



Fake & original: the case of Japanese food in Southeast Asian countries

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Abstract

This paper seeks to answer two main questions: whether restaurants using a national brand to capture customers in fact use original national ingredients for producing food and, in cases where original ingredients are not used, what is the economic rationale behind this choice? Specifically, the study focuses on Japanese restaurants in three Southeast Asian countries, using a theoretical model and an empirical investigation based on interviews and survey data collected through field research. Considering restaurants, their suppliers, and their customers, we show how a dual asymmetric-information problem exists, between suppliers and restaurants and between restaurants and their customers. The results indicate that a first reason for buying non-original ingredients—important especially for cheaper restaurants—is a desire to reduce costs. That said, the use of non-original ingredients occurs among all types of Japanese restaurants in the three studied countries. It does not depend on the presence of a Japanese chef or owner, nor on the share of Japanese customers. By contrast it does significantly depend on the reliability of the wholesale channel, and the resultant difficulties that restaurants encounter when buying original ingredients.

Keywords Food fraud · Adulteration · Mislabelling · Consumer's choice · Japanese food

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1 Introduction

In recent decades, local food has attracted ever greater interest as a cultural expression and heritage of different societies. UNESCO includes foods in its list of Intangible Cultural Heritage and Register of Good Safeguarding Practices which is expanding every year.¹ Other movements such as *Slow Food* have also flourished, promoting approaches that recognize a new role of food, linking it to a cultural or political orientation rooted in sustainability, preservation of local traditions and much more.² Reflecting this interest, in the international food market, consumers are seeking out new taste experiences and have significantly enlarged their diets—and their budgets—to embrace different national cuisines. As a result, national food industries are exporting their domestic foods globally, and more and more foreign-cuisine restaurants are opening in countries around the world.

The legal side of this story is that food ‘intellectual property rights’ have flourished—often in the form of geographical indications (GIs)—and become a central tool for identifying national foods and reaping benefits from their sale. However, there is no comparable control as far as national restaurants are concerned.³

Regarding the production and trade of food products, GI protection is often very strong, sometimes leading to trade disputes to prevent nations from free-riding on the tradition of others (Josling 2006). As an example, the word «*Champagne*» refers to a French region as well as to the well-known sparkling wine that is produced there, using a particular method and specific inputs. Since many people around the world use the term ‘*Champagne*’ for generic white sparkling wine, the *Comité Interprofessionnel du Vin du Champagne (CIVC)*, an association gathering actors of *Champagne* production and trade, devotes a substantial part of its resources to safeguarding the proper use of designation of origins and forbidding their misleading uses, even if the consumer is unable to distinguish between the quality of an original *Champagne* and a non-original sparkling wine produced in a different country (Schiessl, 2018).

Many national food-related products have similar stories. However, and quite amazingly, while these protections apply to products on the retailing channels, no such rules apply to what is served by restaurants. Hence, a customer entering a French restaurant in a country different from France can be easily cheated (or misinformed) about the real connection of the cuisine and its ingredients to the French ones—as if cheating in this case were not relevant for customers and producers. Yet, as we shall argue further on, such cheating is indeed relevant from an economic point of view, because market exchanges are based upon voluntariness and free choice. Hence a lack of information—or better an asymmetric information

¹ Ref. <https://ich.unesco.org/en/lists?>.

² On Slow Food movement ref. <https://www.slowfood.com/about-us/our-history/>.

³ The acronym stands for “geographical indications” and it serves to indicate that a product has a specific geographical origin and possesses qualities or a reputation that are due to that origin (ref *e.g.*, http://www.wipo.int/geo_indications/en/).

problem—simply nullifies the role of the market as an institution. It becomes meaningless if the consumer is unable to choose, or if their choice is irrelevant.

The lack of regulation for restaurants is surprising if we consider how some national cuisines—analogously to the *Champagne* example—are a distillate of cultural traditions and require specific ingredients or procedures. They contribute to give consumers that feeling of the country—France, Italy, Japan and so on—which may then orient them towards other products from that same country. One such example is *Washoku*, a traditional Japanese cuisine designed to appeal to all five senses at once (and so seriously concerned with the many characteristics of food and its ingredients), which in 2013 was granted UNESCO’s Intangible Cultural Heritage protection (Mekata, 2016).

In this paper we focus on the case study of Japanese food, which has grown increasingly popular all around the world, becoming a relevant driver of an entire industry. Japanese food exports have risen steadily over the years. In 2014 they amounted to 611.7 billion yens after an 11.1% increase from the previous year. Just 12 months later, in 2015, exports had risen a further 21.8% to 745.2 billion yens.⁴ It has been extensively shown that success in the food trade is based equally upon stringent control measures to assure consumer product safety, and upon quality (Charlier, 2019; Fagotto, 2014; Henson & Caswell, 1999); especially in developing countries (Lamuka, 2014). This issue is particularly important in the Asian countries neighboring Japan, where the popularity of Japanese food can clash with weaker food controls and lower consumer income. This typically provides the grounds upon which restaurants may decide to acquire non-original Japanese ingredients to serve their customers thanks to a double asymmetric information problem.

We specifically examine trade in non-original Japanese food in a sample of three Southeast Asian countries—Vietnam, Thailand and Indonesia—and seek to identify the main factors prompting Japanese restaurants to use non-original ingredients, considering restaurants’ twofold role: as buyers from upstream wholesale suppliers and as sellers to downstream consumers. Making use of field research, the extant economic literature, and a theoretical model, we sketch out a framework under which the use of non-original ingredients might happen. By means of questionnaires and interviews of staff working at Japanese restaurants, we then try to test the formulated hypothesis and understand *in-vivo* the reasons why non-original ingredients are—despite customers’ expectations—used in certain circumstances, and to identify the main economic reasons explaining this apparently widespread phenomenon.

