + \alpha_2 x_2 + \alpha_3 z_1 + \alpha_4 z_2 + e \quad (5.2)$$

Now, since x_1, x_2, z_1, z_2 are uncorrelated with u , x_3 is uncorrelated with u , if, and only if, e is uncorrelated with u .

Second, estimate the reduced form for x_3 by OLS, and estimate the reduced form residuals, \hat{e} .

Third, estimate the following regression (5.3),

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \gamma_1 \hat{e} + \epsilon \quad (5.3)$$

by OLS and test $H_0 : \gamma_1 = 0$.

If Null hypothesis (i.e., H_0) can be rejected at a small significance level (usually at 5%), it confirm that x_3 is endogenous because e and u are correlated.

(4). Instrument Variable Method (IV)

$$\mathbf{y} = \mathbf{X}\boldsymbol{\beta} + \mathbf{u}, \mathbf{u} \sim \text{iid}(\mathbf{0}, \sigma^2 \mathbf{I})$$

$$E(\mathbf{X}'\mathbf{u}) \neq 0$$

Assume a $n \times h$ matrix \mathbf{Z} that satisfies the following conditions:

1. $E(\mathbf{u}|\mathbf{Z}) = 0$, i.e., $E(\mathbf{Z}'\mathbf{u}) = E[E(\mathbf{Z}'\mathbf{u}|\mathbf{Z})] = E[\mathbf{Z}'E(\mathbf{u}|\mathbf{Z})] = 0$
2. \mathbf{Z} is correlated with \mathbf{X}
3. \mathbf{Z} is asymptotically correlated with \mathbf{u} , i.e., $\text{plim}_{n \rightarrow \infty} \left(\frac{\mathbf{Z}'\mathbf{u}}{n} \right) = 0$
4. $\text{plim}_{n \rightarrow \infty} \left(\frac{\mathbf{Z}'\mathbf{X}}{n} \right) = \Sigma_{\mathbf{Z}\mathbf{X}} \neq 0$
 $\text{plim}_{n \rightarrow \infty} \left(\frac{\mathbf{Z}'\mathbf{Z}}{n} \right) = \Sigma_{\mathbf{Z}\mathbf{Z}} \neq 0$

$$\mathbf{Z}'\mathbf{y} = \mathbf{Z}'\mathbf{X}\boldsymbol{\beta} + \mathbf{Z}'\mathbf{u}$$

thus,

$$E(\mathbf{Z}'\mathbf{u}|\mathbf{Z}) = \mathbf{Z}'E(\mathbf{u}) = 0$$

$$\text{Var}(\mathbf{Z}'\mathbf{u}|\mathbf{Z}) = E(\mathbf{Z}'\mathbf{u}\mathbf{u}'\mathbf{Z}|\mathbf{Z}) = \mathbf{Z}'E(\mathbf{u}\mathbf{u}')\mathbf{Z} = \sigma^2(\mathbf{Z}'\mathbf{Z})$$

the estimator of $\boldsymbol{\beta}$ is

$$\begin{aligned} \hat{\boldsymbol{\beta}}_{IV} &= \left[(\mathbf{Z}'\mathbf{X})' (\sigma^2 \mathbf{Z}'\mathbf{Z})^{-1} (\mathbf{Z}'\mathbf{X}) \right]^{-1} (\mathbf{Z}'\mathbf{X})' (\sigma^2 \mathbf{Z}'\mathbf{Z})^{-1} (\mathbf{Z}'\mathbf{y}) \\ &= \left[\mathbf{X}'\mathbf{Z} (\mathbf{Z}'\mathbf{Z})^{-1} \mathbf{Z}'\mathbf{X} \right]^{-1} \mathbf{X}'\mathbf{Z} (\mathbf{Z}'\mathbf{Z})^{-1} \mathbf{Z}'\mathbf{y} \\ &= (\mathbf{X}'\mathbf{P}_z\mathbf{X})^{-1} \mathbf{X}'\mathbf{P}_z\mathbf{y} \end{aligned}$$

where

$$\mathbf{P}_z = \mathbf{Z} (\mathbf{Z}'\mathbf{Z})^{-1} \mathbf{Z}'$$

thus,

$$\begin{aligned} \text{var}(\hat{\boldsymbol{\beta}}_{IV}) &= \sigma^2 (\mathbf{X}'\mathbf{P}_z\mathbf{X})^{-1} \\ \hat{\sigma}^2 &= \frac{1}{n} (\mathbf{y} - \mathbf{X}\hat{\boldsymbol{\beta}}_{IV})' (\mathbf{y} - \mathbf{X}\hat{\boldsymbol{\beta}}_{IV}) \end{aligned}$$

In this case, $\hat{\boldsymbol{\beta}}_{IV}$ is consistent.

$$\begin{aligned}
\hat{\beta}_{IV} &= (\mathbf{X}'\mathbf{P}_z\mathbf{X})^{-1}\mathbf{X}'\mathbf{P}_z\mathbf{y} \\
&= (\mathbf{X}'\mathbf{P}_z\mathbf{X})^{-1}\mathbf{X}'\mathbf{P}_z(\mathbf{X}\boldsymbol{\beta} + \mathbf{u}) \\
&= \boldsymbol{\beta} + (\mathbf{X}'\mathbf{P}_z\mathbf{X})^{-1}\mathbf{X}'\mathbf{P}_z\mathbf{u} \\
&= \boldsymbol{\beta} + \left(\frac{1}{n}\mathbf{X}'\mathbf{P}_z\mathbf{X}\right)^{-1}\left(\frac{1}{n}\mathbf{X}'\mathbf{P}_z\mathbf{u}\right)
\end{aligned}$$

