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Plunder in the Post-Colonial Era: Quantifying Drain from the Global South Through Unequal Exchange, 1960–2018

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ABSTRACT

This paper quantifies drain from the global South through unequal exchange since 1960. According to our primary method, which relies on exchange-rate differentials, we find that in the most recent year of data the global North ('advanced economies') appropriated from the South commodities worth $2.2 trillion in Northern prices — enough to end extreme poverty 15 times over. Over the whole period, drain from the South totalled $62 trillion (constant 2011 dollars), or $152 trillion when accounting for lost growth. Appropriation through unequal exchange represents up to 7% of Northern GDP and 9% of Southern GDP. We also test several alternative methods, for comparison: we quantify unequal exchange in terms of wage differentials instead of exchange-rate differentials, and report drain in global average prices as well as Northern prices. Regardless of the method, we find that the intensity of exploitation and the scale of unequal exchange increased significantly during the structural adjustment period of the 1980s and 1990s. This study affirms that drain from the South remains a significant feature of the world economy in the post-colonial era; rich countries continue to rely on imperial forms of appropriation to sustain their high levels of income and consumption.

KEYWORDS

Imperialism; unequal exchange; neoliberalism; structural adjustment; global inequality

Introduction

The dominant assumption in the field of international development holds that the economic performance of nations is due primarily to their internal, domestic conditions. High-income countries have achieved economic success because of good governance, strong institutions and free markets. Lower-income countries have failed to develop because they lack these things, or because they suffer from corruption, red tape and inefficiency (Sachs 2005; Collier 2007; Rostow 1960; Moyo 2009; Calderisi 2006). Therefore, development interventions should focus primarily on fixing domestic policy in global South countries, with the assistance of aid from donor governments.

This view has long come under criticism. Methodological nationalism – analysing each country in isolation – erases the longstanding inequitable relationships *between* countries that have defined the global economy for the last 500 years. When we take this history into account, it becomes evident that the wealth of high-income nations depends on processes of appropriation from the rest of the world. This was clear during the colonial period, but it also remains true today. In this paper we quantify the value appropriated from the global South through unequal exchange since 1960, demonstrating that the wealthy nations of the global North continue to rely on extraction to finance economic growth and sustain high levels of consumption. This pattern is evident during the

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entire postcolonial period, from 1960 to today, but has been particularly significant during the era of neoliberal globalisation since the 1980s.

Background

The historical record demonstrates that, during the colonial period, Western European nations depended for their development on extraction from other parts of the world. Britain's industrial revolution depended in large part on cotton, which was grown on land forcibly appropriated from Indigenous Americans, with labour appropriated from enslaved Africans (Beckert 2015). Other crucial inputs required by British manufacturers – hemp, timber, iron, grain – were produced using forced labour on serf estates in Russia and Eastern Europe (Kagarlitsky 2008; Wallerstein 1974: ch. 2; Wallerstein 1989: ch. 3). Meanwhile, British extraction from India and other colonies funded more than half the country's domestic budget, paying for roads, public buildings, the welfare state – all the markers of modern development – while enabling the purchase of material inputs necessary for industrialisation (Bhambra 2017; Patnaik 2018). It is impossible to understand the industrialisation of high-income countries without reference to the patterns of extraction that underpinned it.

The general logic of colonisation was to integrate the global South into the Europe-centered world economy on unequal terms. The South (the 'periphery') was made to serve as a source of cheap labour and raw materials for the North (the 'core'), and as a captive market for Northern manufactured goods (Davis 2002; Chang 2008). Beginning in the 1950s, economists and historians associated with dependency theory and world-systems theory argued that this relationship continues to define the global economy in the post-colonial era (Rodney 1972; Prebisch 1950; Galeano 1973; Wallerstein 1974; Frank 1967; Nkrumah 1965). Recent empirical data confirms that high-income nations continue to rely on a large *net* appropriation of labour and resources from the rest of the world. In 2015, this amounted to 10.1 billion tons of embodied raw material equivalents (accounting for 50% of total consumption in high-income nations), and 182 million person-years of embodied labour (28% of their total consumption) from low- and middle-income nations (Dorninger et al 2021). Note that these figures represent resources and labour embodied not only in primary commodities but also in high-technology industrial goods such as iPhones, computer chips, cars, designer clothes, etc., which over the past few decades have come to be overwhelmingly produced in the South.

This net appropriation occurs because prices are systematically lower in the South than in the North. For instance, wages paid to workers in the South are on average one-fifth the level of Northern wages (Cope 2019, p. 80). This means that for every unit of embodied labour and resources the South imports from the North, they have to export many more units to pay for it. This pattern was first described by Adam Smith ([1776] 1981, p. 141–145), Karl Marx ([1894] 1991, p. 344–346) and Dadabhai Naoroji (1902). It was theorised more fully by Arghiri Emmanuel (1972), Samir Amin (1976) and Stephen Bunker (1985) as a process of 'unequal exchange', which constitutes a 'hidden transfer of value' from South to North.

Theorists of unequal exchange argue that global price inequalities are artefacts of historical and contemporary forces that depress the cost of labour and resources in the South. During the colonial period, dispossession and the destruction of subsistence economies created a surplus of unemployed labour (Davis 2002; Patnaik and Patnaik 2017; Dunaway 2010). Following independence, when Southern governments attempted to improve wages and resource prices, Western powers often intervened to remove them from power, as in the Republic of Congo (1960), Indonesia (1965), and Chile (1973) (Hickel 2017: ch. 4). In the contemporary era, subsidised grain exports from the North, and land grabs by multinational companies, continue to undermine subsistence economies, placing downward pressure on wages (McMichael 2014; Pearce 2012). Structural adjustment programmes (SAPs) imposed on the South by the IMF and World Bank have cut public sector wages and employment, while rolling back labour rights and curtailing unions (Khor 1995; Petras and

Veltmeyer 2002). Finally, the South's dependence on external finance means that Southern governments must compete with one another to offer cheaper wages and resources to attract foreign investment (Hickel 2017: ch. 6). Low wages are ultimately maintained through militarised borders, which preclude easy migration from South to North, and thus prevent international wage convergence.