What emerges is that the popularity of Japanese food is creating a paradox: while popularity boosts Japanese exports, it also fosters the activity of many suppliers of non-original ingredients. This might in turn, over the long run, impair the perception of original Japanese products and their quality; although consumers in our sample seemed unable to distinguish food prepared with original ingredients from food

⁴ For reference see: <https://www.japantoday.com/category/business/view/japans-agricultural-fishery-and-food-exports-hit-record-high-in-2014> or <http://www.japantimes.co.jp/news/2016/02/02/business/economy-business/japanese-food-exports-hit-record-high-third-year-cheap-yen-popularity-washoku/#.WKxyVH9WLAA>.

produced with non-original ingredients. Such a situation is problematic because many restaurants essentially feel themselves *de facto* entitled to misinform—or to not at all inform—their customers about food content, with potentially severe consequences on trust within the market. Accordingly, Japanese authorities are considering how to solve this problem in order to promote the export and use of original Japanese food and ingredients.

Against this backdrop, data for this study was gathered between November 2013 and March 2015, by visiting local Japanese restaurants, marketplaces, customs offices at borders, and authorities in Southeast Asia.⁵ Overall, the results provide an interesting glimpse into the economic rationale underlying the enounced paradox. We found that a large share of restaurants does in fact rely upon non-original ingredients, and that there are many explanations for this. The first and simplest one is economic: when the customer is unable to distinguish the food's quality by simply looking for the proper flavor and the restaurant has the means to mimic the flavor at a lower price, it is rational to expect non-original ingredients. Second, and more interesting for its compelling policy implications, the use of non-original ingredients seems to also result from the hurdles that restaurants encounter when trying to acquire genuine Japanese ingredients.

Interviewed restaurants were asked to list the problems that make it harder for them to successfully import original Japanese goods. Among the various complications listed, cumbersome import procedures and, most importantly, the risk of being tricked by importers with regard to the quality of goods, leap out as statistically significant key factors. These points suggest that restaurants face a problem when buying genuine imported Japanese goods, which overall increases their likelihood of using non-original ingredients. In particular, our empirical analysis shows two covariates to be strongly significant: the expectation that most of the ingredients sold by retailers and suppliers will be non-original anyway and, in the case of local ingredients produced by Japanese brands, that their production did not follow proper procedures.

On the whole, given the risk of being deceived by wholesalers and retailers of ingredients, and consumers' inability to distinguish the origin of the ingredients on the basis of flavor (as further shown by the empirical analysis), plus a robust savings in terms of input costs, restaurants' decision to use non-original goods may rationally serve as a double-sided solution to increase profits while maintaining better control over ingredients' quality. This solution is of course the outcome of adverse selection.

The rest of this paper is organized as follows. Section 2 provides an overview of the different kinds of food fraud while Sect. 3 gives a detailed description of the industrial sector in the countries studied, while also providing a simple interpretative model. In Sect. 4, we statistically analyze survey data in detail and show a difficulty

⁵ This field research was conducted at retailers, wholesalers, and suppliers in Vietnam, Thailand, Malaysia, and Singapore in December 2013. Regarding border trade among Thailand, Myanmar, and Laos; between Singapore and Indonesia; and between Vietnam and China, the research was conducted in February 2014. Survey data was then collected in Vietnam, Thailand, and Indonesia.

in obtaining ingredients for Japanese restaurants. In Sect. 5, we comment on further extension of this work. Finally, in Sect. 6, we conclude our analysis.

2 Food fraud: an overview

Food fraud has a long history dating back centuries, essentially from when economies became complex enough to market food products. In the Roman empire, winemakers and wine sellers often sweetened wine with *sapa*, a syrup of grape juice reduced to one third of its volume through boiling in a lead vessel. This additive helped the wine to preserve longer, but also had the negative effect of causing severe lead poisoning among drinkers (Holmberg, 2010).

Sometimes there may be a positive side to food fraud, with adulterations that generate an unexpected innovation in food production. For example, modern *Port* wine was in fact the accidental result of “fortifying” wine with brandy in order to maintain its quality during the trip toward final markets, mostly Britain.⁶ However, this appears to be more an exception than the rule. In general, food fraud harms consumers in terms of product quality and sometimes even in terms of personal health. On the whole, food fraud has always been a hot topic for authorities, not just because it sometimes directly affects public health, but also because of its various economic effects in terms of consumption, proceeds and tax revenues.

If we try to formulate a taxonomy of food fraud, it can be summed up in two main categories. One is “adulteration”, where other substances, different from those declared on the food label, are added. This, for example, happens when wine is simply diluted with water or replaced with another one of lesser quality than the one declared. Of course, sometimes the additive, as in the case of *sapa* syrup, might also be dangerous to health, making the consequences of fraud much more severe than simply impairing the quality of food and cheating customers. But even in the case of simple cheating, fraud has severe consequences on markets.

The other way fraud is committed is through “misinformation”, whereby some relevant information about the food is not disclosed, leading to a wrong or incomplete perception by the consumer. In economics this is the well-known asymmetric information problem (Holmberg, 2010). This form of fraud can sometimes be subtle because it does not directly cheat the consumer but only withholds information, allowing people to make incorrect assumptions or develop a wrong perception about the food.