According to the above assumptions,

$$\begin{aligned}
\text{plim}_{n \rightarrow \infty} \left(\frac{1}{n} \mathbf{X}' \mathbf{P}_z \mathbf{X} \right) &= \text{plim} \left(\frac{\mathbf{X}' \mathbf{Z}}{n} \right) \text{plim} \left(\frac{\mathbf{Z}' \mathbf{Z}}{n} \right)^{-1} \text{plim} \left(\frac{\mathbf{Z}' \mathbf{X}}{n} \right) \\
&= \Sigma_{\mathbf{XZ}} \cdot \Sigma_{\mathbf{ZX}}^{-1} \cdot \Sigma_{\mathbf{ZX}}
\end{aligned}$$

$$\begin{aligned}
\text{plim}_{n \rightarrow \infty} \left(\frac{1}{n} \mathbf{X}' \mathbf{P}_z \mathbf{u} \right) &= \text{plim} \left(\frac{\mathbf{X}' \mathbf{Z}}{n} \right) \text{plim} \left(\frac{\mathbf{Z}' \mathbf{Z}}{n} \right)^{-1} \text{plim} \left(\frac{\mathbf{Z}' \mathbf{u}}{n} \right) \\
&= \Sigma_{\mathbf{XZ}} \cdot \Sigma_{\mathbf{ZX}}^{-1} \cdot \mathbf{0} \\
&= 0
\end{aligned}$$

therefore,

$$\text{plim}_{n \rightarrow \infty} \left(\hat{\beta}_{IV} \right) = \boldsymbol{\beta}$$

Quod Erat Demonstrandum.

In the above example,

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + u \quad (5.4)$$

$$x_3 = \alpha_0 + \alpha_1 x_1 + \alpha_2 x_2 + \alpha_3 z_1 + \alpha_4 z_2 + e \quad (5.5)$$

Stage 1: regress x_3 on x_1, x_2, z_1 , and z_2 , obtain the predicted values \hat{x}_3 .

Stage 2: regress y on x_1, x_2 , and \hat{x}_3 ; the coefficient on \hat{x}_3 is the 2SLS estimator, $\hat{\beta}_3^{2SLS}$.

As a result,

it can be shown that $\hat{\beta}_3^{2SLS}$ is a consistent estimator of β_3 .

3. Estimation of Generalized Method of Moments (GMM)

Suppose a model that

$$\mathbf{y} = h(\mathbf{X}, \boldsymbol{\beta}) + \mathbf{u}$$

where $E(\mathbf{u}) = 0$ and $E(\mathbf{u}\mathbf{u}') = \boldsymbol{\Omega}$

If the explanatory variables X_1, X_2, \dots, X_k are uncorrelated with the error term u , and without the errors of heteroskedasticity and serial correlation, thus,

$$\sum_{i=1}^n x_{ij} u_i = 0 \quad j = 1, 2, \dots, k$$

$$\sum_{i=1}^n x_{ij} [y_i - h(X_i, \boldsymbol{\beta})] = 0 \quad j = 1, 2, \dots, k$$

Assume a $J \times 1$ ($J > k$) vector Z_i , that uncorrelated with u_i , i.e.,

$$\text{Cov}(Z_i, u_i) = 0$$

By definition, that

$$e(y_i, X_i; \boldsymbol{\beta}) = y_i - h(X_i, \boldsymbol{\beta}) \quad i = 1, 2, \dots, n$$

$$m(\boldsymbol{\beta}) = \frac{1}{n} \sum_i Z_i e(y_i, X_i; \boldsymbol{\beta}) = \frac{1}{n} Z' e(y_i, X_i; \boldsymbol{\beta})$$

where $m(\boldsymbol{\beta})$ (i.e., sample moments) is a $J \times 1$ vector.

(1). If $J = k$, thus we have

$$m(\boldsymbol{\beta}) = \begin{pmatrix} m_1(\boldsymbol{\beta}) \\ m_2(\boldsymbol{\beta}) \\ \vdots \\ m_k(\boldsymbol{\beta}) \end{pmatrix} = \begin{pmatrix} \frac{1}{n} \sum_i Z_{i1} e_i \\ \frac{1}{n} \sum_i Z_{i2} e_i \\ \vdots \\ \frac{1}{n} \sum_i Z_{ik} e_i \end{pmatrix}$$

thus

$$m(\boldsymbol{\beta}) = \mathbf{0}$$

$$\hat{\boldsymbol{\beta}} = \min [m(\boldsymbol{\beta})' m(\boldsymbol{\beta})]$$

is the estimate for normal equations.

(2). If $J > k$, thus we have

$$m(\boldsymbol{\beta}) = \begin{pmatrix} m_1(\boldsymbol{\beta}) \\ m_2(\boldsymbol{\beta}) \\ \vdots \\ m_J(\boldsymbol{\beta}) \end{pmatrix} = \begin{pmatrix} \frac{1}{n} \sum_i Z_{i1} e_i \\ \frac{1}{n} \sum_i Z_{i2} e_i \\ \vdots \\ \frac{1}{n} \sum_i Z_{iJ} e_i \end{pmatrix}$$

thus,

$$\hat{\boldsymbol{\beta}} = \arg \min [m(\boldsymbol{\beta})' \mathbf{W}^{-1} m(\boldsymbol{\beta})]$$

where \mathbf{W} is a $J \times J$ matrix, and it is a consistent estimator for $\frac{1}{n} \text{Var}(\mathbf{Z}'\mathbf{u})$.

