

Indirect trade in steel

Definitions, methodology and applications

April 2012

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A working paper issued by the World Steel Association (worldsteel)

Introduction

This paper aims to define and develop methodologies, and to indicate use of indirect trade in steel. Indirect trade in steel – exports and imports of steel in the form of steel containing manufactured goods – is a crucial issue in steel demand estimations. Incorporating indirect trade in steel allows a more realistic picture of steel use across countries and in time.

1. Measuring steel demand

Demand for steel is defined as the quantity of steel products (e.g. reinforcing bars, hot and cold rolled coils, wire rod, seamless tubes) that users are willing and able to buy at a given price over a given period in a certain country/region. Steel purchases contribute to demand irrespective of whether the purchase is for stockholding or manufacturing.

worldsteel has developed several methods of measuring steel demand. The one most often used is **apparent steel use (ASU)**, which is expressed in volume terms as deliveries minus net exports of steel industry goods. As a unit of measurement worldsteel uses the metric ton.

ASU can be calculated for finished steel products or as crude steel equivalent. The first method is more precise, but requires quality data on steel deliveries (or on production, if deliveries are not reported). Crude steel equivalent figures are used when finished steel data are not available or not precise enough.

Another method follows ASU calculations but takes into account changes in stock levels and measures **real steel use (RSU)**, defined as ASU minus net accumulation of stocks. Since data on stock changes are not easily available, RSU is normally estimated. Based on an assumption that there is a direct relation between the activity in steel consuming sectors (summarised by an index of steel-weighted industrial production – SWIP) and a trend in real consumption, RSU estimated using the SWIP methodology in combination with ASU can be useful in deducting inventory changes. Usually RSU is calculated for finished steel products.

While both methods take into account trade of steel products (bars, sections, coils, tubes, etc.) in estimating steel demand, they do not consider the trade in steel embedded in cars, ships, machines, white goods and so on, namely, indirect trade in steel. The concept of indirect trade is important because it allows us to measure 'true' steel demand of a country: the amount of steel required to meet the country's daily needs.

Steel demand equations

ASU = deliveries + net direct imports

$$ASU_{\text{finished steel}} = \text{deliveries}_{\text{finished steel}} - \text{exports}_{\text{finished steel}} + \text{imports}_{\text{finished steel}}$$

$$ASU_{\text{crude steel equivalent}} = \text{production}_{\text{crude steel}} - \text{exports}_{\text{crude steel equivalent}} + \text{imports}_{\text{crude steel equivalent}}$$

RSU = ASU – net increase in consumer and merchant inventories

TSU = ASU + net indirect imports

$$TSU_{\text{finished steel}} = ASU_{\text{finished steel}} - \text{indirect exports of steel}_{\text{finished steel equivalent}} + \text{indirect imports of steel}_{\text{finished steel equivalent}}$$

$$TSU_{\text{crude steel equivalent}} = ASU_{\text{crude steel equivalent}} - \text{indirect exports of steel}_{\text{crude steel equivalent}} + \text{indirect imports of steel}_{\text{crude steel equivalent}}$$

For example, if country A manufactures a car using one tonne of steel and exports it to country B, it will increase country A's ASU and RSU by one tonne, but it will not increase the TSU of country A. Instead, it will increase TSU of country B.

To address this, worldsteel has developed a concept called **true steel use (TSU)**. TSU is obtained by deducting net indirect exports of steel from ASU. This allows a better understanding of the factors affecting a country's steel demand. It also has important implications for future scrap generation.

As with ASU calculations, TSU can be expressed in finished steel products or crude steel equivalent.

2. Indirect trade in steel

The level of domestic steel demand is most easily defined by production, exports and imports of steel products: ASU. The focus is usually on direct determinants, which are generally well documented and relatively easy to obtain.

In many countries, however, ASU includes a substantial portion of steel which is incorporated by domestic manufactures into goods for export, and which thus leaves the country in the form of fabricated goods. In most countries steel also arrives to the market in processed form.

By solving the issue of limited statistical documentation of indirect trade, it is possible to improve demand calculations.