Misinformation has several economic consequences worthy of interest. If the customer is unaware of the fraud affecting the food experience but still perceives the food to be of lesser quality, she might give a poor evaluation to that food. This will reasonably affect her future consumption of that food, and the word of mouth about it that she circulates among her peers. Conversely, if the consumer is aware that some “cheating” might take place but has no specific means to detect it—*i.e.*, no way to overcome the asymmetric information—she will adopt the usual behavior in case of uncertainty so

⁶ See <https://www.ricksteves.com/watch-read-listen/read/articles/the-history-of-port>.

that expected market failures will arise (Akerlof, 1970). Finally, it must be emphasized that, even in the case where the customer is completely unaware of the fraud and there are no direct consequences on the food experience, the misinformation still affects one of the key tenets of the market, *i.e.*, the voluntariness of the exchange: choice without consent is not a choice.

A choice without reference is simply a random event. So, although there might be no direct consequences of the consumer being “cheated”, because she does not perceive it in any way, this peculiar situation may nonetheless result in her buying something that she does not want. Choosing without consent is a conundrum that makes the market an irrelevant institution. In other words, the mechanism of resource allocation collapses into nothing. The consumer preferences exist, but are not relevant for directing the choice, and any set of allocations becomes indistinguishable so as the Pareto frontier (Marciano & Ramello, 2014). This is tantamount to saying that the market evaporates, and with it all the basic economic principles.

3 Ingredient supply, the food chain, and asymmetric information

This work deals with the consequences of the second type of food fraud, *i.e.*, misinformation, which characterizes country-specific restaurants abroad, meaning those who use a national adjective to qualify their cuisine. Restaurants are not subject to any kind of regulation in terms of country-specific products, so they can declare to produce the cuisine of any given country without any control on the authenticity of the food served. In particular, we focus here on Japanese food served in Japanese restaurants abroad in a handful of South Asian countries. Assuming that they must produce dishes that appear “Japanese” to customers, in accordance with what was previously explained, these restaurants have two distinct possibilities with respect to ingredients: they can use original ingredients of the Japanese tradition, or they can opt for non-original ingredients, meaning ingredients that do not relate to Japanese cuisine and which are produced in other countries, often locally.

It is worth noting here that there are two kinds of ‘original’ Japanese food ingredients, differing in terms of the place of production. The majority are produced in Japan, but there is also local production run by Japanese companies abroad. For example, a typical Japanese ingredient, soy sauce, is produced in several countries in Southeast Asia. For our investigation, both these kinds of ingredients shall be considered as ‘originals’. Conversely, ‘non-original’ ingredients are considered as such, no matter how well they mimic the original ones. The issue here concerns the traditional inputs of the local cuisine, so that the non-original input—whether or not it affects the taste perceived by consumers—represents a *de facto* adulteration of the food, which is not legally tackled simply because there are no rules regulating this issue.

3.1 Food and asymmetric information: literature review

The customer of a Japanese restaurant in general expects to eat genuine food, that is to say food produced using one of the two aforementioned kinds of original

ingredients. Because of the lack of regulation and the different possibilities of mis-information, the restaurant can decide to buy original ingredients, decide to buy an original ingredient and be cheated, or decide to buy a non-original ingredient. The production of non-original ingredients is widespread in Asia, and of course local production by Japanese companies has made the know-how more accessible.⁷ In general, prices will be higher for Japanese production and lower for non-original production.

Now, if we refer to the extant economic literature broadly focusing on the topic of counterfeiting, the following results emerge. Counterfeit (or non-original) products are classified into two categories, deceptive and non-deceptive (Grossman & Shapiro, 1988).⁸ While both kinds of counterfeit products harm original producers, non-deceptive ones do not harm consumers. In the case of food, however, the issue is that either the restaurant is cheated by the supplier, or it intentionally buys non-original ingredients and in turn deceives the consumer who expects Japanese ingredients.⁹ In this respect, regarding deception, food may fall into the class of goods affected by what Darby and Karni (1973) termed “credence quality,” which is difficult to judge, even after purchase. These considerations in turn affect the ability of customers to distinguish whether a product is authentic or not. This issue is so important to food products that a focal point of current scholarly debate is precisely the ability to provide information through labelling in order to reduce consumers’ incomplete information of quality (Golan et al., 2001; Stojanović et al., 2017; Teisl & Roe, 1998; van der Colff et al., 2016).

Using spatial price discrimination models with a uniform distribution of customers, Giannakas (2002) analyzed the effects of mislabeling due to insufficient regulation on economic welfare. Fulton and Giannakas (2004) developed a market model considering both consumers’ and producers’ behaviors in detail, describing the complicated incentives they face. Bonroy and Constantos (2008), developing on the model by Gabszewicz and Grilo (1992), showed that high-quality producers may not have an incentive to introduce regulation by labels, so mandatory regulation may be necessary.

In a non-spatial model of price discrimination, Anania and Nisticò (2004) considered the effects of public enforcement upon cheating behaviors, which depend on suppliers’ levels of risk aversion, and indicated an incentive for each producer for a level of regulation by labels. Vetter and Karantininis (2002) also considered how vertical integration or divestiture of a processed food firm is effective in coping with credence quality. In such research, costs of enforcement and monitoring by authorities are assumed to be covered by fines, and/or a food processor can obtain

⁷ Although outsourcing can be useful in many ways for production, it can present the negative effect of making the know-how available to develop competitive production locally (see on this Ramello, 2014).