According to Hansen (1982), the best weight matrix \mathbf{W} is

$$\begin{aligned} \mathbf{W} &= \text{Asy.Var}[m(\boldsymbol{\beta})] \\ &= \frac{1}{n^2} \sum_i \sum_j \text{Cov}(Z_i u_i, Z_j u_j) \\ &= \frac{1}{n^2} \sum_i \sum_j \omega_{ij} Z_i Z_j' \\ &= \frac{1}{n^2} \mathbf{Z}' \boldsymbol{\Omega} \mathbf{Z} \end{aligned}$$

Chapter 6

Concluding Remarks

Through three essays, the whole study in this thesis investigates the relationships between consumer online buying behavior and three important influential factors, namely, product class, consumer characteristics, and seller attributes. In this chapter, the author concludes the three essays from chapter 3 to chapter 5 with the conclusions, contributions, and managerial implications. Future research directions are presented at the end of the thesis.

6.1 Conclusions

Sheth (1983) has identified that consumer buying behavior is influenced by 1). product class; 2). the personal characteristics of shoppers; and 3). seller attributes and types. This conclusion has been confirmed and cited by substantial research (e.g., Blakney and Sekely, 1994; McDaniel and Burnett, 1990; Noble et al., 2006; Sheth and Parvatlyar, 1995). Although these studies are primarily for consumer behavior in traditional markets, Sheth's consumer behavior theory applies to online shopping behavior as well (e.g., Girard and Dion, 2010; Gounaris et al., 2005; Lim and Dubinsky, 2004; Moon et al., 2008; Swinyard and Smith, 2003; Vijayasathy, 2002).

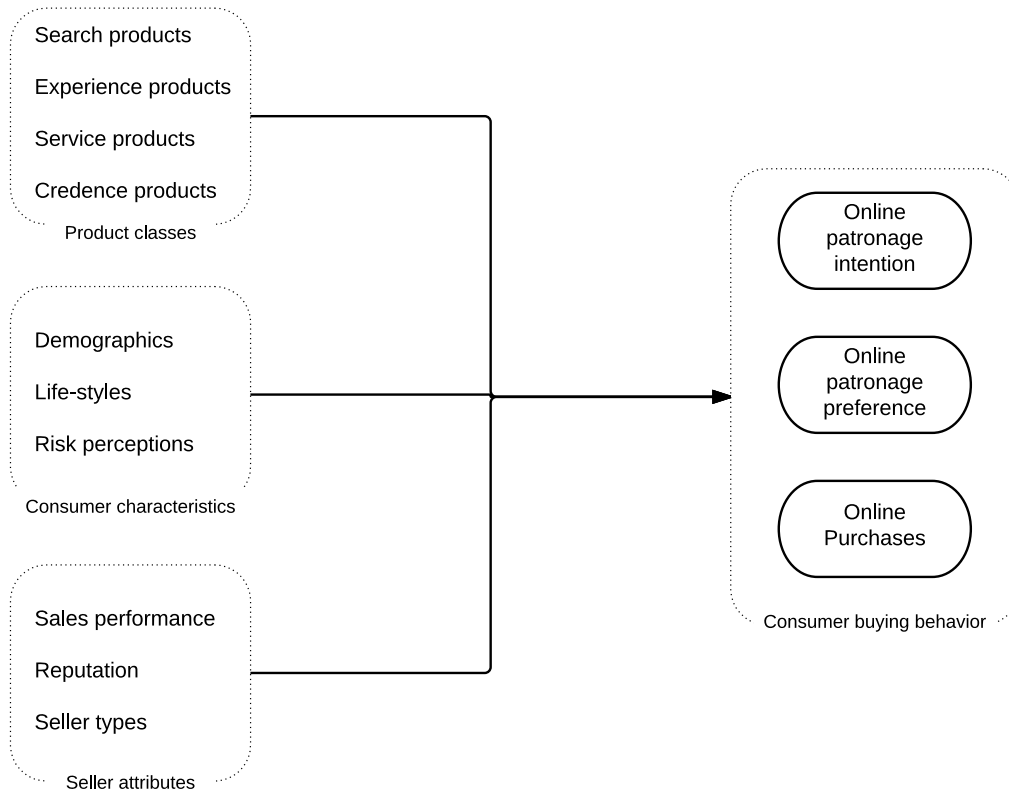
However, empirical studies that examine the relationships between consumer online buying behavior and three important influential factors, namely, product class, consumer characteristics, and seller attributes, seems to be lacking in the literature.

To further investigate these three relationships, this thesis provides the following three in-depth essays. Figure 6.1 offer a visual representation of the research framework for these three essays.

1. In-depth analysis of the relationship between product class and consumer online patronage intentions.
2. In-depth analysis of the relationship between consumer characteristics and online patronage preference.

3. In-depth analysis of the relationship between seller attributes and consumer online purchases.

Figure 6.1: Conceptual framework



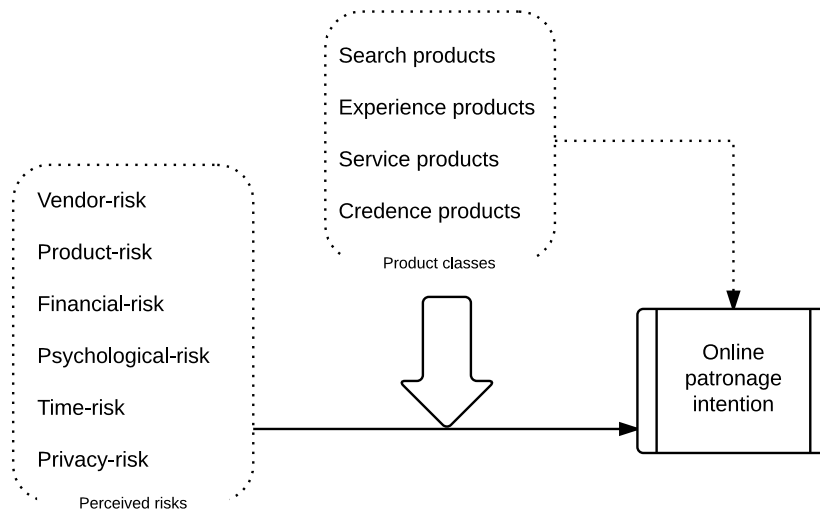
Essay 1. In-depth Analysis of the Relationship between Product Classes and Online Patronage Intentions

