Guidance paper on bundling in the compilation of services statistics

31st Voorburg Group Meeting
Zagreb, Croatia
September 19, 2016

Revised to reflect feedback from the meeting
January 2017

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1. Bundling

In following the methodical approach of the content development strategy, the Voorburg Group encountered a number of cross-cutting issues. While statisticians rely on classification systems to separate products and industries into measurable pieces, companies involved in multiple sectors will often bundle their services to capture a customer and maximize profits. Bundling surfaced as an issue in a number of sectors such as Telecommunications, Information Technology and Media Services. In some cases, bundles include both goods and services, and may involve more than one enterprise. For example, some retailers sell cellular phones below cost bundled with a telecommunications plan of a third party.

The use of bundling in markets is extensive and has existed for centuries. Economic and marketing literature includes extensive theory on approaches to building and pricing bundles. The focus of literature is almost exclusively on maximizing surplus capture and maximizing revenue. One thing missing from theory is how products are defined and what impact product definition decisions have on classification systems, output programs, and price programs.

This paper is meant to provide statistical offices with guidance regarding the measurement challenges associated with bundled products. It provides definitions and parameters for identifying the issue and its impact on the measurement of services and provides some approaches and best practices to handle different scenarios.

This guidance paper consolidates the papers, slides and discussion of the Cross-Cutting Issues Session on Bundled Services presented at the 2015 meeting of the Voorburg Group in Sydney, Australia. In some cases, the contributing authors' original text, diagrams and examples are used in their entirety, in other cases, the contributing authors' ideas are paraphrased. The paper draws from the experiences and practices of the authors' statistical offices as well as those of the participants of Voorburg Group who have contributed to the discussion of the issue over a number of years.

The paper also provides some background to the issue from previous meetings and outside sources. Section 1 clarifies what is meant by a product and clarifies some definitions to help illuminate the issue. With a base understanding and common definitions, the rest of the paper delves into specific guidance in: Product Classification (Section 2); Turnover (Section 3); and SPPIs (Section 4). Section 5 looks at how the issue affects the System of National Accounts. Finally, Section 6 provides a general conclusion and summary of a few key points.

1.1 Literature review of bundling

The Eurostat-OECD Methodological Guide for Developing Producer Price Indices for Services defines Bundling as:

> *Bundle (bundling of services) Bundling is also referred to as package tie-in and tends to occur when one product is sold in combination with another as a requirement for the sale. Bundling of products may be a source of economies or efficiencies for the producer, part of which may be reflected in a lower composite price for the buyer than if all the different products were supplied or bought separately. However, bundling may also make it difficult for firms to enter different product segments of the market. The competition implications of bundling, including that of tied selling generally, are complex and need to be evaluated on a case by case basis adopting a rule of reason approach.*[1]

The practice of bundling was identified in a 1976 paper by Adams and Yellen. They described bundling as:

> *Firms often sell their goods in packages: sporting and cultural organizations offer season tickets, restaurants provide complete dinners, banks offer checking, safe deposit, and travelers' check services for a single fee, and garment manufacturers sell their retailers clothing grab bags comprised of assorted styles, sizes, and colors. We shall refer to the practice of package selling as commodity bundling.*[2]

They also identified two different cases of bundling, what they called 'pure bundling' and 'mixed bundling'.

> *A firm that sells goods only in package form has adopted a pure bundling strategy. A firm that sells the same goods separately as well as in packages has adopted a mixed bundling strategy.*[3]

In 1997, at the 12th Voorburg Group meeting in Denmark, Ann Chadeau addressed several questions to the group regarding bundles of services in the context of pricing services to enterprises. Specifically, the Voorburg Group was asked if there was a consensus on three types of services[4]:

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[1] OECD/Eurostat (2014), Eurostat-OECD Methodological Guide for Developing Producer Price Indices for Services: Second Edition, OECD Publishing. http://dx.doi.org/10.1787/9789264220676-en, page 424

[2] Commodity Bundling and the Burden of Monopoly Author(s): William James Adams and Janet L. Yellen Reviewed work(s): Source: The Quarterly Journal of Economics, Vol. 90, No. 3 (Aug., 1976), pp. 475-498 http://au4372.epage.au.edu.tw/ezfiles/71/1071/attach/31/pta_41897_1023718_80983.pdf

[3] Ibid.

[4] Chadeau A. [1997], APrices of Services to Enterprises,@ paper presented in Twelfth Meeting of Voorburg Group on Service Statistics, Copenhagen: Denmark, September 15-19, 1997
These three categories were also referenced by the United States Economic Classification Policy Committee when announcing the North American Product Classification System initiative in 1999. - 64 FR 18984-18989, accessed at http://www.census.gov/eos/www/napcs/papers/Federal_Register.pdf

Simple service: a standard service that is measured by quantities such as hours, miles, etc.
Composite service: a number of simple services that are produced together because of practice, regulation, or other reasons.
Service bundle: a set of services negotiated between the provider and the consumer.

These approaches focus on the composition of particular transactions but do not get to the elemental question of what is a product and what is a bundle. This question creates a number of problems for classifications, output programs and pricing programs because a focus on transactions is almost infinitely variable and subject to rapid change.

1.2 What is a product?

There are a number of different definitions of products that are available. The CPC defines a product as a good or service that is the result of production in any economy.[5] The North American Product Classification System (NAPCS) initiative provided a similar definition, "[products] are created and transacted (sold or transferred) by the reporting units to economic entities outside the individual reporting units."[6]

In both definitions, products must be produced. This is a straightforward concept for the collection of final outputs. The transaction requirement included in the NAPCS definition was intended to eliminate from scope intermediate outputs, those that are produced and consumed in the production process but it opens the door to including bundles of individual products in a classification because they are transacted in that way.

Is production alone sufficient to define an output product? No because there is production for work in progress that will never be transacted as such.

Is transaction alone sufficient to define a product? No, because there can be transactions where no product is produced such as a firm's sell off of their used capital equipment (unless there is a margin activity or commission service produced to facilitate the transaction of the used asset).

In simple terms, to be identified in an output product classification, production and transaction are both necessary conditions. If there is production and eventual transaction, the resulting product (i.e., good or service) is within scope of an output product classification.