Just as Southern prices are kept artificially low, Northern prices are kept artificially high. Northern firms control 97% of patents (Chang 2008, p. 141) – a form of monopoly power that, bolstered by the TRIPS agreement under the WTO, enables them to extract returns well in excess of free market rates. Moreover, high-income nations exercise monopoly power within the core institutions of economic governance. In the World Bank and the IMF, the G8 hold a majority share of votes, allowing them to determine the rules of international finance. In the World Trade Organization, bargaining power is determined by market size, enabling high-income nations to set trade rules in their interests. Neoliberal policies imposed by these institutions have forced global South governments to remove tariffs, subsidies and other infant industry protections, preventing them from developing the industrial capacity to compete with the North (Chang 2008). As a result, a relatively small number of firms from high-income countries have grown so large that they now control an overwhelming share of the world economy, with revenues that exceed the GDP of most sovereign countries (Vitali et al. 2011; Anderson and Cavanagh 2000). These firms can set final prices that are effectively insulated from competition, while depressing input costs across their supply chains (Suwandi 2019; Cope 2019: ch. 3).

The deployment of geopolitical and monopoly power by Northern states and corporations maintains price differentials that enable them to appropriate labour and resources from the South through international trade. This pattern sustains high levels of income in the global North, and preserves levels of material consumption well above equitable and ecologically sustainable levels (O'Neill et al 2018). At the same time, it depresses the South's potential trade revenues, denying them access to resources that could be used for investment in public services, economic development and poverty reduction. In light of this, one might ask how much the South has been losing (and the North gaining) as a consequence of this relationship.

Several attempts have been made to estimate the scale of the South's losses through unequal exchange. Samir Amin (1976, p. 144) calculated that 'if the rewards of labor were equivalent to what they are at the center, with the same productivity,' the South's revenues from exports to the North would have been $152 billion higher in 1966 (updated to constant 2011 dollars). This method has been improved upon by Zak Cope (2019, p. 81), who devised a way to distinguish between losses the South suffers due to the 'undervaluation' of their exports (comparing the South's wages to global average wages), and losses they suffer due to the 'overvaluation' of imports (comparing the North's wages to global average wages). He finds that in 2010, the South lost $2.8 trillion in hidden value appropriated by the North.

In the late-1990s, a second method for quantifying unequal exchange was developed by Gernot Köhler (Köhler 1998; Köhler and Tausch 2002, p. 43–100). Instead of looking at wage differentials, Köhler uses the distortion factor between market exchange rates (MER) and purchasing power parity (PPP) as a proxy for calculating how much higher Southern export prices would be if valued in Northern prices. Using this approach, Köhler estimates that the South lost $134 billion in unequal exchange in 1965, a figure which rose to $2.586 trillion in 1995 (updated to constant 2011 dollars). Köhler (2003) also employed a simplified version of his formula (using arithmetic rather than weighted averages to estimate exchange rate distortion) to construct annual estimates of unequal exchange from 1960 to 1998. His data showed that the South lost $27.7 trillion (updated to constant 2011 dollars) over that period.[1]

This paper builds on these previous attempts in order to provide annual estimates of unequal exchange over the past five to six decades, using both methods for comparison. The data allows us to measure the South's total losses over multiple decades, and enables us to analyse the impacts of policy changes in the world economy over time. We conclude with a discussion that addresses critiques of unequal exchange, while assessing the limitations of this analysis.

Methodology: Exchange Rate Differentials

Köhler measures value transfer through unequal exchange by starting with the exchange rate disparities between Northern countries and Southern countries. For instance, Köhler notes that India's GDP per capita in 1995 was US$1,400 in PPP terms (i.e. measured at the US price level), but only US$340 in MER. Dividing PPP by MER yields what Köhler calls the 'Exchange Rate Deviation Index', or ERDI. For India in 1995, ERDI was 4.12. Put differently, prices in the US were 4.12 times higher than in India. For Northern countries, by contrast, ERDI is generally very close to 1. Köhler proposes that we can use ERDI to measure value transfer. His formula is as follows:

$$T = d*X - X$$

Where:

T = value transferred through unequal exchange
X = exports from periphery to core
d = the ratio of the peripheral country's ERDI to the core country's ERDI

There are two ways to conceptualise Köhler's approach to value transfer. Some scholars have interpreted it as the amount of additional income that the South would have earned on its exports under conditions of fair-trade (Köhler 1998; Somel 2003). In other words, value transfer is calculated under the assumption that Southern exporters could receive Northern prices in a fairer world. One might criticise this approach on the grounds that it is impossible for all countries to achieve Northern prices, given that Northern prices are high because of imperial power, which cannot be universalised. But there is another, more robust way to conceptualise Köhler's approach, namely, as measuring the value of commodities that the South transfers uncompensated to the North *in terms of* the Northern price level.

This represents commodities that the South could have sold on world markets, as well as labour and resource inputs that could have been used to meet domestic needs, but which were instead transferred gratis to the North. It also represents a significant windfall for the North, in terms of the money saved by acquiring goods from the South, on unequal terms, rather than producing them domestically at Northern prices. These savings are available for reinvestment in Northern economic development and to enhance the North's economic and geopolitical power, which further enables unequal exchange.