The first essay focuses on the relationship between product class and consumer online patronage intentions. In this essay, the author explores the intentions of consumer online patronage across four classes of products (i.e., search, experience, service, and credence products), and investigates the differences in six types of risk perception (i.e., vendor, product performance, financial, psychological, time loss, and privacy risk) among the four product classes. The research conceptual framework of this essay is shown in figure 6.2.

In this essay, the author performs this examination through an Internet survey, from which 829 valid responses are returned. On the basis of the study, the main conclusion suggests that patronage intentions for the Internet are the highest for search and service products, followed by experience products, and lowest for credence products.

Specifically, prior studies identified that the intentions for shopping online are particularly strong for search products, while the credence products are most likely to be purchased in shops (Girard et al., 2002; Girard and Dion, 2010; Levin et al., 2005). As an extension, first, this essay examines the online

Figure 6.2: Research conceptual framework of essay 1



patronage intentions not only for the SEC-products, but also for service products. Through paired-sample t-tests, this essay confirms that the patronage intentions for the Internet are higher for search products than for experience and credence products, which is consistent with the literature. Furthermore, as a new finding, the author finds that service products also seem more likely to be purchased online than experience or credence products. Given the strict management in online markets and the third party guarantee (e.g., Alipay and PayPal) in e-commerce, more and more consumer prefer buying service items from the Internet, because it helps them to save time (Rajamma et al., 2007). In addition, due service products not needing shipping, consumer can gain the service quickly through the Internet. By contrast, despite the characteristics of intangibility and variability in service products, online patronage intentions do not significantly differ between search and service products. One possibility is that most online service products are provided by official flagship stores, which reduces consumer risk perceptions.

Second, to explain the reasons for the difference in patronage intentions among the four classes of products, this essay examines the risk perceptions (i.e., vendor, product performance, financial, psychological, time loss, and privacy risk) in those four classes. Through an ANOVA procedure, the author finds that almost of all risks significantly and negatively related to online patronage intentions except for financial risk. A possible explanation for this finding is that the development of information encryption technology (e.g., SSL, SET) and the third party guarantee enhance consumer trust of payment in e-commerce (Chen et al., 2010). In addition, a further insight gained from the analysis is that the overall-risk perception is the lowest for service and search products, followed by experience, and highest for credence products. This finding supports the main conclusion from the perspective of risk perception. Although the overall-risk perception differs significantly between service and search products, the difference seems to be very small in the results.

Third, this essay discusses the relationship between risk perceptions and product class. For the four

classes of products, most of the risk perceptions are significantly lower for search products than for the other classes, but perceived risks in vendor, product performance and time loss for search products are higher than for service products. One reason for this is that service products in online shopping need not be shipped. Another is that most of the vendors of service products are identified by e-commerce platforms. Compared with search products, trust in vendor, finance, and psychology seem to be significantly more important for experience products, while the risk perception in time loss is the lowest. This is because of the uncertainty in experience products, leading consumers to be more willing to take time to experience the product before purchase (Girard and Dion, 2010; Li and Zhang, 2002). By contrast, for service products financial, psychological, and privacy risks are perceived as being higher than other risks, while the time loss risk is the lowest. This is because most service products in online shopping require consumers to provide their true information, which leads to it involving consumer privacy more (Kim et al., 2006). Finally, previous studies suggested that the level of uncertainty is the highest for credence products (e.g., Girard and Dion, 2010). Consistent with this conclusion, the finding in this essay shows that most of the risks are perceived as being higher for the credence class of products than those for other classes. This is because the relevant attribute information for credence products is the most difficult to evaluate for consumers (Darby and Karni, 1973; Mitra et al., 1999).

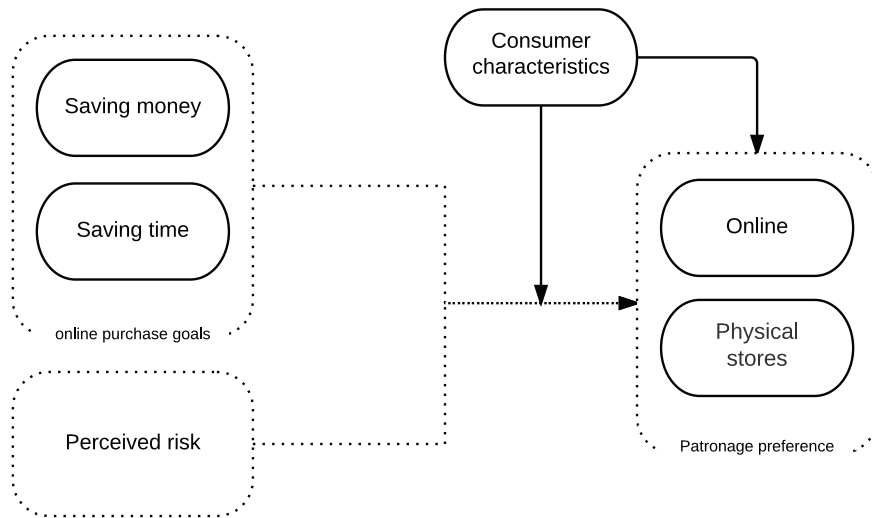
Essay 2. In-depth Analysis of the Relationship between Consumer Characteristics and Online Patronage Preference