⁸ Higgins and Rubin (1986) considered the snob effect of brand-name products on counterfeiting. In food products, this effect is minor, and we need not take it into account.

⁹ The issue of food safety might also be at stake here, and indeed it has been the subject of extensive scholarly discussion, resulting in additional private and public regulation (Fagotto, 2014; Charlier, 2019). However, as far as this investigation is concerned, we did not face any safety issues that can thus be here neglected.

the public information freely. That is, the level of enforcement and monitoring can be exogenously determined and adjusted. However, for authorities in developing countries already facing many social problems, costs are critical and budgets limited, thus they do not have a free hand as this type of model assumes.¹⁰

As far as our investigation is concerned, there are two ways in which non-original ingredients can be used for cooking in Japanese restaurants. In either case, non-original ingredients are smuggled by the distribution system as originals. Hence both restaurant and consumer are deceived.¹¹ To be sure, the supply chains for ingredients in the three Asian countries considered here can be very articulated. Accordingly, there is a great deal of opacity in the system. Using interviews with wholesalers, importers, retailers, and restaurants, we have tried to obtain a glimpse of this chain.

3.2 The Japanese restaurant sector and its supply chain

A first agent acting in the supply chain of Japanese food ingredients is the wholesale distributor. There are several methods for buying original ingredients. A few major players in Vietnam, Thailand, and Indonesia periodically import by cargo ship from Japan. It is assumed that in general they do not deal with counterfeit ingredients, and should accordingly be sufficiently trusted by restaurants. In most cases, the prices of such imported foods are much higher than the original prices in Japan. Therefore, prices are very high, even compared to the price levels of original ingredients locally produced by a Japanese brand. Often the high prices result from trade tariffs or cumbersome import procedures.¹²

In addition, there are many small and medium-size wholesale suppliers selling imported, locally-produced, original, or non-original food ingredients. Their targets are inexpensive restaurants that local people can afford. Since imported Japanese foods are very expensive, such restaurants, especially, may try to save money on ingredients (as we heard in interviews with suppliers and restaurants). Beyond this deception, there are two stages in the supply chain where asymmetric information—and hence, potentially, deception—can occur. One is between suppliers and restaurants, and the other is between restaurants and customers (asymmetric information #1). Suppliers may have correct information on whether a food is counterfeit or not, but restaurants might find authenticity difficult to judge. In general, we would expect that when the staff and the ownership are Japanese, this kind of cheating should be

¹⁰ For example, in Vietnam, effective enforcement by authorities is financially supported by foreign companies producing original products. Without such support, authorities cannot enforce trade rules due to manpower and budget constraints. We heard about concrete measures undertaken with local authorities to combat counterfeits from several Japanese companies. See Domon et al. (2012).

¹¹ A typical case we observed in interviews concerning the three countries under observation, involved ingredients using counterfeited brand names and packages, e.g. fake soy sauces, cooking sake, and MSG (Monosodium Glutamate).

¹² The latter issue was observed during the field research preceding the collection of survey data, and it has been widely lamented by the restaurants interviewed within the sample.

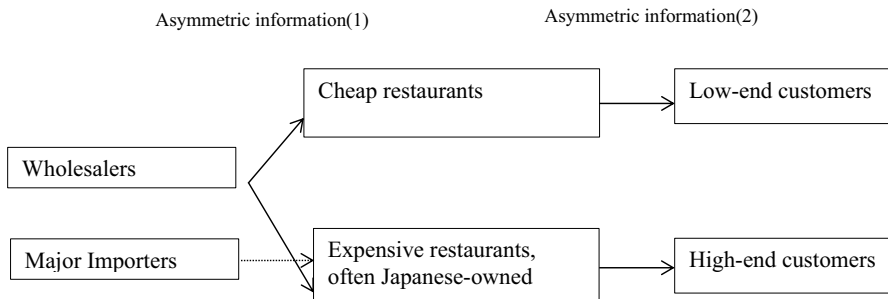


Fig. 1 Supply chain and the double asymmetric information problem

more difficult, as personnel have familiarity with the original taste.¹³ However, even when the authenticity of ingredients can be reliably judged, owners might still be willing to buy non-original ingredients to save money. In this case a second asymmetric information problem may arise (#2), between restaurants and customers.

In this case we would expect two different attitudes, depending on the segment of the market served by the restaurants (see Fig. 1). On one hand, we have fancy and expensive restaurants serving customers with higher willingness to pay, higher education, and accordingly (in theory), better skilled in detecting the authenticity of the food. Often such restaurants serve Japanese as well as local customers. In such a case one would expect a more extensive use of original ingredients. On the other hand, there are cheaper restaurants that attract low-end customers who are more sensitive to price. As a rule, one would expect less familiarity with traditional Japanese food here, and consequently less ability to distinguish whether original or non-original ingredients have been used in preparing the food. In turn, one also expects non-Japanese owners to be less sensitive to the authenticity of ingredients and thus more willing to contain costs by recruiting less skilled (and less expensive) staff and chefs compared to high-priced restaurants.

In this cheaper segment of restaurants, since the customers have presumably not often tasted authentic Japanese food (second type of asymmetric information between restaurant and customer), owners can more easily decide to buy non-original ingredients. However, also owners and staff—who on the whole are less skilled at assessing Japanese flavor—can be more easily cheated by suppliers selling counterfeited Japanese ingredients (we observe then the first type of asymmetric information between supplier and restaurant).