1.3 Basic definitions of products and price bundles

To review this topic in greater depth, some terminology should be applied to identify products from pricing bundles. A **product** is defined as a good or service produced and

[5] Central Product Classification, Version 1.1, Statistical Papers, Series M, No. 77, Ver. 1.1. United Nations, New York (2004) – preface page iii.
[6] 64 FR 18984-18989, accessed at http://www.census.gov/eos/www/napcs/papers/Federal_Register.pdf

transacted. For services, this would broadly cover what has been called simple and composite services by the Voorburg Group (see section 1.1). The key is that regardless of the characterization as simple or composite, the product is the smallest level of service that is available separately and not dependent on the core service in the case of a composite service.

To illustrate, the rental of a hotel room is often identified as a composite service because it includes lodging but also maid service. The maid service is not available separately so it should treated as a characteristic of the lodging rather than as a separate service when viewed from the transaction perspective. Another example is caller ID or call forwarding associated with landline telephony. Without the telephony, caller ID or call forwarding cannot be purchased. Although it is often billed for separately, it is not available unless tied to a core service. Thus, caller ID is a characteristic or optional inclusion for the core service of landline telephony.

A **price bundle** is a bundle of services or goods that are available separately but are grouped together and sold as a group. This sale often includes some level of discount for purchasing multiple goods, services, or combinations.

Price bundles are very common. A number of countries have noted that many wired telecommunication service providers offer bundles of landline service, internet access, and television programming. Each of these services is available separately but are offered to the customer at a discount off the total price of each service separately. Wireless telecommunications providers often provide a bundle of goods and services such as a free or discounted smart phone with the purchase of a two-year contract.

Price bundles can occur in many markets. If you buy four tires, mounting and balancing are free. If you lease office space, the rent of a parking space is included. Probably one of the most commonly understood examples is a la cart menus and meals at restaurants. In each of these cases, multiple services are discounted when sold together but the individual services are also offered separately. These price bundles involve production and transaction but the most appropriate treatment in classifications, output measurement programs, and price programs is often not clear.

Definitions

Service Product – a simple or composite service that is the result of production and is transacted to a consumer of the product.

Composite service – A primary service combined with a secondary service that would not otherwise be available without the purchase of the primary service. Can be considered as core service with characteristics (e.g. hotel room with maid service).

Price Bundle – a single transaction that includes more than one service product when the total change in the condition of the consumer is no greater than the sum of the individual service products. In simple terms, a combination of independent services that are available separately but are sold as a group (e.g. telephone and cable television services).

1.4 Challenges in distinguishing composite services from price bundles

In defining composite services as services that are not otherwise available unless tied to a core service, we often find secondary services that are not available independent of the primary service. The multitude of activities can be vast and the lines blurred between composite products and bundled services. What may be a composite service to one firm may be a price bundle to another. Consider three firms engaged in the leasing of office space:

Firm 1: Charges a separate price for parking
Firm 2: Includes parking in the price of its leases
Firm 3: Offers parking rental services to the public but charges a reduced rate on parking when included in the lease agreement

In this example, firm 1 produces two simple services (leasing and parking); firm 2 offers a composite service; firm 3 produces two simple services and offers a price bundle of the two services.

At the 2015 Voorburg Group Conference meeting, participants discussed the idea of availability of separate services as an identifying mark between composite and price bundles. Using the hotel venue that the conference was held as an example, participants noted that if the hotel offered meals and accommodation separately and also as a package, the combined package therefore would be a price bundle.

In contrast, if the two services were not available separately but came as a package, it would be a composite service. Another example of a composite product would be an all-inclusive package at a resort where it would not be possible to purchase meals separately. The all-inclusive the package would likewise be a composite service and the meals a characteristic of the accommodation service provided.

Composite services can be as challenging as price bundles for statistical agencies to define and measure. In fact, some composite services can be quite complex and challenging to distinguish changes to a specific product offered by a firm over time. Participants at the 2015 meeting of Voorburg Group identified issues of rapidly changing bundles and associated prices, and the problems when bundles contain goods and services or when the accounting for components is not clear (free phone with two year contract)

1.5 Prevalence of composite products and price bundles

Composite products and price bundles are prevalent in many industries. Telecommunications is commonly cited by statistical offices as being particularly problematic for bundling. For example, a 2011 OECD study across 30 OECD countries showed that '*broadband services in the OECD are overwhelmingly sold as mixed bundles, allowing users to choose among stand-alone offers or bundled services'.*[7] Many service providers offer a variety of services such as landline service, cellular phone service, Internet access, and television services.

Increasingly, customers are being offered "end-to-end" services. Such services include a variety of stages in the production chain and may include the services of more than one firm. There are many examples of companies that provide a full logistics solution including freight movement, cargo handling and storage services. A freight movement firm may offer its customers storage and handling as a secondary activity (composite service) while a storage company may offer the same package of services, outsourcing the freight movement to a freight company and charging the customer for the full end-to-end service. Another example of end-to-end services is observed in the engineering industry where there is frequent bundling of engineering plans or groundwork, engineering service work and testing.

Many Irish businesses classified in Industrial Cleaning also offer services such as Security and Landscape Services. They also offer in many cases a complete bundled facilities management service. In the UK, computer services often include bundles of services including PC and printer support, network support and maintenance and software installation.

Participants at the 2015 meeting of Voorburg Group offered the finance sector as an example. Of particular note was the bundling of insurance with annuity products. This raised the question of what is the main activity and what is the secondary activity in these cases. Again, allocation of revenue or value added can be used to make that determination. Health tourism was another example raised at the meeting.

Another issue discussed at the 2015 meeting was "floating services", such as the case of a hotel/airport transfer that also included a phone card or discount admission to an attraction. Members suggested that it might be useful to consider that as advertising

[7] OECD (2011), "Broadband Bundling: Trends and Policy Implications", OECD Digital Economy Papers, No. 175, OECD Publishing. http://dx.doi.org/10.1787/5kghtc8znnbx-en

rather than a composite service or price bundle since there is no direct transaction between the traveler and the floating service provided unless and until the services are used.