The second essay focuses on the relationship between consumer characteristics and patronage preferences for the Internet and local stores. In this essay, to alleviate the arguments on the relationship between consumer characteristics and shopping channel choice, the author proposes 7 sets of hypotheses, which involve demographics, lifestyle, and risk perceptions, and performs a longitudinal survey to investigate the direct effects of consumer characteristics on online patronage preference and the moderating effects of these socioeconomic factors on the relationship between the two online purchase goals (i.e., saving money and saving time) and consumer patronage preference. Figure 6.3 represents the research conceptual framework of this essay.

Through this study, the author finds that only a consumers' age and online experience have direct effects on their own patronage preference. Besides this, the consumer characteristics mainly impose indirect effects through their interactions with money consciousness and time consciousness respectively.

Specifically, first, despite the existence of gender difference in patronage preference in prior discussion (Bae and Lee, 2011; Hernández et al., 2011; Rodgers and Harris, 2003), the direct impact of gender on patronage preference is shown to be limited. This finding means that gender difference primarily relies on male consumers' greater tendency toward saving money and saving time, indicating that males are more likely to shop online when online shopping enables them to save money and time. One possible

Figure 6.3: Research conceptual framework of essay 2



explanation for this finding is that men just want to buy things that they need as cheaply and quickly as possible, while women have an innate love for the shopping experience, which incites them to ignore the time they spend on shopping.

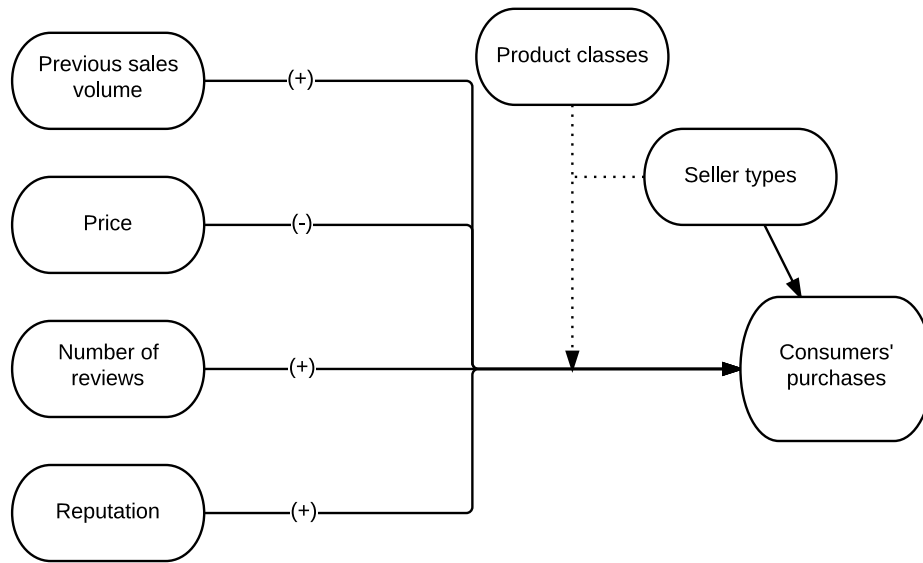
Second, although early research suggested that consumers who prefer shopping online are wealthy (Bellman et al., 1999; Swinyard and Smith, 2003), the regression results in this essay show some distinction. Instead, the author finds that consumers with a higher income pay more attention to time, signifying they are attracted to online shopping because it saves time (Punj, 2012). The rule behind this result might be the law of the diminishing marginal rate of substitution, which also leads the lower-income consumers to exhibit a greater tendency toward saving money.

Third, younger people are more prone to making an online purchase decision. This is because these consumers are relatively computer literate and deem e-commerce more credible. Meanwhile, just like males, younger shoppers also have a greater interest in saving money and time. So they lead in online shopping.

Fourth, consumer online patronage preference is not found to be directly associated with education or work status. As a complement to previous studies, the conclusion in the literature that online shoppers tend to be more time-constrained is mainly because online shopping provides the benefit of saving time. Consistent with the results in Punj (2012), the author also finds that a consumer with a relatively busy work status gives more consideration to time spent in shopping behavior than those who have more discretionary time. This is likely due to the opportunity costs associated with the lost time being high.

Fifth, experience in online shopping relates positively to online patronage preference. This means that consumers with experience of shopping online have a higher probability of making an online patronage decision, suggesting that the number of online shoppers and online buying behaviors will increase gradually along with the popularization of the Internet usage. Moreover, the author notes that having

Figure 6.4: Research conceptual framework of essay 3



engaged in online shopping can attenuate consumer perceptions of risk related to delivery time.

Lastly, perceived risk is negatively related to patronage preference for the Internet. It provides additional support for the conclusion that perceived risk is a useful context to explain barriers to online shopping (Forsythe and Shi, 2003). In addition, the level of perceived risk is significantly lower for consumers who prefer to shop online, showing the negative relationship between consumer risk perceptions and online patronage preference. This finding also highlights the importance of reducing the level of risk perception in online shopping.