One might claim that the latter situation does not seriously hamper either restaurants or customers, as long as the food is safe and the price is lower. Moreover, customers can afford to enjoy Japanese flavors, and restaurants also can make profits if they save money, as shown in the case of non-deceptive counterfeiting by Grossman and Shapiro (1988). However, there are endogenous effects that should be properly

¹³ According to some interviews, non-Japanese chefs and staff require training to make them aware of the proper taste, and this training must be renewed in order to avoid the resurgence of local taste.

Table 1 Average payment of customers

	Less 5 USD	5–10 USD	10–15 USD	15–20 USD	20–25 USD	25–30 USD	30–35 USD	35–40 USD	45–50 USD	More 50 USD
Indonesia	6	11	3	4	1	0	0	3	0	1
Thailand	5	27	18	11	15	4	17	5	3	1
Vietnam	7	26	9	5	5	1	0	2	0	0

The scale here must be read less than 5, between 5 and 10, between 10 and 15, and so on

considered. First, if a share of customers is exposed to low-quality Japanese tasting food, their willingness to pay for high-end food might decrease, or they might direct their preferences to other foods. Second, we have drawn a simplified scheme of restaurants and suppliers, but this distinction of tastes cannot be easily made, especially by the ordinary consumer. Hence the existence of grey areas¹⁴ could reasonably raise a case of adverse selection. In the absence of other reliable signals, the customer will necessarily expect Japanese food of average quality, comprising the cases of both original and non-original ingredients. This is confirmed by our interviews, in which we discovered that in many cases customers have difficulty in judging authentic Japanese foods and ingredients. Several major suppliers dealing only with originals know the details of competitors, especially small suppliers who sell counterfeits, invading original food markets.

3.3 Types of ingredients and the variety of restaurants: a simple model

In order to further clarify the picture, we provide here a simple model summarizing the framework and trying to further capture what was previously described. To account for the variety of restaurants, we introduce the probability of buying original ingredients, $\Pr = f(p)$, where p is the price of an ingredient with $df/dp > 0$ and $\lim_{p \rightarrow \infty} f(p) = 1$. We thus assume that a restaurant is indexed by a type t_i representing the market segment and the profitability of using original ingredients. The expected profit function of restaurant i is then $\pi_i(q_i, f(p); t_i)$, which is strictly concave with respect to q_i , quantity of a product. For the sake of simplicity, we also assume that restaurants face perfect competition in their t_i market segment and determine p after q_i .

The first maximizing problem to solve is.

$$(1) \quad \underset{q_i}{\text{Max}} \quad \pi_i(q_i, f(p); t_i).$$

We denote the solution as $q_i^*(f(p); t_i)$. Next, $\pi_i^*(p; t_i) = \pi_i(q_i^*, f(p); t_i)$ must be maximized under the assumption of strict concavity of π^* with respect to p .

$$(2) \quad \underset{p}{\text{Max}} \quad \pi_i^*(p; t_i)$$

We denote this solution as $p^*(t_i)$.

In this situation we obtain a natural result as to the relationship between p^* and t_i . By a total differentiation of the first-order condition, $\partial \pi_i^* / \partial p = 0$, we obtain.

$$(3) \quad \underbrace{\frac{dp^*}{dt_i} = - \frac{\partial^2 \pi_i^* / \partial p \partial t_i}{\partial^2 \pi_i^* / \partial p^2}}_{-} \begin{pmatrix} > \\ = \\ < \end{pmatrix} 0 \quad \Leftrightarrow \quad \frac{\partial^2 \pi_i^*}{\partial p \partial t_i} \begin{pmatrix} > \\ = \\ < \end{pmatrix} 0.$$

¹⁴ A look at Table 1, showing the distribution of pricing in the different countries, shows that while it is easy to distinguish the extremes, there is an extended zone in which it is more difficult have a clear-cut view.

If and only if the effect of t_i on a marginal profit, $\partial\pi_i^* / \partial p$, is strictly positive, i.e. $\partial(\partial\pi_i^* / \partial p) / \partial t_i > 0$, then a restaurant with a high t_i prefers the high probability of buying original ingredients and will reasonably go to the expensive importers. Although we do not consider the supply side and equilibrium within the market, it is obvious that menu prices in restaurants increase with a high price of ingredients.

While the survey data will be analyzed in detail in the next section, we list here the variety of restaurants in the sample divided per country and per average bill paid by customers. In accordance to our model, the average payment can be used as a proxy for restaurant quality. As can be easily seen, extreme cases of less than 5 USD and more than 50 USD exist, but they are rare. Restaurants with a price range of between 10 and 30 USD represent the majority of restaurants. Although we might try to carve out two distinct market segments, i.e., high-end and low-end restaurants, the majority of restaurants lie in between, in a grey area with overlapping pricing and minor differences. Consequently, we can reasonably assert that a large portion of them, anyway, are exposed to the previously described ingredient-buying decisions and the consequent probability of being cheated by importers.

4 Empirical analysis and results

This study uses data from a survey conducted among Japanese restaurants in Indonesia (July 2014), Thailand, and Vietnam (both August–September 2014) by means of door-to-door submission of questionnaires. On the whole, 222 respondents composed the sample of restaurants serving Japanese food.

The collection was preceded by field research at retailers, wholesalers, and suppliers in South Asian Countries, focusing also on border trades among Thailand, Myanmar, and Laos (December 2013), between Singapore and Indonesia (February 2014), and between Vietnam and China (February 2014) in order to sketch out the organization of food trade in the region.