Summary Table of Definitions and Concepts[8]

<table>
<tr><th colspan="2">Service Product</th><th>Price Bundle</th></tr>
<tr><td colspan="2">A simple or composite service that is the result of production and is transacted to a consumer of the product.</td><td rowspan="2">A bundle of services and/or goods that are available separately but are grouped together and sold as a group.</td></tr>
<tr><th>Simple Service</th><th>Composite Service</th></tr>
<tr><td>The smallest level of service that is available separately</td><td>Services that are not otherwise available unless tied to a core service</td><td></td></tr>
<tr><td colspan="2">Types of Composite Services:</td><td>Types of Price Bundles:</td></tr>
<tr><td colspan="2">• Individually priced characteristics of a service (similar concept to interior trim and options on an automobile)
• Secondary services that can be added onto the primary service but are not otherwise offered</td><td>• Primary services of the firm's industry (similar concept to bulk discounts)
• Secondary services available separately
• End-to-end services (value chain)
• Goods and services</td></tr>
<tr><td colspan="2">Examples:</td><td>Examples:</td></tr>
<tr><td colspan="2">• Hotel with maid service
• Wireline phone with caller ID
• Financial fee-based services such as chequing, account statements, ATM transactions, etc.
• Retail trade: delivery, assembly, installation, etc.
• Wholesalers: warehousing, advertisement, marketing, warranty services
• Tour packages (Transportation, accommodation, admission to attractions, guided visits, commentary, entertainment, meals, etc.)
• Freight: freight movement, cargo handling and storage</td><td>• Telecommunications bundles: Telephone, Internet, Cable/Satellite, Cell phone service
• Hotel with breakfast in public dining room
• End-to-end engineering: e.g. planning, engineering service, testing
• Cell phone and telecom plan
• Good purchased with a service plan (e.g. copy machine and maintenance services)
• Parts bundled with repair services</td></tr>
</table>

2. What does this mean for output product classifications?

When looking at products in general, it is critical to identify the common or core good or service at the elemental transaction level. Output product classifications are intended to identify the object of measurement.

Output product classifications generally do not address quantity ranges in individual products. For example, product classifications include individual goods, for example a

[8] Summarized from the presentation and discussion at 2015 meeting of the Voorburg Group

ream of copy paper. A ream of paper is one price, a case has ten reams at a discounted price per ream and a purchase of 10 cases has 100 individual reams at a discounted price based on the quantity. The product classification does not identify reams, cases, and 10 case lots, it identifies copy paper. Output product classifications also do not generally identify individual options for the core products. Classifications include core products like automobiles and light trucks but not automobiles with air conditioning or automobiles with optional sport interior packages. Those are characteristics of the products.

Because of the wide variation in services offered in the economy, the proper identification of the core service is of even greater importance. To use the lodging example again, the core service is lodging. Characteristics of the service can vary to include maid service, breakfast, internet access, etc. If those services are not available separately, the core product is lodging and the maid service, breakfast, internet access, etc. are characteristics of the product. This applies even if the output product classification identifies maid service as a stand-alone product, meals as a stand-alone product, and internet access as a stand-alone product. There are cases where those services are offered separately by other producers and are themselves the core service produced and consumed.

If the core service is not properly identified in the classification, substantial problems can arise with measurement.

Example: Wired telecommunications services

There are two concepts that could be used to define the core service provided by wired telecommunications carriers. The core service could be defined as access to the wired telecommunication network. No additional services or characteristics are available without access to the network. Under this definition of the product, individual options such as telephony, video services, or Internet access are characteristics of the core service. There is no bundle problem because the core service is uniquely identified and the additional features or characteristics can be collected. This conceptually aligns with how wired telecom firms report their revenue, market share, profitability etc. They focus on subscribers and revenue per subscriber.

If on the other hand, the core services are defined as telephony, video services and Internet access services, the ability to group these into bundles arises. These services are sold individually with distinct separate prices. However, they are also offered with quantity discounts for purchasing multiple services. Telephone and cable bundled together are one price, telephone and internet bundled together are offered at a different price, and all three are bundled together at yet a different price. A provider could arrange for multiple discounts for different packages but is still providing three services – telephone, cable, and Internet.

When there are different ways to define the core service, subject matter knowledge, recordkeeping practices, and data user needs can help choose the most appropriate concept to apply when identifying products. A focus on practical considerations is important but the decision also has to make sense. In the example above, is access to the telecom network really the core product? How is the condition of the consumer changed through access to a telecommunications network unless other services are provided?

So, using this approach, the products would be the telephony, video services, and internet access services that are provided. Those are the core services. The identified core services are available separately and prices for those services are available. Providers often bundle these together at discounted rates in order to maximize revenue per subscriber or reduce the surplus available for other providers. Should there be a separate product in the output classification for the bundle?

Going back to the definition of the product, there is production and there is transaction so they would be eligible but is the bundle really a different product or is it a pricing mechanism?

At the 2015 meeting of the Voorburg Group, the membership agreed that inconsistent or incorrect treatment of bundles will lead to double counting or allocation of product revenue to the wrong place in a classification (goods/services, advertising/publishing).

It was noted that secondary activities of wholesalers can be challenging for industry classification. Some wholesalers are also involved in manufacturing and repair and maintenance but view themselves as a wholesaler. The contribution of their income stream from sales of goods produced versus the sales of goods resold is used to classify the unit as manufacturer or wholesaler.

At the 2016 meeting in Zagreb, there was much discussion about the role of product classifications with respect to bundling. One perspective was that classifications should be set based on a concept even if we know going into implementation that we may not be able to achieve the ideal concept in implementation. The authors of this paper proposed the exclusion of bundles from output product classifications. This would then be the standard that we would strive to meet. That recommendation did not receive consensus support from the group. The authors have removed the previous classification recommendation that stated: "A price bundle of services, for which the total change in the condition of the consumer is no greater than the sum of the individual service products, should not be identified in product classifications."

While such a recommendation is entirely consistent with the agreed definition of a service product, a number of meeting participants felt that in practice, there are situations where it would be impossible to follow such a recommendation.

One example that was noted was securities brokerage services bundled with investment advice. Stockbrokers have traditionally collected commissions on each transaction where they assisted customers with the purchase or sale of securities. In recent decades many brokers have transitioned to a fee-based model where the broker takes a fixed percentage of the assets in the account in exchange for unlimited trading and advisory services. In any given month a broker may assist with numerous trades or they may assist with none. The amount of investment advice provided may also vary substantially. The price remains the same each month regardless of the level of service provided. Since investment advice and securities brokerage services are both available as individual

services, fee-based accounts meet the definition of a price bundle. But the majority of firms would not be able to identify how much of the fee is charged for investment advice and how much is charged for brokerage services. It might be more appropriate to create coherent price and turnover statistics with a distinct product classification for this bundled fee-based service.