To calculate ERD indices, we rely on Penn World Table version 9.1 (Groningen Growth and Development Centre, 2019). We use GDPe instead of GDPo, because the latter makes assumptions about export prices that are invalid for our purposes (in short, GDPo calculations assume that price differences of internationally traded goods are caused principally by quality differences, rather than differences in bargaining power; see Feenstra and Romalis 2014; Feenstra et al. 2015).[2] We use the IMF's (2019) Direction of Trade Statistics (DOTS) for data on exports. All exports are measured Free On Board (FOB), and do not include Cost Insurance and Freight (CIF). Since DOTS does not include data on imports, FOB, we calculate each country's imports as the sum of other countries' exports to that country.

One limitation of Köhler's method is that the export figures include the import content of exports (ICE). To overcome this, we subtract the ICE, as recorded by the OECD (2020), from each country's export data. Import content data is not available for all countries, however, and is not available for years prior to 2005 or after 2016. For countries without available data, we have assigned them the global average ICE percentage in the relevant year. For instance, we do not have data for Albania in 2008, so we have taken the average ICE in 2008 (27%) and assigned this to Albania. For years prior to 2005 and after 2016, we have extrapolated from each country's 2005–2016 mean. For instance, Argentina's mean ICE was 10% from 2005 to 2016; we apply this figure to all other years.

Using Köhler's formula, we calculate the annual loss or gain from unequal exchange for all countries with available data, for all years between 1960 and 2017. We have categorised each country as either 'core' (global North) or 'periphery' (global South), based on the IMF's (2020a) 'Advanced economies' and 'Emerging and Developing economies' categories. For each peripheral country, we calculate the quantity of value lost through the undervaluation of their exports to core countries as a group. For each core country, we calculate the amount they gain through the undervaluation of their imports from peripheral countries as a group. Like Köhler, we weight the core's average ERDI by imports from the periphery, and the periphery's average ERDI by exports to the core. Since the IMF's DOTS are listed in current dollars, we have used IMF (2020b) data on the US Consumer Price Index to convert all results to 2011 constant dollars.

Results and Analysis

Figure 1 shows the scale of annual value transfer due to unequal exchange (calculated as the sum of all losses suffered by the 'peripheral' group) from 1960 to 2017. In the 1960s, the South lost on average $38 billion a year (constant 2011 dollars), a significant sum at the time. Yet the scale of value transfer increased dramatically over the following decades, with particularly rapid growth between 1983 and 2005, during the height of the structural adjustment period and the establishment of the WTO trade system. Value transfer reached a maximum of almost $3 trillion per year before declining somewhat after the global financial crisis.

In 2017, the most recent year of data, drain through unequal exchange amounted to $2.2 trillion; in other words, it was equivalent to the quantity of Northern commodities that one could buy in that year with $2.2 trillion. This represents a significant loss for the South. For perspective, $2.2 trillion is enough to end extreme poverty fifteen times over (i.e., with reference to the poverty gap at $1.90 per day in 2011 PPP, or the rough equivalent of Northern prices).[3] For the North, this represents $2.2 trillion in savings, which can be invested in technological development, military power, etc., while maintaining high consumption levels. Aggregate value transfer over the whole period sums to a total of $62 trillion.

There are two factors that drive fluctuation in the scale of value transfer over time: a) the volume of international trade, and b) the ratio of the South's export-weighted average ERDI to the North's import-weighted average ERDI (in other words, the price distortion factor, or *d*), which represents the intensity of exploitation. These trends are represented in Figures 2 and 3. We can distinguish between two different types of growth in unequal exchange. The first is *extensive* growth, where

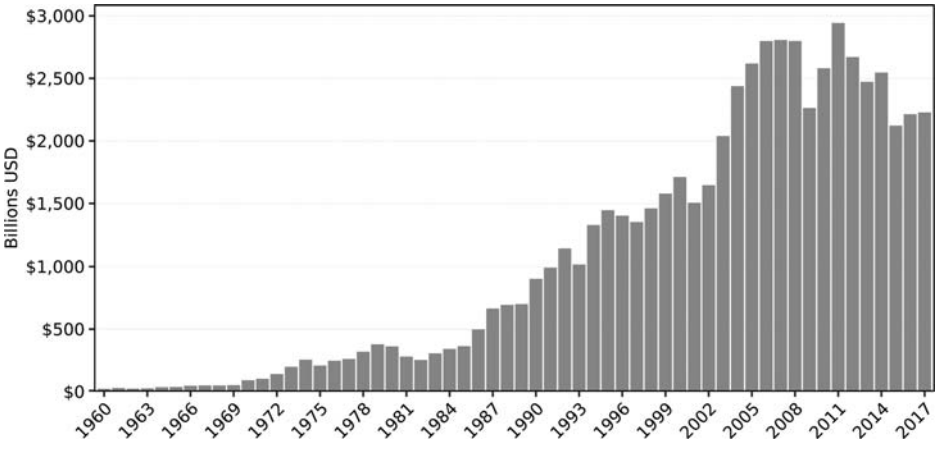

Figure 1. Drain from the global South, constant 2011 dollars, billions (1960-2017).