Essay 3. In-depth Analysis of the Relationship between Seller Attributes and Consumer Online Purchases

The third essay discusses the relationship between seller attributes and consumer online purchases. Due to the lack of related theoretical and empirical research which examines this relationship in the literature, the purpose of essay 3 in this thesis is to explore the influences of seller attributes, which involve sales volume, the number of reviews, sales price, seller reputation, and seller types, on the quantities of consumer online purchases, and to investigate the discrepancies of these influences across product classes (i.e., search, experience, and service products) and seller types (i.e., B2C and C2C sellers). The research conceptual framework is represented in figure 6.4.

In this essay, a total of 12 categories and 39950 monthly transaction records was retrieved from Taobao China for the period from May, 2014 to November, 2014 through a Java-based crawler. Considering the characteristics of the dataset, the author applies a set of simultaneous equations, and estimates the relationship between consumer online purchases and the factors of seller attributes by using a GMM

model. The main findings suggest that 1). buyers are inclined to buy an item from a seller who sets a low price in online shopping; 2). seller sales volume and the number of reviews in the current period relate positively to the quantity of consumer purchases in the next period; 3). reputation is positively related to consumer purchases in an online market; and 4). *Ceteris paribus*, online shoppers prefer buying an item from B2C sellers than from C2C sellers.

First, the study indicates that a negative relationship occurs between price and the quantities of consumer online purchases, because of the perfect competition in an online market. This finding is consistent with the conclusions of Chevalier and Goolsbee (2003) and Ellis-Chadwick et al. (2009), and also is in accordance with the law of demand, which states that as the price of a product increases, quantity demanded falls. However, the price-related effect is not significant for buying service products. This is because buying service products requires more trust in sellers. In addition, by exploring the difference in price effect across product classes and seller types, the author finds that the effect of price on consumer purchases is more pronounced for search products than for experience products. Similarly, the price effect also seems to be more pronounced for buying from B2C sellers than for buying from C2C sellers. This is because the perceived risks in buying experience products and buying from C2C sellers are relatively high, which weakens the effect of price on consumer purchases.

Second, the estimated results in the GMM models show that both the effects of sales volume and number of reviews in period $t-1$ on the quantities purchased by consumers in period t are positive and significant. This means that seller sales volume and the number of reviews in the current period relate positively to the quantity of consumer online purchases in next period. These findings support that consumer buying behavior in online shopping is easily influenced by the purchases of other buyers. According to the literature, sales volume served as a proxy variable for seller scale and the number of reviews served as a surrogate for reputation (e.g., Frankish et al., 2012; Lee et al., 2011). Therefore, it can be considered that because of the asymmetry of information in online markets, consumers prefer purchasing from sellers with a large scale and high reputation, to reduce their perceived risks (Limayem et al., 2000; Zhou, 2011).

On the basis of the potential effects of previous sales volume and the number of reviews on subsequent consumer purchases, this study discusses the difference in the effects of sales volume and number of reviews on consumer purchases across product classes and seller types. As a result, the author notes that consumers attach more importance to prior purchases made by other buyers when they buy experience or service products than when they buy search products. This is because buyers have difficulty in obtaining the relevant attribute information through the Internet, which makes perceptions of psychological-risk for experience and service products higher than that for search products (Girard and Dion, 2010). Additionally, compared with purchasing from B2C sellers, consumers seem to be more concerned with the cumulative number of reviews when they buy experience or service products from C2C sellers. This

is because perceived risk about vendor is relatively high for C2C sellers compared to B2C sellers, which boosts consumer trust in B2C sellers (Fan et al., 2013; Forsythe and Shi, 2003).

Third, to examine the reputation effects on the quantities of consumer purchases in online shopping, the author uses three 5-point scale scores to respectively represent item quality, seller service, and shipping to denote reputation of B2C sellers, and uses three additional factors, including shop level, positive feedback rate, and positive feedback numbers, to denote the reputation of C2C sellers. The results in this essay indicate that all three scores positively affect consumer purchases as supposed. Item Score is significant and positive for experience products. This is because the relevant attribute information is more difficult to get before transaction for experience products than for search products, which causes consumer risk perception in product performance to be much higher for experience products than for others. Also, the effects of Service Score on consumer online buying behavior are positive and significant for all three types of products. Due to the distance between sellers and buyers on the Internet, consumers are more inclined to buy an item from a seller who provides good service because of the perceived risk about vendor (Forsythe and Shi, 2003; Li and Zhang, 2002). By contrast, the effects of Shipping Score are not significant. In addition, the results in this essay also indicate that consumers seem to be concerned with shop level and the volume of positive feedback when they buy an item from C2C sellers. All these findings support the conclusions in the literature which demonstrated that reputation can reduce consumer risk, enhance the trust between buyers and sellers, and contribute to a better sales performance (Utz et al., 2009; Ye et al., 2013).

Finally, this study demonstrates that in online markets, consumers are more likely to buy an item from an official flagship store than from an individual agent. According to the existing studies (Fan et al., 2013; Wigand, 1997), consumers are more willing to purchase from B2C sellers than to purchase from C2C sellers, due to the differences in seller numbers, shop size, entry barriers, and resources. Furthermore, consistent with the conclusion of Fan et al. (2013), the estimated results in this essay also show that in addition to the importance of previous purchase records (i.e., sales volume and review numbers), consumers attach more importance to price when they decide to purchase from B2C sellers, while consumers seem to be more concerned for reputation when they purchase from C2C sellers.