Recommendation for product classifications

1. A service product should be identified in a classification if it results in a unique change in condition for the consumer of the service.

3. What does this mean for the measurement of turnover?

In general, bundling should have less of an impact on output collection if bundles are identified as separate products in the classification system as long as they are defined in terms that are captured by producers in their records. Generally, output is collected at nominal values and there is no attempt to ensure constant quality – outputs are outputs. There is not a problem with mutual exclusivity because the bundle has been defined as a different product for the individual services.

In practice, the provider should be able to provide revenue for the individual services as well as the bundles. Adding the constraint of the recommendation 2 (above), it is best if turnover programs first try to collect data allocated to separate products rather than bundles.

In section 4, the significant challenges arising from the prevalence of bundling on price measurement are noted. Information collected by turnover programs on the proportion of activity sold as a simple or composite service product versus price bundles can be an important input to price programs. In Canada, the Telecommunications industry is dominated by large companies providing a variety of services. Service providers are asked to report the number (and associated revenues) of residential customers purchasing bundles of 2, 3 or 4 of the following services: local telephone; Internet; mobile wireless; and cable distribution services. The number of subscriptions for bundled services have been growing over time.[9]

In other words, the turnover program needs to adjust to the specific statistical needs for the industry of observation. The turnover program needs to provide the industry and

[9] CRTC Communications Monitoring Report 2014, Table 2.0.4 Canadians at the centre of the communication system, d) Connections.
http://www.crtc.gc.ca/eng/publications/reports/PolicyMonitoring/2014/cmr.htm

product details required for supply use tables while also meeting the requirements of the price program to provide sufficient product weights to produce meaningful deflators of the turnover.

3.1 Turnover under Eurostat regulations

Services Output statistics in Europe is covered by two regulations, the Structural Business Statistics (SBS) Regulation (number 295/2008), and the Short Term Statistics (STS) Regulation (number 1165/98). The respective surveys for the services turnover parts of these regulations in Ireland are the Annual Services Inquiry and the Monthly Services Inquiry. Neither of these regulations considers the issue of bundling.

The current statistical unit prescribed in these regulations for services is the enterprise. The effect of this is that all output is assigned to the primary activity (NACE) code of the business, regardless of specific products, bundled or otherwise. The proposed changes to the regulations under the Framework Regulation integrating European Business Statistics (FRIBS) programme foresee that the new statistical unit for these regulations will be the Kind of Activity Unit (KAU). The effect of this should be that secondary activity of a business can be assigned to the NACE code for that activity. But neither the enterprise nor the KAU take account of the possibility that a product may be bundled, and may be a combination of products across different product codes.

Annex 8 of the SBS Regulation asks for a more detailed breakdown of turnover by product (according to CPA) in some service industries. Again, the assumption is that turnover can be broken down to its constituent parts. The section of the Irish turnover survey asking for this breakdown specifies:

> *If some of your products overlap with several of the proposed product categories, provide a qualified estimate of the percentage breakdown belonging to each of the relevant categories. Your answers are more usable to us, if you estimate the breakdown, even if the results are not perfect than if you allocate complex products to the main category.* [10]

We see that a fundamental assumption of output regulations, of the prescribed statistical units for these regulations, and of the implementation in practice of these regulations, is that output can be broken down into single detailed industry and product codes. Bundling of products is in conflict with this assumption. In practice, it does appear that businesses can generally supply output figures broken down to the detail the regulations require, even for bundled products. The question is to what extent this breaking down of a bundled products output figure into its constituent parts is arbitrary, and whether it tells us anything meaningful about what is really happening.

3.2 Bundling and the reselling of goods and services

[10] http://www.cso.ie/en/media/csoie/surveysandmethodologies/surveyforms/documents/distributionservices/pdfdocs/NACE,Insert,Form,B,with,instructions,2013.pdf

The reselling of services can result in the bundling of services (and possibly goods) produced by different industries. This can be even more prevalent in countries where output is not measured at the enterprise level but at an establishment or at a kind of activity unit level. Different establishments of an enterprise operating in different industries may provide customers with bundled products produced by establishments classified to different industries.

For example, in Canada, major telecommunication service providers and their authorized dealers have established numerous retail outlets in which cell phones and service contracts are sold to consumers in addition to other related accessories. For these stores, most of their revenues are derived from commissions received after customers sign up to service plans and to a lesser extent, from the sale of assorted accessories. Retail outlets of telecommunications service providers and their independent authorized dealers are classified in the retail industry.[11] The retail establishments report commission revenues for signing up customers for the telecommunication service and are asked to exclude the selling price of equipment owned by the telecommunications carrier in the retail turnover surveys. Instead, the equipment sales are captured in the telecommunications providers' survey. This treatment avoids duplication and ensures that total operating revenues and gross margin figures accurately represent the activity taking place in the retail services industry.

In Canada, the telecommunications industry is regulated by the Canadian Radio-television and Telecommunications Commission (CRTC). In 2013, the CRTC imposed a Wireless Code (Telecom Regulatory Policy CRTC 2013-271) on wireless service providers. That Code deals with devices (cellular phones) that are bundled in the context of a wireless telecommunications service contract. Whenever there is bundling of a device with a telecommunication service, the service provider must disclose the undiscounted retail price of the phone in the contract. Statistics Canada and CRTC collect data in partnership. Therefore the statistical program has access to information on both telecommunication services and related equipment that is sold or leased.

The draft of Chapter 5, Merchanting of Services[12], in the guide to globalization that is being developed addresses when the transactions should be measured as gross and when reselling services should be treated as a net or margin activity. In essence, the guidance is that when outsourcing services, if there is a simple pass through, the measurement should be net. If the combination of services actually is of greater value or transforms the condition of the consumer, a gross measurement approach is more appropriate.