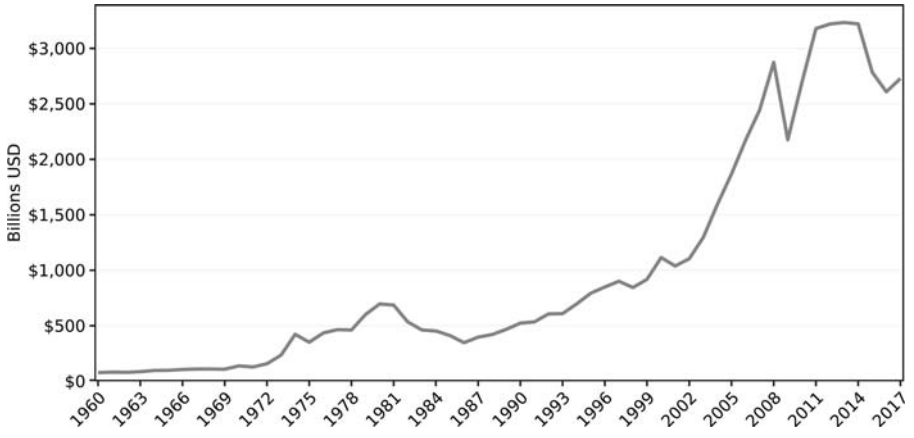

Figure 2. South-North exports, constant 2011 dollars, billions (1960-2017).

transfers increase because of an increase in the volume of exports, even if the price distortion factor remains unchanged. Though exploitative, extensive growth allows the South to increase its export earnings. *Intensive* growth in unequal exchange, on the other hand, happens when the price distortion factor increases, even if the scale of trade remains unchanged.

During the 1960s and 1970s, the volume of trade grew while the price distortion factor remained relatively steady. The intensity of exploitation increased somewhat from 1960 to 1972, but declined during the 1970s as the South managed to raise the prices of its labour and resources relative to Northern prices. This coincides with the period of progressive developmentalist policies in the global South, and the rise of the anti-colonial movement, which altered the balance of global economic power at the time. Any growth in value transfer that happened during this period was for the most part extensive in nature.

This pattern changed in the 1980s and 1990s, under structural adjustment and neoliberal globalisation. During this period, rising value transfer was driven primarily by an increase in the intensity of exploitation, with the price distortion factor doubling from 1.4 to 2.8. By cheapening labour and resources in the South, structural adjustment caused a dramatic decline in Southern prices relative to Northern prices. In fact, during the 1980s, the market value of the South's exports actually *fell*, even though the quantity of commodities exported (measured at Northern prices) was rising. In

Figure 3. Price Distortion Factor (1960–2017).

1993, Southern exports had a lower market price than they did in 1980, even though the value the North was receiving increased significantly. In other words, the South's exports continued to increase even while their earnings on those exports stagnated. This represents purely intensive growth in unequal exchange.

In the early 2000s, the price distortion factor began to decline quite rapidly. This likely reflects the commodities boom, which increased the bargaining power of Southern primary commodity producers. Nevertheless, despite this decline in price distortion, the early-2000s saw an extraordinary increase in South–North trade, due to the rise of the WTO system, and the outsourcing of most manufacturing activity to the periphery. As a result, value extraction continued to increase despite the decline in the intensity of exploitation. This represents extensive growth in unequal exchange. It is only after 2011 that value transfer itself began to decline, due to a decline in the volume of North–South trade in the aftermath of the global financial crisis.

We should note that most of the decline in value transfer since 2005 is due to a change in the position of China. If we take China out, we see that value transfer from the rest of the South has remained largely unchanged, or even increased (Figure 4). Over the past decade China has played a diminishing role in unequal exchange. Value transfer from China declined from 42% of total value transfer in 2005, to only 16% in 2017. It is worth noting that, unlike the rest of the global South, China's economy was never forcibly structurally adjusted. Figure 5 shows the price distortion factor outside China.[4] While there is a decline from 1999 to 2013 (during the commodities boom, which was itself driven by growing Chinese demand for resources), it has increased again since 2013. In other words, China is responsible for most of the improvement in the price distortion factor, due perhaps to its greater degree of control over economic policy and greater bargaining power in international trade.

Figure 6 represents the sum of all Northern gains as a percentage of the North's GDP, and the sum of all Southern losses as a percentage of the South's GDP. Since our estimates of value transfer are measured at the Norths' price level, for comparison to the North's GDP we use MER, and for comparison with the South's GDP we use PPP.[5] When calculating total GDP we excluded countries with no unequal exchange data in any given year. For the period 1960–2005, value transfer represented a rapidly growing share of GDP for both the North and South. The two lines converge in 2008, at a point when value transfer represented nearly 7% of GDP for both regions. In the years since, value transfer has declined relative to GDP. The North however still appropriates transfers equivalent to 5% of its GDP.[6]

Table 1 shows the ten peripheral countries that suffered the highest absolute losses due to unequal exchange with the core in 2017.[7] The results show that China suffered the greatest absolute

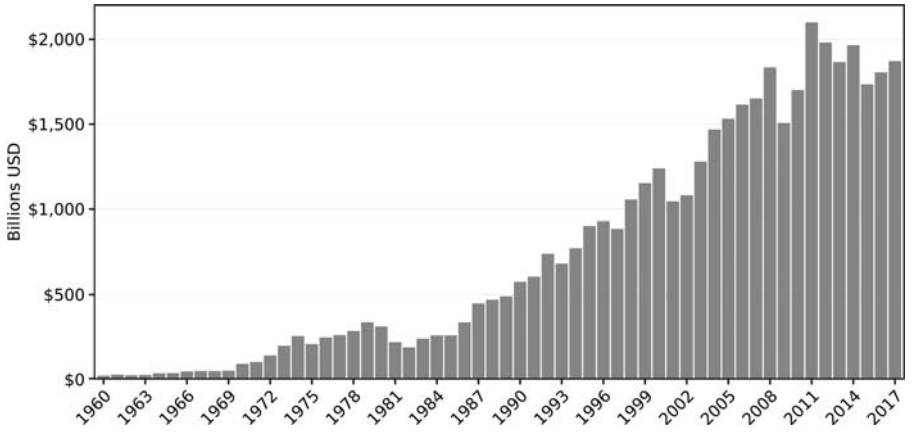

Figure 4. Drain from the global South, excluding China, constant 2011 dollars, billions (1960-2017).