Although all the general *caveats* of survey data analysis apply here, we believe the findings to be interesting and worthy of consideration for at least two reasons. First, they provide an overview, even if limited, of an issue that is otherwise difficult to investigate. Second, although individual answers may contain some bias or error, we expect the figures on the whole to be sufficiently reliable, since the geographic breadth of the sample makes systematic coordination in the answers very unlikely.

The questions focused specifically on details of restaurants' productive organization and on their awareness, familiarity, and use of non-original ingredients. More specifically, our investigation used the survey data:

1. To test the supply-side: whether the use of non-original ingredients is country-specific and whether it depends on stricter Japanese connections (having or not a Japanese chef or owner) used as a proxy for the greater/lesser ability to detect cheating

Table 2 Non-original ingredients contact in each country

	Non-original ingredients contact		Tot
	No	Yes	
Indonesia	29 (63.04)	17 (36.96)	46 (100)
Thailand	72 (62.61)	43 (37.39)	115 (100)
Vietnam	33 (54.10)	28 (45.90)	61 (100)
Tot	134 (60.36)	88 (39.64)	222 (100)

Pearson Chi-squared test: p value = 0.5 (row % in parenthesis)

Table 3 Non-original ingredients contact in Japanese and non-Japanese chefs

	Non-original ingredients contact		Tot
	No	Yes	
Non-Japanese chef	92 (61.74)	57 (38.26)	149 (100)
Japanese chef	42 (57.53)	31 (42.47)	73 (100)
Tot	134 (60.36)	88 (39.64)	222 (100)

Pearson Chi-squared test: p value = 0.54
(row % in parenthesis)

2. To test the demand-side: whether the customers matter (e.g., by considering the share of Japanese, *i.e.*, taste-sensitive, customers)
3. To test whether the main determinant for using non-original vs original ingredients is dependent upon a market's characteristics and its institutional setting.

A first interesting insight is that no differences emerge in the use of non-original ingredients among the three countries analyzed in this report (Indonesia, Thailand, and Vietnam). In other words, country-specific effects do not seem to exist. As can be seen in Table 2, when accounting for the shares of restaurants in each country where counterfeiting was acknowledged, no statistically significant difference emerges from the Chi-squared test: percentages range from 37% (Indonesia) to 46% (Vietnam). The use of non-original ingredients thus appears to be equally widespread across the nations considered here.

Second, the data do not support our assumption, emerging from the hypothesis discussed in the previous sections and the relating pricing model, that restaurants owned by Japanese firms or employing Japanese chefs should be less inclined to use non-original ingredients in their menus. In the case of Japanese companies, we hypothesized that owners have greater expertise and can therefore more easily prevent undesired use of non-original ingredients and, at the same time, have stronger bonds with Japanese exporting firms that supply such products abroad. With respect to Japanese chefs, we predicted that their training would make them better equipped to spot counterfeiting and more inclined to use genuine products in their menus. What's more, their stronger cultural ties should make Japanese chefs more loath to use non-original ingredients. Finally, since Japanese owned or operated restaurants

Table 4 Non-original ingredients contact in Japanese and non-Japanese firms

	Non-original ingredients contact		Tot
	No	Yes	
Non-Japanese firm	110 (59.14)	76 (40.86)	186 (100)
Japanese firm	24 (66.67)	12 (33.33)	36 (100)
Tot	134 (60.36)	88 (39.64)	222 (100)

Pearson Chi-squared test: p value = 0.4

(row % in parenthesis)

are expected to serve high-end customers (*e.g.*, Japanese businessmen) relatively more, we hypothesized that their profits would be positively correlated with use of original ingredients.

However, empirical evidence shows no such correlations: no statistically significant difference emerges in the prevalence of non-original ingredients between these two categories of restaurants. Table 3 shows how, out of the 222 restaurants considered, 73 employed Japanese chefs, while 149 did not. Contact with non-original ingredients was reported in 42% of restaurants employing Japanese chefs, but in only 38% of those not employing Japanese chefs. Despite these raw numbers, the difference is not statistically significant. The same is true when considering restaurants' ownership, as shown in Table 4. Contact with counterfeits was reported by 33% of the 36 restaurants controlled by Japanese owners, compared to 40% of non-Japanese owned restaurants. However here again the difference, as a result of the estimated Chi-squared test, is not statistically significant. On the whole, Japanese corporate ownership or workforce is not associated with a lower likelihood of adopting non-original ingredients in the restaurants we considered.

Even Japanese customer nationality does not matter. As emerges from Column 1 in Table 5, if it is true that restaurants with no contact with non-original ingredients have a slightly bigger share of Japanese customers (46% versus 42%), a Student-t test does not allow us to reject the hypothesis that Japanese equally eat in restaurants with and without non-original ingredients.

When accounting for other aspects of customer experience, it emerges that clients are not able to discriminate between food made with genuine or non-original ingredients (Table 5, columns 2 and 3). When it comes to subjective indicators of their meal experience, it turns out that customers do not assign a better "Japanese" flavoring to the meals likely to have used only genuine ingredients than to those likely to have adopted non-original ones. Also, overall customer satisfaction does not differ between restaurants having contact with non-original ingredients and those that do not.