6.2 Contributions

Essay 1. In-depth Analysis of the Relationship between Product Classes and Online Patronage Intentions

For the relationship between product attributes and patronage intentions for the Internet and local stores, prior studies usually focused on the high touch-low touch distinction (Chiang and Dholakia, 2003; Levin et al., 2003; Lynch et al., 2001). Although the SEC-product classification framework has been built upon

by many studies, it has seen limited use in the context of online and offline shopping (Girard and Dion, 2010).

The first essay in this thesis focuses on the relationship between product class and consumer online patronage intentions. This essay contributes to the existing literature in three ways.

First, the previous studies mixed service products into the classes of search and credence products, and found online patronage intentions to be the highest for the search products, and lowest for the credence products (Girard and Dion, 2010). This study is the first to attempt to serve service products as a separate product class on a par with the SEC-products. Through this study, the author finds that as well as the search products, the intentions for shopping online are also higher for service products than for experience and credence products.

Second, in this essay, the author discusses the differences in risk perception among the four product classes to explain the product class and patronage intentions relationship. Different to the literature, this essay investigates both horizontal and vertical difference in risk perceptions, i.e., one risk in different classes of product and different perceived risks in one product class.

Third, the majority of studies on the relationship between product class and patronage preference usually focused the sample on the United States. Compared with those studies, the data in this essay covers the United States, China, and Japan, which are three of the world's largest online markets with different cultures and economic policies. Therefore, the author claims that it can help to control for bias from culture and economic policy, and to draw a relatively general conclusion.

Essay 2. In-depth Analysis of the Relationship between Consumer Characteristics and Online Patronage Preference

For the relationship between consumer characteristics and patronage preference, most of the prior research only focused on the statistical correlation between consumer characteristics and patronage preference, and ignored discussion of the indirect effects (e.g., moderating effects) of consumer characteristics on patronage preference.

The second essay in this thesis discusses the direct effects of consumer characteristics on online patronage preference and the moderating effects of those socioeconomic factors on the relationship between the two online purchase goals (i.e., saving money and saving time) and consumer patronage preference. This essay contributes to the existing literature in four ways.

First, as the results in previous literature are inconsistent, the author re-checks the correlation between consumer characteristics and online patronage preference. As a result, the association in this study seems to be weak.

Second, this essay contributes to investigating the effects of consumer characteristics on patronage preferences for Internet and local stores both directly and indirectly. Compared with much prior research,

which focused on the statistical correlation between consumer characteristics and patronage preference (Bellman et al., 1999; Swinyard and Smith, 2003; y Monsuwé et al., 2004), this study not only explores the direct effects of consumer characteristics (i.e., gender, income, age, education, work status, experience of online shopping, and risk perception) on patronage preferences for the Internet and local stores through rigor methods, but also investigates the moderating effects of these socioeconomic factors on the relationship between the two goals of saving money and time and consumer patronage preference.

Third, as well as the contribution in essay 1, this essay concludes relatively general results through an Internet survey in three of the world's largest online markets with different cultures and economic policies – the United States, Japan, and China.

The fourth contribution relates to the method of data collection. Taking the difficulty of collecting data into consideration, the author improves the possibilities of data collection through experimental investigation and the use of stated preference data.

Essay 3. In-depth Analysis of the Relationship between Seller Attributes and Consumer Online Purchases

Despite the substantial interest in the importance of seller attributes on consumer buying behavior, the literature lacks an empirical study that examines the relationship between seller attributes and consumer online purchases. To investigate this relationship, the author applies an estimation of GMM with dynamic models, and discusses the effects of seller attributes on the quantities of consumer online purchases by using objective panel data in the third essay of the thesis.

The essay contributes to the existing literature in four ways. First, although Becker (1991) has indicated that demand by a typical consumer is positively related to quantities demanded by other consumers, the theory of network externality has not been discussed in the context of online shopping. This essay contributes by introducing the theory of network externality to an online shopping context. In this essay, the author investigates the theory of network externality in an online shopping context from two perspectives – quantity of consumer purchases (i.e., sellers' sales volume) and number of reviews, and indicates the positive effects of these two factors in the current period on consumer purchases in the next period.

Second, despite the existing studies on the relationship between seller attributes and consumer purchases in online shopping (Garbarino and Strahilevitz, 2004; Gu et al., 2012; Ye et al., 2009, 2013), the differences in the relationship mentioned above across product classes and seller types have been more or less ignored. However, it is necessary to discuss these differences. According to the literature, different classes of products have different attributes, which influence risk perception in consumer decision making (Girard and Dion, 2010). Similarly, seller types with different sales performance, resources, and managerial experience also indeed affect the trust between buyers and sellers (Fan et al., 2013). Therefore,

this study contributes to investigating the differences in the relationship between seller attributes and consumer online purchases across product classes and seller types.

Third, although much prior research discussed the effects of seller attributes on consumer purchases and seller growth, most of them treated those attributes influencing the process as static and discussed the effects only in a cross section (e.g., Gu et al., 2012; Utz et al., 2009; Ye et al., 2013). By contrast, this essay applies a dynamic model to the relationship between seller attributes and consumer online buying behavior, and has found the effects of seller attributes on customer purchases are continuous. In addition, compared with many previous studies that regarded the number of reviews as an exogenous variable in static models (King et al., 2014; Zhu and Zhang, 2010), the present study confirms its endogeneity in dynamic models.

Last, most of the prior studies only relied on survey (attitudes, intentions, etc.), which left the discussion static and caused the predictions to be different from the real results (Forsythe and Shi, 2003; King et al., 2014; Mitchell, 2001). This study contributes to the literature by using objective data. In comparison, the data in this study uses transaction records that were crawled from Taobao China (i.e., objective data), including both time series and cross-section. It truly reflects consumer buying behavior in Internet shopping, being long-term and dynamic.