Figure 5. Price Distortion Factor excluding China (1960–2017).

losses, equivalent to $357 billion, and a total of $19 trillion over the whole period. This aggregate loss is equivalent to nearly $14,000 for each person presently living in China. And yet China's annual losses amount to only 2% of the country's annual output. Vietnam, by contrast, has suffered losses that amount to 17% of its output. Note that these results are not a measure of each country's total losses through unequal exchange, but rather only of losses in relation to the core. Extra-peripheral states like India may suffer losses not only to the core but to semi-peripheral states. Meanwhile semi-peripheral states like China and Russia may be able to offset part of their loss to the core by exploiting other peripheral states.

It is worth noting that, if the value of outward transfers had been retained by the South, it could in theory have been reinvested for national economic development. If we assume a rate of growth consistent with that of Southern GDP in each year, cumulative losses over the period sum to $152 trillion, significantly higher than the $62 trillion represented here.[8]

Table 2 shows the ten core countries that appropriated the highest absolute gains through unequal exchange in 2017. The United States has enjoyed the greatest absolute gains, equivalent to $856 billion, and a total of $18 trillion over the period – equivalent to $56,000 for each American citizen living in the country today. There is a slight discrepancy between total peripheral losses and

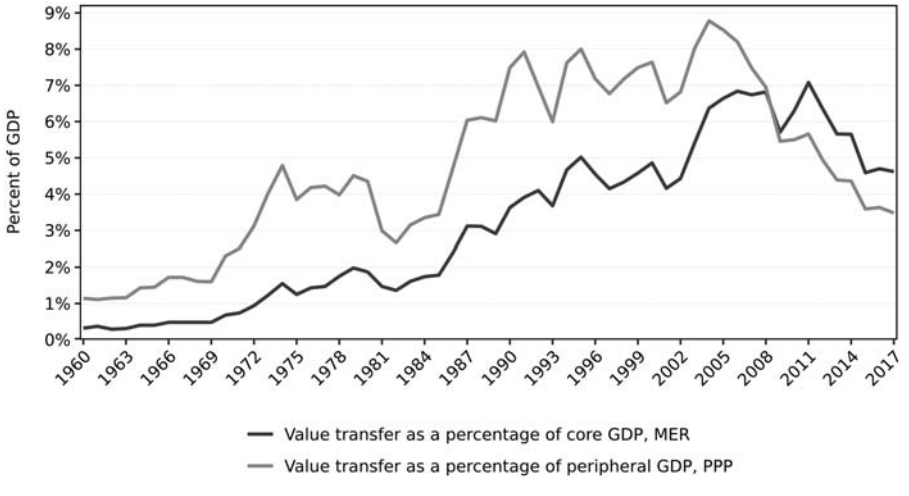

Figure 6. Value transfer as a percentage of GDP (1960-2017).

Table 1. Peripheral losses due to unequal exchange, constant 2011 dollars.

	2017 losses			Aggregate losses (1960–2017)		
Country	Total (billions)	Per capita	% of GDP, PPP	Total (billions)	Per capita	% of GDP, PPP
China	$357	$257	2%	$18,760	$13,531	102%
Mexico	$202	$1,619	9%	$2,838	$22,742	120%
India	$200	$150	2%	$3,378	$2,524	40%
Russia	$155	$1,070	5%	$4,057	$28,077	120%
Poland	$118	$3,119	11%	$1,428	$37,597	132%
Vietnam	$106	$1,120	17%	$1,158	$12,237	188%
Indonesia	$98	$371	3%	$3,502	$13,232	122%
Malaysia	$93	$2,983	11%	$2,359	$75,837	287%
Thailand	$90	$1,298	8%	$2,222	$32,101	193%
Turkey	$81	$998	4%	$984	$12,138	46%
Peripheral Total	$2,228	$357	3%	$62,086	$9,951	97%

total core gains. This is due to two reasons. First, it is not possible to calculate a loss or gain for countries for which ERDI data is unavailable. As a result, export figures from peripheral countries without ERD indices are not included in the sum of peripheral losses, while export figures to core countries without ERD indices are not included in the sum of core gains. In all years except for the period running from 1993 to 1996, we capture more export data when measuring core gains than peripheral losses.

The second reason has to do with a flaw in Köhler's method. To calculate the periphery's losses, Köhler multiplies each country's export figure by the ratio of that country's ERDI to the core's import-weighted ERDI. As a result, aggregate exports are multiplied by the ratio of the export-weighted peripheral ERDI to the import-weighted core ERDI (i.e. the price distortion factor, *d,* shown in Figure 3). By contrast, when calculating the core's losses, Köhler multiplies each core country's import figure by the ratio of the export-weighted peripheral ERDI to the relevant core country's ERDI. This is equivalent to multiplying total imports by the import-weighted average of the ratio of the periphery's export-weighted mean ERDI to each core country's ERDI (henceforth, *D*). Köhler's method produces a discrepancy between total gains and total losses because *d* differs from *D*. Our calculations suggest that *D* is systematically larger than *d*; between 1960 and 2017, the former was on average 0.08 points higher than the latter. It is not clear why this happens, or what the discrepancy means in terms of political economic theory. This could be an avenue for future research.

To keep our estimates of value transfer conservative, we use total peripheral losses in Figure 1. However, there is no reason to assume *d* is a more reliable indicator of global price differences than *D*. It may be that the hidden transfer of value from South to North since 1960 was not $62 trillion but $68 trillion, equivalent to $65,517 for everyone living in the core of the world-system.

We can also calculate the scale of value transfer by region. Figure 7 illustrates drain from each region of the global South, accumulated by the core economies since 1960.

Table 2. Core gains due to unequal exchange, constant 2011 dollars.