For example, if a producer outsources architectural work and then passes that architectural work on to a customer, there has been no additional transformation. If the same unit outsources the engineering work required to convert the architectural work into a detailed set of construction plans, and then passes on the plans, the total (buildable

[11] The US generally classifies the carrier owned stores with the carriers for output statistics. In the Economic Census, the unit is an alternative reporting unit – closer to the enterprise than the establishment.
[12] UNECE, Working Document No. 5, Meeting of Group of Experts on National Accounts, Interim meeting on Global Production, 12th session. Geneva Switzerland, April 3-4, 2013.

plans) is greater than the individual architectural work or engineering work. Reselling services would most likely want to measure the output of buildable plans at gross values rather than attempting to develop a margin for each "resale" of the services.

A similar approach can be taken when evaluating whether a transaction is a price bundle or is a unique simple or composite service product. In the case of the buildable plans, a unique product should be identified rather than treating the services provided as a bundle because buildable plans have been developed from the architectural services and engineering services. The final service output is greater than the individual services provided.

This would not necessarily be the case for wired telecom services. If a pricing bundle is offered that includes three services (voice, data, video), the sum of the condition change for the consumer is the simple sum of the individual services. Placing all three together in a single transaction produces a discounted price but does not change the condition of the consumer over three individual transactions.

Recommendations for turnover programs

2. Firms should be asked to report turnover by product. Where products overlap product categories, respondents should be asked to provide an estimate of the products to the best of their ability.
3. In some cases, turnover surveys may need to be very specific in instructions to respondents regarding bundling to ensure proper treatment and to eliminate double counting.
4. In areas where bundling is extremely prevalent, collecting additional information to better understand what is being bundled and the prevalence of these bundles is desirable.

4. What this means for SPPIs

Price bundles can pose a number of challenges for the calculation of Services Producer Price Indexes (SPPIs). Pricing index structures are based on defining homogeneous service products. A bundled price, consisting of various products, does not provide the disaggregated price components that are required. This provides a key problem, as the homogeneity is lost.

The core definition of the products will have a significant impact on SPPIs in terms of quality adjustment. If the core products are chosen and there is no bundled product, normal quality adjustment for changes would apply. If a bundle is present, two separate quality adjustments would potentially be required when a service changes – one for the

stand alone service and a second quality adjustment for a bundle that includes the stand alone service.

There are some other implications for bundles of products that are also offered as stand alone offerings. Using wired telecommunication services as an example, data users will face the following:

1. There will be no price index for all telephone service, all cable service, and all internet access.
2. There will be price indexes for each only when sold separately and excluding all discounted provision of the services as part of bundles.
3. There will be a price index for bundles that will include all of the discounts but also a mixture of services that can be fairly heterogeneous. The index will include telephone and cable bundles, telephone and internet bundles and cable and internet bundles. The separate product for bundles might make collection easier but result in data that could be hard to interpret or present misleading prices for the various services.

4.1 Options

Michael Prestwood's paper on Bundling of Services[13] summarizes and illustrates with numerical examples, the available approaches to address bundling of services in government statistics, namely:

- 'Ignore' them and calculate the price index solely on the basis of the separate service products

This is obviously not ideal, and conceptually, bundled service discounts should be included to accurately represent the actual transaction. This exclusion could lead to existing indices not being representative and having bias, whereby we are potentially overstating inflation.

If bundling occurs frequently, and comprises the vast majority of turnover in the industry, then the remaining coverage of the actual component products can be quite low, thus leading to quality issues at the disaggregate product level.

- Include bundling of services as a separate product in the aggregation structure

This could potentially solve the problem at the aggregate level, but a separate index for 'bundles' might not be so meaningful, and cause other issues. It could cause problems at the lower aggregate levels, as these will be biased (bundles under estimate, whereas bundle component indices may overstate inflation for those aspects).

[13] Prestwood, Michael (2015) Bundling of Services, Office for National Statistics, UK. Paper for Voorburg Group meeting 2015, http://voorburg/Documents/2015%20Sydney/2006.pdf Section 4 (Options for dealing with bundling of services)

There is also an issue as to how often the specification/components of bundles change – in a competitive market, this could be fairly frequent, to ensure the service provider stays ahead of its competitors and/or provides innovative bundle combinations. Overall, this could lead to difficulties in properly measuring price changes, and the need for frequent quality adjustments.

- Assume same price movement for each of the products included in the bundle

This would assume a starting price for each component of the bundle and apply the movement of the whole bundle to each of these

This would give more meaningful sub-indices for product details, and seems a good approach. However, it could be difficult to apply, as there would need to be quality adjustments to the bundle and the price index.

- Calculate price for each bundle component

This approach requires the business to estimate the price and weight of each component within the bundle. Businesses would need to provide prices when first recruited and be able to continually provide this. Experience has indicated that both these aspects are not always possible.

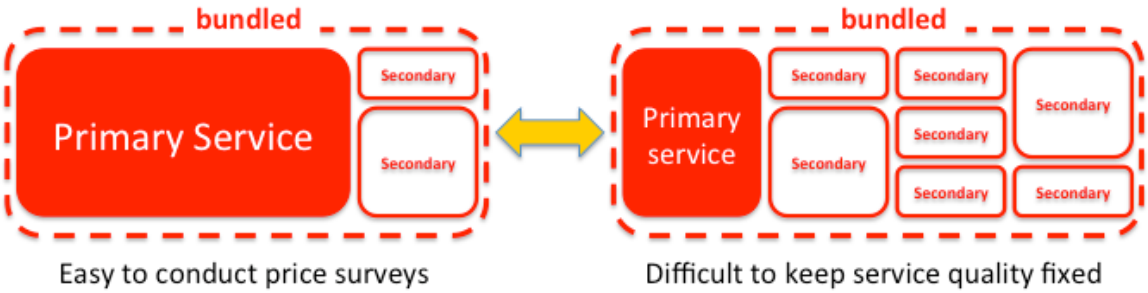
In addition, changes to the composition of the bundle could make this difficult to maintain. This would be a key factor, as bundles would be expected to frequently change, with businesses operating in a competitive market.

Statistics Netherlands noted that bundling and unbundling does not occur very often in their service industries. They stay with simple methods and use geometric means and have not had issues with bundling.

4.1.1 Treatment of composite services in SPPIs

In the case of composite services, the primary service should be followed in pricing. The secondary service is regarded as a characteristic of the primary service. Using the lodging example from section 1.3, where maid services are a secondary service included in the price, the price of lodging may rise entirely due to increased costs in the maid service (perhaps resulting from higher costs to launder the linens). In this example, the entire accommodations fee rises.