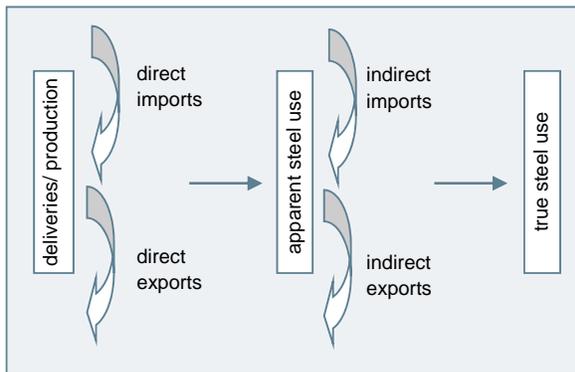


Figure 1: Indirect trade in steel concept

Source: worldsteel

Indirect trade in steel covers exports and imports of goods which contain steel. For example, there are many different steel products in an average car or ship. In the TSU calculation, if a car is exported the domestic demand should be diminished by the amount of steel that went into producing the car. In case of imports, the amount of steel that went into making the car would increase the domestic demand.

3. Methods of calculation, used classifications

Between 1974 and 1996, worldsteel (known then as IISI) carried out various studies on indirect trade in steel. The main assumptions of the present methodology are based on those reports and further developed by worldsteel and experts from the association's member companies.

worldsteel uses a methodology based on finished steel products calculations.

Trade data of fabricated goods (**trade of steel containing goods**) are reported both in value and in volume terms. To process the **indirect trade in steel** calculations, it is necessary to count how much steel is in each manufactured product, namely steel coefficients. This will determine:

- the steel content of a product expressed as percentage of its weight,
- the amount of steel (finished steel products or crude steel equivalent) needed to produce one tonne of a product.

According to the worldsteel methodology, the **steel coefficient** is the amount of finished steel products (in tonnes) needed to produce one tonne of a manufactured product. This way, the coefficient can be greater than one for certain products. For example, to produce one tonne of boilers 1.1 tonne of finished steel products must be used.

The estimation of steel coefficients for the very large number of steel-containing manufactured goods can involve different techniques:

- surveys involving steel producers
- surveys involving fabricated goods producers
- carrying out market studies
- using existing knowledge and statistics.

To various degrees, worldsteel has applied each one of the abovementioned methods.

With the evolution of manufacturing technology and development of new products, the amount of steel industry products needed to make a certain end-user product can change over time: revision of coefficients is an ongoing task. Also, the same traded product (for example, a car) could be made in one country using different quantities of steel from that made in another country; in a first approximation, we assume steel coefficients to be the same across countries.

For product classification, worldsteel's indirect trade study has adopted the Harmonised Commodity Description and Coding System (HS). HS codes up to six-digits to define traded goods in a detailed way. More than 900 codes are used in the study. However, steel coefficients have been defined for aggregated HS codes, mostly at the 4-digit level. Trade data and results of computations have been further synthesised in this study and presented for six commodity groups: metal products, mechanical machinery, electrical equipment, domestic appliances, automotive and other transport (to match conventional steel-using sector groupings).

4. Reliability of data

The source of trade data used in the current indirect trade study is the United Nations Commodity Trade Statistics Database (UN Comtrade). It contains detailed imports and exports statistics reported by statistical authorities of about 200 countries, updated every year.

The main advantage of UN Comtrade is that it provides sets of data standardised by the UN Statistics Division expressed in volume (kg).

However, the limitations of the database are:

- countries do not necessarily report their trade statistics for each and every year
- estimations of missing data are not provided
- sometimes countries report value but not volume
- discrepancies between value and volume reported.

In cases of missing data and misreporting, the statistics have been estimated by worldsteel based on trends. If long series are not available, mirror (i.e. trading partners') statistics are used. However, based on the preliminary studies, for most of the 60 main steel consuming countries in 2000-2010 it was concluded that mirror statistics are not necessary.

Figure 2 presents an example of country A, which reported value in 2001-2004, but not volume. Missing data were estimated by worldsteel.

Period	Trade Flow	Trade Value (US\$)	Weight (kg)
2000	Import	6,958,028,695	746,876,186
2001	Import	6,253,340,755	0
2002	Import	6,268,448,622	0
2003	Import	6,985,896,193	0
2004	Import	8,195,502,991	0
2005	Import	8,105,370,984	841,482,581
2006	Import	7,654,017,135	628,839,960

Figure 2: Example of missing data

Source: UN Comtrade

Figure 3 presents an example of country B, which in 2004 reported invalid volume. The misreported record was corrected by worldsteel.

Period	Trade Flow	Trade Value (US\$)	Weight (kg)
2002	Import	5,996,376	1,028,429
2003	Import	5,545,944	984,454
2004	Import	5,481 653	40,005,512,897
2005	Import	6,772,338	1,458,785
2006	Import	7,440,635	1,387,202

Figure 3: Example of misreporting

Source: UN Comtrade

5. Practical application of indirect trade data

Data on indirect trade in steel are useful for better insight into steel demand. It helps to identify flows of steel-containing goods. This is a way of measuring trade, for example of the automotive industry, but expressed in amount of steel needed to manufacture those goods.