	2017 gains			Aggregate gains (1960–2017)		
Country	Total (billions)	Per capita	% of GDP, MER	Total (billions)	Per capita	% of GDP, MER
United States	$856	$2,634	5%	$18,291	$56,255	103%
Japan	$212	$1,671	3%	$11,995	$94,609	180%
Germany	$170	$2,061	4%	$5,752	$69,588	140%
Hong Kong	$162	$21,873	56%	$2,822	$381,841	971%
Netherlands	$140	$8,150	14%	$4,416	$257,788	452%
Korea	$103	$1,996	7%	$1,681	$32,660	118%
Great Britain	$97	$1,469	3%	$3,597	$54,446	121%
Australia	$77	$3,116	4%	$1,349	$54,849	75%
France	$73	$1,099	2%	$3,354	$50,160	110%
Italy	$73	$1,210	3%	$3,496	$57,758	155%
Core Total	$2,356	$2,266	5%	$68,113	$65,517	134%

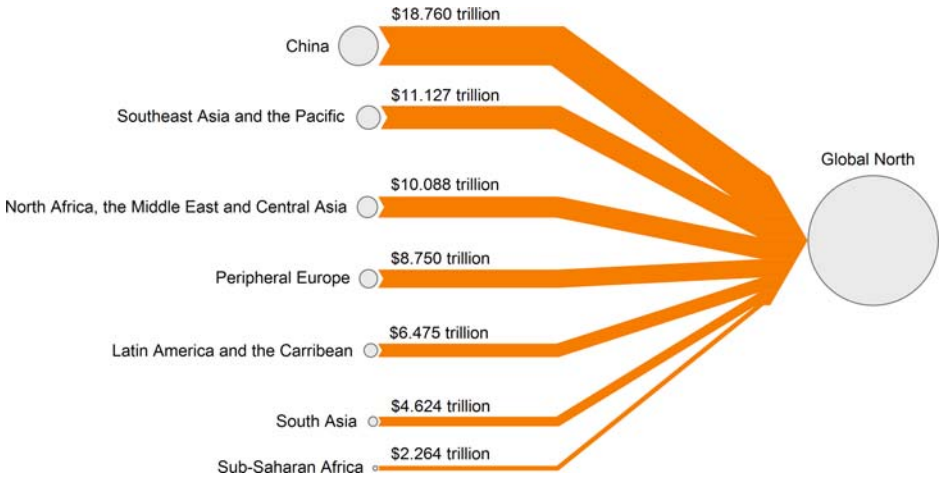

Figure 7. Drain from the global South (1960–2017).

Methodological Modification 1: Value Transfer Compared to a Fair-Trade World

There is another method for measuring value transfer that is worth considering. Instead of measuring the quantity of commodities transferred for free from South to North, at Northern price levels, we can measure the South's losses in terms of the market dollars the South would receive if the North's geopolitical and commercial monopolies were dismantled, and prices converged at a global average level. To do this, we can compare the South's ERDI not to the North's ERDI, but rather to global average ERDI. This allows us to distinguish between two different kinds of losses: losses that the South suffers due to the 'undervaluation' of its exports to the North, and losses that the South suffers due to the 'overvaluation' of its imports from the North. The formula for this is:

$$T1 = d1 * X1 - X1$$

Where:

T1 = value transfer due to the undervaluation of Southern exports

X1 = exports from South to North

d1 = the ratio of the South's export-weighted average ERDI to the global average ERDI, weighted by GDP, PPP.

$$T2 = X2 - d2 * X2$$

Where:

T2 = value transfer due to the overvaluation of Northern exports

X2 = exports from North to South

d2 = the ratio of the North's export-weighted average ERDI to the global average ERDI, weighted by GDP, PPP.

The South's total losses, T = T1 + T2

This method is derived from Cope (2019), but instead of looking at deviations in wages, as Cope does, we use ERDI. Figure 8 shows our results. This method yields a similar curve, but the figures are smaller for the most part, with maximum annual transfers reaching just over $1.6 trillion prior to the global financial crisis. The difference in scale can be explained by the fact that this approach represents value transfer in terms of global average prices, rather than Northern prices. That said, these results are higher for the 1960s and early 1970s. The reason may be that this method accounts for the South's imports, rather than just exports, and during this period the former exceeded the

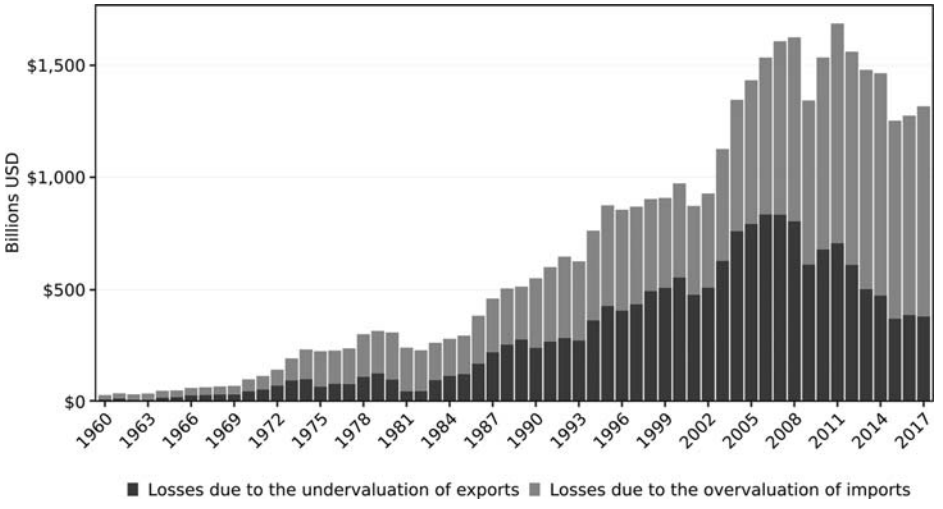

Figure 8. Peripheral losses compared to fair-trade, constant 2011 dollars, billions (1960 -2017).

latter.[9] This indicates that Köhler's original method underestimates the scale of value transfer when the South runs a current account deficit. Future research may be able to modify Köhler's approach to account for this, while still rendering value transfer at Northern price levels.