When the corresponding relationship between primary service and secondary service is clear and defined, it is relatively easy to conduct price surveys. However, it is more difficult to survey prices in practice when diverse secondary services are increasingly tied with primary service. In other words, it becomes more difficult to follow pure price changes with service quality fixed.



For example, consider wholesalers who resell goods to other businesses or act as an agent or broker in buying and selling. Their primary service is wholesaling but they provide secondary services such as warehousing, marketing, and transportation. It can be extremely difficult to collect prices of wholesale services with quality held constant. Japan, Canada and the United States collect wholesale margins to calculate a wholesale SPPI but in practice, it is very difficult to quantify quality changes that reflect changes to the secondary services provided by a wholesaler.

4.1.2 Treatment of service bundles in SPPIs

Unlike composite service products, it can be difficult to identify the primary service in a service bundle, particularly for price measurement. Joseph Keating's paper on Bundling of Services provides a numerical example that illustrates the challenges for price measurement when two products that had previously been sold separately are combined to form a price bundle at a discount.[14] *Should the price reduction due to bundling be reflected in price indexes?*

In fact, some argue that the price reduction is a kind of quantity discount. There has been a change in the terms of the transaction, in other words, a quality change. A numerical example of this argument can be found in Attachment 1 of John Murphy's paper, "Service Products and Pricing Bundles – Discussion Paper on Treatment in Classification, Output Statistics and SPPIs"[15].

On the other hand, some Voorburg Group members strongly disagreed with the notion that price bundles are conceptually the same as quantity discounts that should be unbundled into separate products for measurement. Some members noted that the price developments of a price bundle may differ from the individual price movements of the

[14] Keating, Joseph (2015) Contribution to cross Cutting Issue Bundling of Services, Central Statistics Office, Ireland. Paper for Voorburg Group meeting 2015, http://www.voorburggroup.org/Documents/2015%20Sydney/2004.pdf page 6.

[15] Murphy, John B. (2015) Service Products and Pricing Bundles – Discussion Paper on Treatment in Classification, Output Statistics and SPPIs, U.S. Census Bureau. Paper for Voorburg Group Meeting 2015, http://www.voorburggroup.org/Documents/2015%20Sydney/2001.pdf, Attachment 1.

components. Results would differ if the bundled service accounted for a disproportionate proportion of the activity.

If we regard the price reduction due to bundling as a pure price change, how should it be reflected?

The associated change in utility is dependent on customer preference. Looking again at Keating's numerical example[16] of two services that were once offered separately but now only available as a bundle. The bundle is a price discount to the customer who previously purchased both products but is actually a price increase to the customer who only wants one service but now has to pay more for a bundle. There may also be consumers who place some value on the product they were not previously purchasing. To get an accurate measure of the change in utility, one need to consider how much a customer who only bought one service would be willing to pay for the second service.

In practice, assessing utility is not feasible in the calculation of SPPIs. Considering an example where office space rental is replaced by office space rental that includes the rental of a parking space at a discount from the previous price of the two separate services. The Bank of Japan does not reflect the total discount because the price change is caused by the purchase of multiple services together. In other words, there is a change in the terms of the transaction. In this case, the sample is reviewed or replaced by others.

More often, customers are offered both simple services and a variety of bundles. Different firms may have different offerings and pricing models such as Keating's example of Irish Telecommunications Operators[17]. In practice, it is hard to know in what proportions customers buy bundles or buy the single component.

4.1.2.1 Service bundle - within the same product category

If all parts of the bundle are in the same product category, the prices of simple and bundled services should be followed simultaneously (Service A, Service B, and the Service Bundle of A and B).

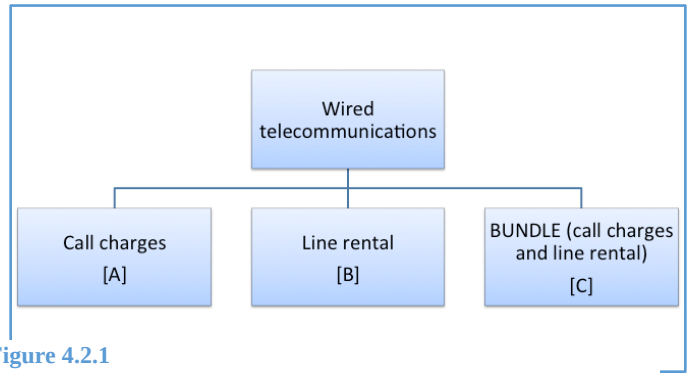


Figure 4.2.1

Consider Figure 4.2.1. where the Wired Telecommunications product includes both call charges and line rentals. The SPPI could collect prices for the three products, the bundle and the individual components (call charges and line rentals). Ideally, each would be weighted, requiring information to estimate what proportion of consumers

[16] Keating (2015), pp 6-7.
[17] Keating, Joseph (2015), Table 4.

buy simple products or price bundles. Keeping the bundles representative over time is another challenge.

In the absence of product weights, many countries measure SPPIs at an industry level. The above approach could also be used for price bundles that consist of the primary service products of a given industry. The more specific the product definition, the more challenging the measurement is for SPPIs.

4.1.2.2 Service bundle - across product categories

If the bundled service consists of a combination of products across different product categories, it is more difficult to handle. One approach used by the Bank of Japan is to ask respondents to provide unbundled prices for the individual services using a production cost approach. For example, when building cleaning services are bundled with security services, respondents are asked to split the prices into constituent parts for each service, based on the cost estimation or detailed breakdowns.

In unbundling the individual services, the prices for each service would need to reflect their discounted levels. This if fine in theory but could create substantial burden for respondents if they do not readily make distinctions. If the respondent cannot provide unbundled prices for the individual services, a price statistician might need to develop an alternate method of estimating the individual service prices. In the Bank of Japan example above, if the respondent cannot provide a breakdown of cleaning and security services, the bundled service is excluded from price collection.

The authors proposed the following recommendation based on the Bank of Japan model: "Where price bundles consist of a combination of products across product categories, it is recommended that SPPIs try to collect an unbundled price from respondents for the individual services using a production cost approach." While participants at the 2016 meeting agreed that this is a possible solution, some felt that other solutions were valid approaches that might be better suited to specific circumstances. One such approach is to include the bundle in the more prominent product category and essentially "ignore it".