6.3 Implications

Essay 1. In-depth Analysis of the Relationship between Product Classes and Online Patronage Intentions

In this thesis, in light of the findings, several important managerial implications can be gleaned from essay 1.

First, sellers of search products should pay more attention to online markets. With the rapid growth of e-commerce some physical stores of search products, like of book shops and flower shops, may be replaced by online shops such as Amazon.com.

Second, sellers of experience and credence products could consider building an O2O commerce model, and explore both the online and offline channels to expand sale performance. Especially for sellers of experience products, though the likelihood of in-shop purchase is relatively high because information on product attributes cannot be easily gained from the Internet, a single offline channel also seems to be somewhat negative due to the showrooming effect.

Third, since risk perceptions are the highest for credence products, it requires the sellers of credence products to enhance their reputations to reduce consumer perceived risk levels. Also, the effects of word of mouth should also be given attention by sellers who sell credence products.

Last, although online patronage intentions are relatively high for service products, sellers need to pay

careful attention to protect customer privacy.

Essay 2. In-depth Analysis of the Relationship between Consumer Characteristics and Online Patronage Preference

Also, four managerial insights can be drawn in light of the findings from the second essay.

First, managers of online markets and traditional markets should all make clear their own target consumers and adjust their managerial strategy for the different market segments.

Second, in tailoring their advertising strategies to males, online sellers should provide a relatively low price for goods and emphasize high efficiency in delivery. In contrast, it may be more effective to advertise shopping environment and product assortment to females.

Third, Internet retailers should also provide more descriptions (e.g., performance of goods, specification, usage, and after service) on goods to reduce the level of consumer risk perception that is caused by information asymmetry.

Lastly, managers in online retail markets need to enhance their reputations to reduce consumer perceived risk in vendor, attracting consumer patronage. Considering this tendency, e-commerce platforms should publish the reputation score of each store to consumers to boost their confidence.

Essay 3. In-depth Analysis of the Relationship between Seller Attributes and Consumer Online Purchases

From the third essay, which focuses on the relationship between seller attributes and consumer online purchases, the author suggests that overall, managers in online markets should improve shop reputation and expand the scale of sales, to attract customer patronage. Specifically, four managerial implications arise from the conclusions.

First, for online sellers who mainly sell search product, because of complete information of products and the perfect competition of the market, it may better for sellers to improve service levels, and attract consumer patronage through small profits but quick returns. In other words, for these sellers it is important to obtain the advantage on the price (i.e., win on price).

Second, because of the incomplete information on experience products, consumers perceive more risk in product performance when they purchase online. This suggests online sellers of experience products should enhance their ratings for “Item as Described” and “Service” to bridge the trust gaps with buyers, thus increasing their sales volume. Also, due to the distance gap between buyers and sellers, it is particularly important for those sellers to provide information about the item in more detail, and make customers understand the item clearly (Lee et al., 2008; Park and Kim, 2003).

Third, since the price effects on consumer online buying behavior were non-significant for service

products, it suggests that online sellers of service products could attract customers more effectively by employing service differentiation rather than by adopting a low prices strategy.

Fourth, in light of the difference in consumer attitudes towards different seller types, increasing seller reputation is regarded as the primary objective for C2C sellers, while B2C sellers are better focusing on expanding their sales volume (Fan et al., 2013; Yoo et al., 2007). In addition, because the perceived risks in vendors and service are relatively high for service products (Featherman and Pavlou, 2003; Pires et al., 2004), individual sellers are not recommended to participate in service products.

6.4 Limitations and Future Research Directions

Inevitably, this thesis has several limitations that need to be addressed in future research.

In the first essay, the study has two major limitations. First, the author serves service as an independent class and discusses the online patronage intentions across four classes of products (i.e., search, experience, service, and credence products). However, in the study, products in each class are enumerated insufficiently (i.e., three products per class), which causes product bias in the essay. Second, because the research is based on the cross-section data which was collected relied on survey, it cannot reflect the continuous relationship of patronage intentions with the class of product, which may cause the analysis results to be unstable or underestimated. Given these possibilities, the author suggests that it is better to repeat the examination on the relationship between product class and patronage intentions by using different products.

The second essay also suffers from two key limitations. First, the author explores the indirect effects of consumer characteristics on patronage preference by analyzing the interactions with two online purchase goals – saving money and saving time. However, according to the study of Scarpi (2012), the hedonic orientation is also an important indicator that may influence consumer decision to buy. In light of the importance of hedonic orientation for consumer behavior, the author suggests that future research could add the moderating effects of consumer heterogeneity on hedonic orientation in online shopping into consideration. The second limitation in this essay is that it focuses on only one product (i.e. clothing) to investigate the relationship between consumer characteristics and patronage preferences for the Internet and local stores but gives no consideration to the influence of product attributes. Therefore, it is also necessary to discuss the differences in the relationship between consumer characteristics and patronage preference across different product classes in future research.

In the third essay, although the author uses objective data to improve the limitation caused by survey data, because of time constraints (i.e., only seven months in the study), this study is not able to discuss seasonal effects on online shopping. Since online shopping has obvious sales midseason and off-season that are caused by product attributes and seller sales promotions (e.g., Double 11 in China), the seasonal

effect also has a very important effect on consumer online purchases that it is necessary discuss it in future research. In addition, this study only focuses on the market of Taobao China but does not examine other e-commerce platforms, such as Amazon, Rakuten, and eBay. Because the number of sellers and competition types may differ across e-commerce platforms, comparative analysis for the difference in consumer buying behavior across platforms is also a research topic for future study.

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