The utility of this approach is that it allows us to meaningfully compare value transfer to the South's GDP in MER, and to any other financial stocks or flows measured in terms of market dollars. For instance, in recent years, the South has suffered annual losses of $1.4 trillion through unequal exchange, $486 billion through profit repatriation (Griffiths 2014), and $1.1 trillion through illicit financial flows (Kar and Spanjers 2015), which together sum to $3 trillion (note however that Griffiths (2014) uses somewhat different country groupings, so is not directly comparable).

This approach also allows us to make meaningful comparisons with ODA. The original method yields results that can be compared with ODA from the perspective of the North (i.e. seeing ODA as a cost to the North), in the sense that the North saves through unequal exchange a sum that's many times more than it gives out in aid. But from the perspective of the South, this modified method works better, because ODA receipts are subject to the global price level. So, over the past few years the South has lost around $1.4 trillion per year in unequal exchange, while receiving around $100 billion per year in aid. In other words, for every $1 the South receives in aid it loses $14 through unequal exchange (or $30, if we include losses due to profit repatriation and illicit financial outflows).

Methodological Modification 2: Wage Rate Differentials

The primary limitation of using exchange rate deviation to estimate value transfer is that PPP exchange rates are calculated using price surveys of consumption and investment products, which include imported goods but not exports. As Feenstra et al. (2015) explain, this means that countries with favorable terms of trade have lower estimated GDPe price levels than the real price level of their output. In other words, the estimated price level of US GDPe may be unrealistically low because it incorporates the price of cheap goods imported from the periphery, but fails to account for expensive US exports. In light of this, the unequal exchange figures presented above are probably underestimates.

An alternative method for calculating unequal exchange is presented by Cope (2019), who relies on wage differentials. Instead of measuring Southern exports in Northern prices using ERDI, we can calculate the price distortion factor as the ratio of the North's import-weighted average wage to the

South's export-weighted average wage. To calculate these average wages, we use the ILO's (2020) data on 'mean nominal monthly earnings of employees.'[10] One problem with this dataset is that some countries have wage figures which are clearly inaccurate. For instance, Benin's monthly wage is listed as $0.18 in 2011, while Belarusian workers are recorded as earning $99.8 million a month in 2000. To overcome this problem, we removed 61 cells which contained data that appeared faulty.

Another problem with the ILO's data is that wage figures are not consistently available for any country. Any time series based on ILO figures would fluctuate wildly due to changes in the availability of data. To overcome this issue, we have linearly interpolated the intermediate years. We then extrapolated backwards and forwards using average regional growth rates. For instance, in 1990 the average rate of nominal wage growth in the periphery (including the growth of interpolated figures) was 1.06%. As such, for countries with data in 1989 but not 1990, we extrapolated forward by multiplying their 1989 wage by 1.0106. For those countries that already had data in 1990, but not 1989, we extrapolated backwards by dividing their 1990 wage by 1.0106.

Given these assumptions, our results should be interpreted with caution. For any country that has not grown close to the average rate, our wage figure will be inaccurate. Nevertheless, since we have extrapolated from historically accurate wage figures with historically accurate growth rates, these figures give us a meaningful picture of the scale and trend of unequal exchange. Figure 9 shows that, according to this method, value transfers reached almost $13 trillion prior to the global financial crisis, before declining to about $10 trillion in 2018, measured at the Northern price level. These figures are higher than our previous estimates because the wage price distortion factor is higher than the ERDI price distortion factor. Figure 10 shows that, according to this method, prices are up to eight times higher in the North than the South.

We can also use wage disparities to estimate the South's losses from unequal exchange in global prices. We can do this using the same formula as in Figure 8, but calculating the distortion factors with wages, such that d1 is the ratio of the population-weighted global average wage to the South's export-weighted average wage, and d2 is the ratio of the population-weighted global average wage to the North's export-weighted average wage. Figure 11 shows our results. According to this method, in an equal-exchange world, the South would have received $3.5 trillion more in its trade with the North in 2011.

Estimating value transfer with wage disparities allows us to avoid the issues associated with PPP calculations, but is limited in that it proceeds on the assumption that international trade can be measured in labour alone, as if labour were the only factor of production. This is a significant limitation, because exports are comprised of a range of inputs: labour, but also land, energy, and raw

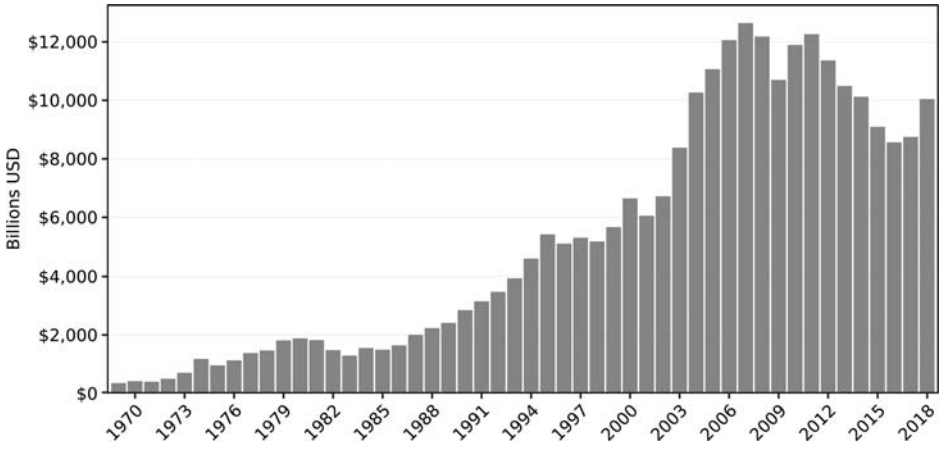

Figure 9. Drain from the South, measured with wage deviation, constant 2011 dollars, billions (1969–2018).