4.1.2.3 Price bundle of goods and services

Bundles and composite products can be much more challenging for price measurement when they include services that are not the primary output of the industry. The bundle could also have a Services and Non-Services component such as the sale of a mobile phone and network contract as a bundle. The SPPI manual stresses that "The bundle should be priced excluding of hardware so that the price index is only capturing services."[18] There are also cases where the bundle comes from different enterprises. Potentially these enterprises could even be in different countries.

[18] OECD/Eurostat (2014), Eurostat-OECD Methodological Guide for Developing Producer Price Indices for Services: Second Edition, OECD Publishing. http://dx.doi.org/10.1787/9789264220676-en, page 226

In some cases, such as the sale of a copy machine with a maintenance plan, the goods and services are provided at different periods, so unbundled prices are easy to follow. However, the good and service components have great influence on each other in price determination. A firm may discount the good to secure the service contract but may charge a little more for the maintenance contract. The Bank of Japan selects samples that captures both activities by a specific provider. In other words, they will ask the firm to report the prices of both "copy machines" and of "maintenance services for copy machines'" and then reflect them in the indexes respectively.

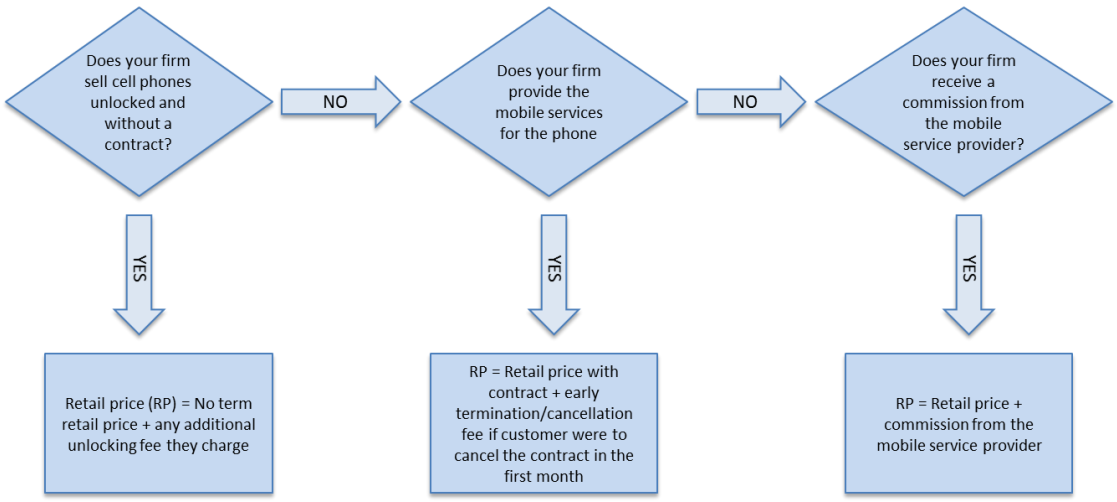
As noted in section 3.2, Canada has regulations requiring telecommunication service providers to disclose the undiscounted retail price of the phone in the contract. This facilitates an approach such as the one used by the Bank of Japan.

However, it can still be challenging to collect retail margins on cellular phones sold in Canada. It is common for retailers to market cell phones to customers at retail prices that are lower than vendor prices if bundled with telecommunication service contracts. For these types of transactions, telecommunications service providers may provide a commission to retailers per service contract that are recovered from the consumer over the course of the contract. This takes the form of the 'cancellation fee'[19] consisting of the difference between the price that the consumer pays and the Manufacturer's Suggested Retail Price (MSRP). In addition, service providers are also setting up retail stores which function as a direct marketing channel to consumers. This is in contrast to the indirect approach where independent "big box" electronic retailers take on the marketing, distribution and customer signup function at the behest of competing telecommunications service providers for a commission. It is possible for customers to purchase unlocked or unbundled cell phones; however, these are usually older generation phones with low volumes and often near the end of their product life cycle.

To avoid negative margins for cellular phones in the Retail SPPI, or an over-representation of older generation phones, the following flow chart is used to select representative products to price[20]:

[19] New regulations from the CRTC specifies that effective June 2015 consumers will be able to terminate all wireless contracts without "cancellation fees" after a maximum of two years and regardless of when they were signed. The updated regulations also mandated the use of clear and plain language in contract documents for the benefit of consumers.

[20] Garneau, Mary Beth (2015) Bundling in services turnover statistics and SPPIs in Canada, Statistics Canada, Paper for Voorburg Group meeting 2015, http://voorburg/Documents/2015%20Sydney/2003.pdf



Recommendations for SPPIs

5. In the case of composite services, the primary service should be followed in pricing.
6. If all products included in a price bundle fall within the same product category (or are primary activities of an industry-level SPPI), the prices of simple and bundled services should be followed simultaneously when the bundle is a significant component of turnover. Ideally, each product and bundle would be weighted according to the corresponding proportion of turnover.
7. In product replacement, the sum of two simple services is not equivalent to a price bundle of the services as there is a change in the terms of transaction. The bundle may be considered as a volume discount.
8. Where a firm discounts the price of machinery and equipment in order to secure a service contract, it is best that both the good and the service be followed in the appropriate samples of the corresponding producer price indexes.

5. Impact on the System of National Accounts

The authors were not able to find much in the way direct guidance on bundling from the System of National Accounts' perspective. The System of National Accounts 2008 (SNA 2008) appears to suggest unbundling or partitioning in paragraphs 3.66 to 3.68.

> ***Partitioning transactions***
> *3.66 Partitioning records a transaction that is a single transaction from the perspective of the parties involved as two or more differently classified transactions. For example, the rental actually paid by the lessee under a financial lease is not recorded as a payment for a service; instead, it is partitioned into two transactions, a repayment of principal and a payment of interest. This*

> *partitioning of the rental payment is part of a treatment that implements an economic view of financial leasing in the SNA. Financial leasing is viewed as a method of financing the purchase of a fixed asset and a financial lease is shown in the SNA as a loan from the lessor to the lessee.*
>
> *3.67 Another example is the treatment of certain financial services. For example, the SNA prescribes partitioning interest payable by financial intermediaries on deposits and payable to financial intermediaries on loans into two components. One component represents interest as defined in the SNA while the remainder represents the purchase of financial intermediation services for which the intermediaries do not charge explicitly. The purpose of the partitioning is to make the service item explicit. In consequence, intermediate and final consumption of particular industries and institutional sectors as well as gross domestic product are affected. However, the saving of all the units concerned, including the financial intermediaries themselves, is not affected.*
>
> *3.68 The recording in the SNA of transactions for wholesalers and retailers does not mirror the way in which those involved view them. The purchases of goods for resale by wholesalers and retailers are not recorded by these units explicitly, and they are viewed as selling, not the goods, but the services of storing and displaying a selection of goods in convenient locations and making them easily available for customers. This partitioning measures output for traders by the value of the margins realized on goods they purchase for resale.*

In addition, the Balance of Payments Manual 6 (BPM6) appears to suggest unbundling or partitioning in paragraph 3.17.