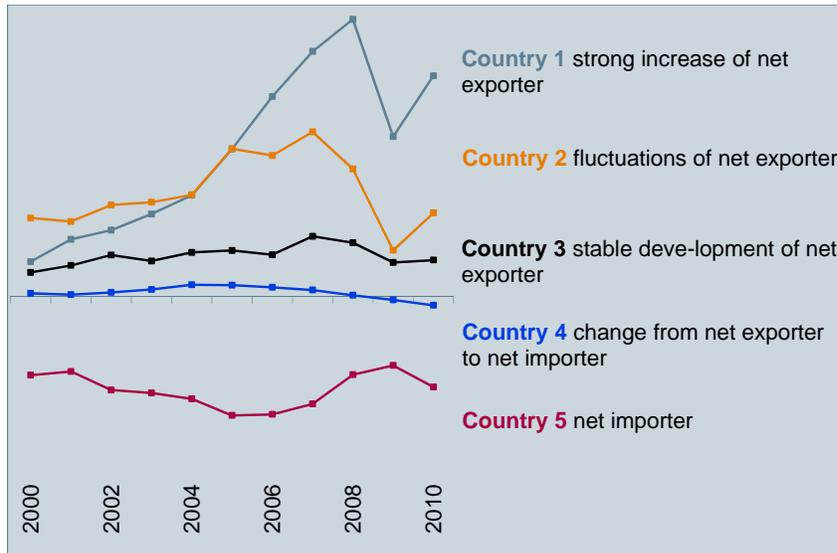


Figure 4: Indirect net exports of steel

Source: worldsteel

Figure 4 presents different developments of five chosen economies, from strong improvement of net exporter position (country 1), through to changing from net exporter to net importer (country 4), to pure net importing economy (country 5). These evolutions can be associated on a case-by-case basis to changing structural variables such as real exchange rate changes, the effects of regional integration, the occurrence of growth spikes or collapses, thus enabling a better insight of the evolution of indirect steel flows and of steel demand, as further illustrated below.

It can be said that the most important use of indirect trade data will be to estimate TSU, which is obtained by deducting indirect net exports of steel from ASU.

True steel use is expected to give a better picture of steel demand in a country than apparent steel use. It will be more closely correlated with macroeconomic series like gross domestic product, industrial production and gross fixed capital formation. As some preliminary statistical tests give support to these considerations, we believe that combining TSU and structural variables is expected to improve forecasting results for steel demand in the medium and long term.

TSU is also important when comparing steel use among countries. It is well known that steel intensities (measured either in per capita terms or per dollar of GDP) differ significantly among countries.

Figure 5 shows that ASU per capita differs significantly among countries. Applying the TSU concept narrows the differences considerably.

TSU gives a clearer view of the steel consumption pattern and the industries in which a nation specialises.

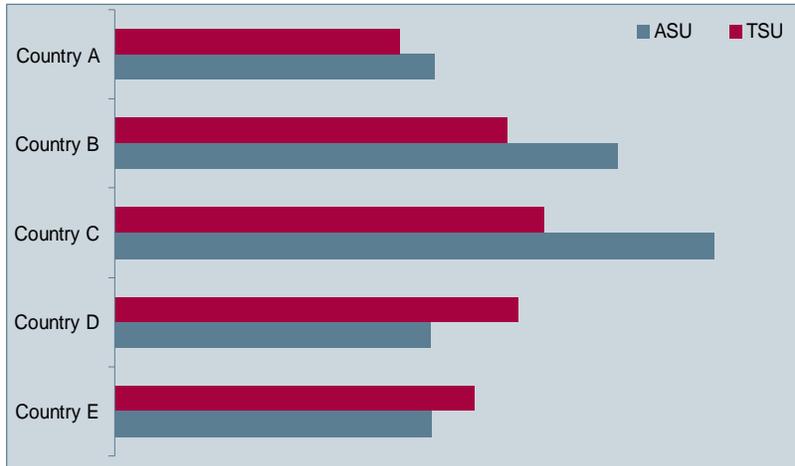


Figure 5: Comparison of true steel use per capita and apparent steel use per capita

Source: worldsteel

Another use of indirect steel trade statistics is to illustrate the sectorial patterns of steel using industrial activity among countries or over time, and the degree of openness of steel using industries. This information deepens our knowledge of the world steel industry and improves our ability to forecast its evolution in the long run.

From a raw materials point of view, consideration of indirect trade in steel is necessary to estimate future scrap availability of a country more accurately.

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Last updated on 11 April 2012