Table 6, reporting pairwise correlation coefficients, shows further interesting results. Although customers are in general unable to distinguish whether food ingredients are original, they prefer Japanese flavoring menus. Moreover, restaurants with a Japanese owner or a Japanese chef are more prone to buy from Japanese suppliers. Finally, Japanese customers prefer restaurants with a Japanese

Table 5 Non-original ingredients contact in Japanese and customer's perception

Non-original ingredients contact	(1) Avg. % Japanese customers	(2) Avg. perceived flavoring ^a	(3) Avg. customers' satisfaction ^b	(4) Avg. # import problems
Yes	42.48 (85)	1.91 (78)	2 (76)	2.17 (88)
No	45.88 (127)	1.93 (123)	1.89 (124)	1.56 (134)
p value ^c	0.46	0.9	0.28	<0.0000

(Observations in parenthesis)

^aExpressed on a five point Likert-scale, where 1 represents traditional Japanese flavoring and 5 local flavoring^bExpressed on a five point Likert-scale, where 1 represents high satisfaction and 5 poor satisfaction^cp value associated with a Student-t test

brand or where the sales staff is Japanese (thus conveying a stronger Japanese relationship). Taken together, these results provide the following unexpected evidence: while customers look for strong Japanese signals, in order to be reasonably assured about the quality and the original flavor of the food purchased, restaurants with a Japanese brand or a Japanese cook, despite being more likely to buy ingredients from Japanese suppliers and thus to exploit potentially safer retail channels, do not buy fewer non-original ingredients.

At this juncture, the question arising is: why many Japanese restaurants in these three countries are likely to rely indiscriminately upon non-original ingredients? The first and simple answer would be one based on economic theory: if the customer is unable to distinguish food quality while simply looking for the proper flavor, and the restaurant is able to mimic proper flavor at a lower price, it is rational to expect counterfeit ingredients. It is worth noting that this seems to apply for all restaurants and in general represents a long-lasting reason for deceiving consumers in food matters (Otter, 2011).

Second, and subtler, the use of non-original products seems also to depend on the hurdles restaurants encounter when trying to acquire genuine Japanese ingredients. Interviewed restaurants were asked to list the problems that made it harder for them to successfully procure original Japanese ingredients. Of the eight different complications reported, cumbersome procedures for direct import and the risk of being tricked by importers with regard to the quality of goods are key factors. A preliminary analysis, reported in column 4 of Table 5, shows that restaurants encountering more problems purchasing original ingredients, are also the ones using more non-original ingredients. This difference is a statistically significant one. We can interpret these results as follows: on average, when restaurants experience more difficulties in attempting to obtain genuine Japanese ingredients, they are more likely to use non-original goods, either intentionally or unintentionally.

A third explanation for why Japanese restaurants resort to non-original ingredients stems from Table 7. It presents the results of a logistic regression employed in order to support the robustness of the previous findings while controlling for

Table 6 Correlations matrix

	Japanese company	Japanese workers	Japanese chefs	% Japanese customers	Flavoring menu	Customers' satisfaction	Japanese supplier
Japanese company	1						
Japanese workers	0.2400*	1					
Japanese chefs	0.1829*	0.3001*	1				
% Japanese customers	0.2346*	0.2051*	0.1071	1			
Flavoring menu	− 0.1066	− 0.1827*	− 0.2241*	− 0.2782*	1		
Customers' satisfaction	− 0.0193	− 0.0096	− 0.1522*	0.0545	0.2571*	1	
Japanese supplier	0.1688*	0.0187	0.1669*	− 0.0069	− 0.0295	− 0.1183	1

* $p < 0.05$

Table 7 Regression models

	(1) Non-original = 1	(2) Non-original = 1
Import difficulties	0.352 (0.102)***	
Japanese company	– 0.398 (0.423)	
Japanese chefs	0.002 (0.005)	
Japanese customers	– 0.005 (0.005)	
Japanese supplier	– 0.003 (0.006)	
Thailand dummy	0.022 (0.388)	
Vietnam dummy	0.589 (0.439)	
High taxes		0.039 (0.336)
Import prohibited		0.454 (0.520)
Counterfeit ingredients		2.753 (1.078)**
Production deception		1.881 (0.837)**
Procedural issues		0.279 (0.379)
Time		0.073 (0.361)
Limitations		– 0.048 (0.365)
Other problems		1.075 (0.765)
Constant	– 0.827 (0.381)**	– 0.797 (0.211)***
Obs	212	222

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

other factors: restaurant owned by Japanese, presence of Japanese chefs, share of Japanese customers, restaurant supplied directly by a Japanese importer and country-fixed effects. While it emerges from column (1) that all control variables turn out to be not significant, the covariate summing up the observed import problems is a significant determinant of the likelihood of observing contact with non-original ingredients in the restaurants considered. This once again confirms the previous explanation.

Column (2) in Table 7 reports the results of a second model that estimates the impact of all possible problems faced by a restaurant when buying genuine imported Japanese goods on the likelihood of that restaurant to use non-original ingredients. Each independent variable represents a dummy capturing all possible problems (not mutually exclusive). Very clearly, two covariates turn out to be strongly significant—the expectation that ingredients sold by suppliers are non-original or that their production did not follow proper procedures (production deception)—implying that restaurants' attitudes towards the use of non-original products descends from lack of trust in wholesale suppliers.

On the whole, given the risk of being deceived by suppliers and retailers and given the consumers' inability to distinguish the origin of the ingredients in terms of flavor (plus robust savings in terms of input costs), restaurants' decision to use non-original ingredients may rationally serve as a double-sided solution to increase profits while having better control of the quality of ingredients. The latter, of course, is the outcome of an adverse selection.

5 Insights for policy implications

In the current analysis we excluded situations in which the use of non-original ingredients creates safety problems (Henson & Caswell, 1999; Otter, 2011). In such cases, the issue of public health would require a different analysis and, in accordance to the literature, strong regulatory intervention (Charlier, 2019). Nonetheless, even when health is not a stake, there is a serious issue surrounding the massive use of non-original ingredients for preparing Japanese food (and the debate could extend to consider the use of non-original ingredients used by country-specific restaurants in general).