> *Partitioning*
> *3.17 Partitioning unbundles two or more different transactions that appear as a single transaction from the perspective of the parties involved. For example, interest payable and receivable by financial intermediaries is partitioned into two components. One component represents the return on investment (pure interest), while the remainder represents the purchase of financial intermediation services for which the intermediaries do not explicitly charge (see paragraphs 10.126–10.136 for measuring financial intermediation services). Likewise, when a financial derivative is settled with the delivery of the underlying asset, this single event should be broken down into a transaction in the financial derivative and a separate transaction in the underlying asset. One example of partitioning and rerouting is the valuation of goods at FOB (free on board) values, with transportation and insurance services separately recorded (see paragraph 10.34 for CIF (cost, insurance, and freight), and FOB adjustments).*

The Manual on Statistics of International Trade in Services 2010 (MSITS 2010) notes that transactions can be bundles but is unclear on how to treat them. In addition, Chapter P discusses complementary grouping of service and non-service transactions but assumes the finer details from which the data are aggregated are in place.

> ***P. Complementary groupings of service and non-service transactions***
> *3.280. For various analytical purposes, compilers may wish to aggregate a number of service transactions (and non-service transactions) so as to provide information on areas of particular interest or concern to users. These may relate to health care, environmental activities or audio-visual or software activities. As is the case for the components described above, it would be useful for compilers to follow the same guidelines for producing these complementary aggregations. Compiling economies which are willing to further disaggregate some of the complementary groupings (e.g. call-centre services), are encouraged to do so on a basis compatible with CPC, Version 2.0. For each complementary grouping a list of services (or goods) items is provided which indicates under which item the transactions sought are most likely classified. This does not necessarily mean that the entire service item should be included under the complementary grouping, or that other relevant transactions may not be covered under other items.*

Deflation is on a product basis so it is easier for national accountants to take account of the bundles if they are separated products. While it is unlikely that anything is lost or unmeasured in the Macroeconomic Accounts, bundling causes noise in price quantity measurement. It can impact the precision and granularity of details, or aggregation biases in the data used to assess economic efficiencies in a precise sector of the economy. The effect of errors in the allocation of total production between different products for bundled products on volume index and price index could be large, especially at the industry level.

In a way we are already bundling by producing industry SPPIs and not product based. Studies on productivity in health services at Statistics Canada suggested that the volume is underestimated due to bundled health services and price is overestimated. In addition, decisions to bundle products will reduce the detail available for analysis.

5.1 Alignment of turnover data and price deflators

A key issue for National Accountants is the coherence between the turnover data output concept and that of the comparable SPPI. Selecting less representative products from which to calculate the index could lead to a potential difference between price indexes that are used to deflate retail margins collected on turnover surveys in the calculation of real output levels.

There is already a bit of a mismatch between the industry-based SPPIs and turnover. To better associate the industry to the product, industry-level SPPIs target the primary activity of an industry. But with bundling, that may not always be possible.

In an industry such as Trucking, shipping freight via truck often includes loading and unloading at either end of the delivery. More frequently, shipping companies also combine this service with storage to hold goods if the delivery date differs significantly from the pickup date. Where the secondary activities are bundled and reported as one

price in an industry-based SPPI, the trucking product measured by the turnover survey may not align exactly with the deflator.

National accountants will analyze volume data to see if there is something that they don't expect. Price analysts need to think about how the price changes affect the volumes in national accounts when determining the best approach with the data available.

5.2 Product detail

From a production sense, GDP could be calculated with bundles of goods and services but doing so limits our ability to calculate detailed and accurate measures of productivity and efficiency. When goods and services are bundled together, the margins in the distribution channel are blended with the service. Using the cell phone example, the supply of cell phones could be treated as part of a service. The cell phone could be considered necessary to deliver the telecomm service and could thus be considered an input into the production of the service. Rather than treating the phone and service as a bundled service, one could consider the cell phone as an item used to sell the telecommunications service.

Similarly, one could see the bundled service contract and cell phone as a service contract with a financial contract imbedded in it. The service contract is a way to amortize the value of the phone over the duration of the contract.

Following a production function, National Accountants put together resources (labour, capital, materials) to produce an output. The Canadian System of Macroeconomic Accounts (CSMA) uses a modified basic price by considering subsidies (such as those received by farmers) as impacting the market price of the product/service. Discounted cell phones to consumers could be similarly "subsidized" impacting the price of the telecommunications service.

From a transactional approach, one must ask whether each service requires different resources to produce or are firms differentiating products in order to maximize revenue? With more granular supply use data, researchers can better evaluate productivity improvements and the overall economic impact of the expansion of a particular industry.

6. Conclusion

This paper provides a clear basis for defining products, composite products and price bundles. It specifically recommends new definitions and terminology that differ from the bundling definition in the Eurostat-OECD Methodological Guide for Developing Producer Price Indices for Services and from previous definitions proposed by the Voorburg Group.

The paper provides some specific recommendations for the treatment of composite services and price bundles in classification, output and prices. These recommendations

reflect the collaboration of Voorburg Group members who participated in the 2015 meeting but will be expanded upon to reflect the collective opinions and ideas gathered at the 2016 meeting of the group.

There is no single solution to the issue of bundling. It can be treated in product and industry classification or carefully teased out of turnover and price surveys. A sharing of specific practices across programs and statistical offices can help NSOs develop a suite of tools to handle this complex issue. Most important is the use of consistent approaches for individual products or industries throughout a country's statistical system to ensure coherent data to measure the real value of services outputs.

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