The recent international success of Japanese food is connected to its peculiar characteristics and its attendant quality, witnessed equally by the recognition from institutions like UNESCO and by the intrinsic value that variety, in food as in other products, has for customers. However, Japanese food represents a credence good in the sense that many customers—and sometimes restaurant staff—are unable to detect the originality of the ingredients and are happy with generic Japanese-tasting food, an issue that until now has not been seriously questioned. This in turn fosters an intense activity of *de facto* fraud in the sense of exploiting misinformation, which still represents a food fraud. We clearly observed this in our field research, in which either the suppliers cheat the restaurants (first type of asymmetric information) or the restaurants cheat the customer by using non-original ingredients (second type of asymmetric information).

While in the case of suppliers cheating restaurants, it is possible to at least claim a clear issue of commercial fraud that can be pursued by the authorities, the matter of restaurants deceiving customers might appear more controversial, as Japanese flavoring does not require proof that ingredients are original. In most cases this does not raise any legal concern in the countries where the data was collected. This is equally true for most of the restaurants serving national cuisine in foreign countries.

One could equally object that, insofar as the consumer does not perceive the difference, the issue does not necessarily affect social welfare. Yet, there are two distinct problems to be raised here. The first is that, in the long run, a *laissez-faire* approach in the use of ingredients can dilute the distinctive features making Japanese food and *Washoku* a special product worthy of interest. This argument could be made for any food outside of its native country, and accordingly this entire kind of differentiation could be weakened: we would have markets of French-tasting foods, Chinese-tasting foods, and so on, made without the proper ingredients. However, the paradox lies in that fact that what is forbidden in the trade of food such as wine, GI products, and so on, is possible within restaurants. The second problem arises from the asymmetric information between restaurant and consumer, coupled with the latter's inability—in most instances—to detect the ingredients' originality. This situation is so far leveraged as to permit a *de facto*—though not yet *de jure*—fraud, which hampers one of the pivotal tenets of market exchange, voluntariness. If the consumer cannot easily distinguish differences, she must be informed in order to make choices, or voluntariness could

be compromised. It might be argued that, if the taste is indistinguishable, the choice and hence the equilibrium would not change, so that cheating the customer does not pose a problem. However, this is just a further reason for providing the proper information, preserving the freedom of the customer, the voluntariness of the choice, and the market equilibrium. In many jurisdictions, for example, restaurants must declare whether ingredients used are frozen or fresh, although this has nothing to do with the safety and quality of the food. Likewise, it should be simply indicated whether the food is prepared with original or non-original ingredients.

All in all, this might or might not have an impact on the market equilibrium, yet making the consumer aware and conscious of existing differences seems to be in line with respect for the foundations of market exchange. By contrast, it seems quite dubious to accept the principle that when the consumer does not suffer from cheating, fraud can be permitted.¹⁵

6 Concluding remarks

This work dealt with food fraud and tries to provide insights into the phenomenon by examining use of non-original ingredients in Japanese restaurants abroad. This kind of behavior falls into the category of food fraud reliant on misinformation, which is—quite surprisingly—regulated only for products sold in shops, but not for restaurants.

We conducted an applied investigation using data collected on Japanese food consumption in a sample of restaurants in three South Asian countries, where the food fraud concerned the use of non-original Japanese food ingredients and customer misinformation. Such ingredients per se do not represent a problem so long as buyers, restaurants, and restaurant customers are informed about what they are buying. However, in many cases customers and sometimes even restaurants are not properly informed, and thus they are cheated regarding the authenticity of the Japanese food.

We analyzed which factors affect the use of non-original ingredients and found that the main factor behind choosing non-original ingredients is a double asymmetric information problem: between wholesalers and restaurants and then between restaurants and customers. In addition to the typical economic motivation for buying cheaper non-original ingredients—saving money—other issues result from the multiple opportunities for asymmetric information to arise in the supply chain.

The observed situation then creates a paradox. The popularity of Japanese cuisine has led to a strong increase in Japanese food exports and also fostered the production and use of non-original ingredients, which in the long run might affect those same

¹⁵ In an article dealing with labelling food using ingredients from genetically modified organisms, Crespi and Marette (2003) show that welfare depends extensively on the cost of labelling and the share of consumers sensible to non-GMO ingredients, but it is worth noting that in the case under investigation, labelling de facto happens anyway, and accordingly this is a matter of simply indicating the truth.

Japanese exports, especially given the observed inability of customers to distinguish original food from non-original.

Although there are no specific IPRs regulating national cuisine, countries have a number of measures available for controlling provenance, especially in the case of credence goods: labelling, import certificates, quality standards, and so on. These kinds of measures are not seriously used by the countries within our sample and do not affect the food produced in restaurants, who remain more or less free to use the ingredients they want without declaring their origins. In selected cases, the restaurants accept this state of affairs because they are in turn victims of wholesalers who smuggle non-original ingredients as original. While apparently consumers can do little, the extant asymmetric information can lead the market toward adverse selection in which original ingredients are seldom used. Now, if from a static viewpoint, food is a credence good, from a dynamic perspective education to properly identify food is relevant to making consumers aware of what they are eating. What is more, even when the consumer is unable to detect what she buys, unrestrained cheating hampers the market intended as an institution for allocating resources.

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Declarations

Conflict of interest The authors have no relevant financial or non-financial interests to disclose.

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