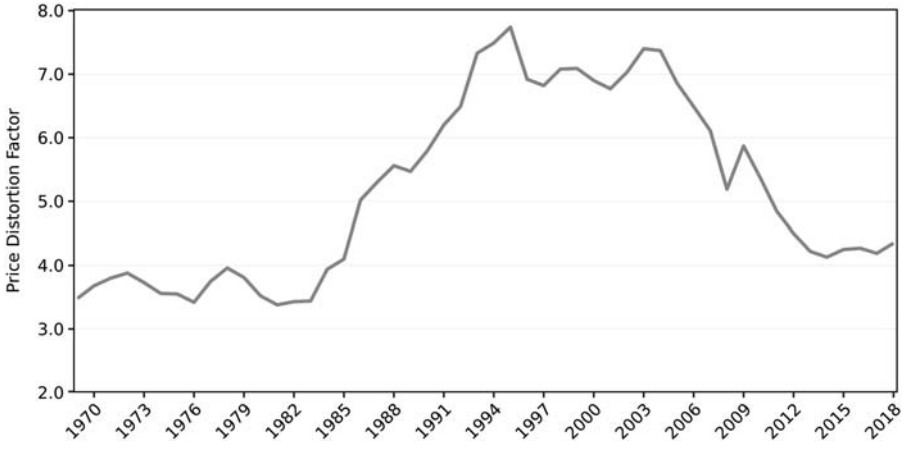

Figure 10. Price Distortion Factor, measured with wages.

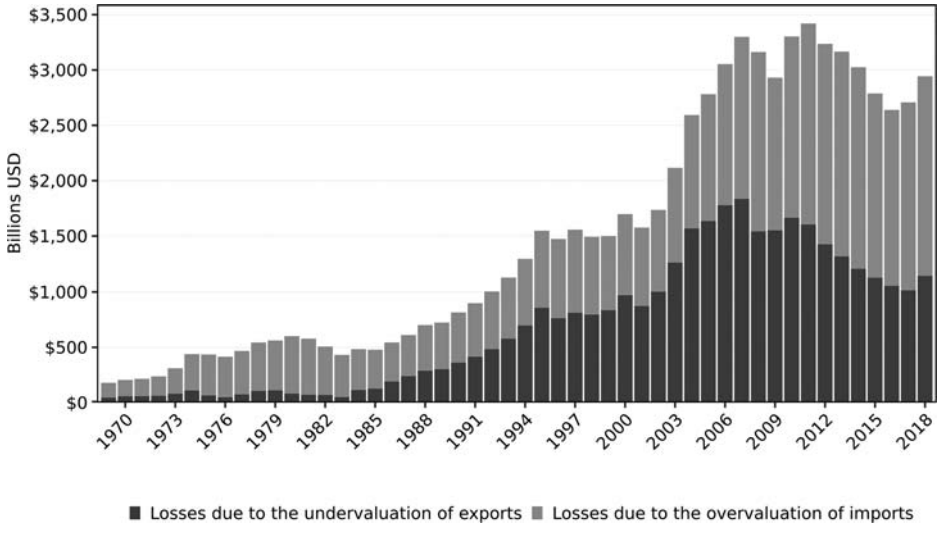

Figure 11. Peripheral losses compared to fair-trade, measured with wage deviation, constant 2011 dollars, billions (1969-2018).

materials. Of these, global price inequalities are bigger for labour than for other inputs. If we could account for the full range of inputs to exports, the scale of unequal exchange would likely be smaller than the estimates presented here. While Köhler's method may underestimate unequal exchange, Cope's method likely overstates it.

Conclusions and Discussion

Our results affirm that drain from the global South remains a significant feature of the world-economy in the post-colonial era. 'Advanced economies' rely on unequal exchange to facilitate their economic growth and to sustain high levels of income and material consumption. In recent years, the drain has amounted to around $2.2 trillion per year (constant 2011 dollars) in Northern prices, or $1.3 trillion per year in global average prices, when calculated according to exchange-rate differentials. The intensity of exploitation and the scale of unequal exchange increased significantly during the structural adjustment period of the 1980s and 1990s. These patterns of appropriation through North–South trade are a major driver of global inequality and uneven development.

It is worth considering possible critiques of these results. Subasat (2013) has argued that PPP exchange rates cannot meaningfully be used to estimate value transfer, because the South's relatively low price levels (i.e. high ERD indices) may be driven not only by power imbalances in the world economy, but also other factors unrelated to global exploitation (2013, p. 374–375). While we agree that other factors may be involved, these are unlikely to have a major impact on our results. For instance, Subasat (2013, p. 375) postulates that exchange rate asymmetries may be driven by 'quality improvements' in high-income countries' non-traded sector. Yet the International Comparisons Programme follows 'well-established procedures for identifying matching qualities of goods in each country' (Kravis et al. 1978, p. 32). These procedures should prevent systematic overestimates of price inequalities. Another possible cause of price inequality, according to Subasat (2013, p. 375), is declining transport costs, which may allow rich countries to export goods more efficiently, leading to exchange rate appreciation. But the effect of this on Northern price levels would be mixed, since declining transport costs should allow domestically traded goods to be provided at lower prices. In short, while these factors may create some noise in the calculation of value transfer, they are unlikely to account for the large price asymmetries demonstrated in this paper.

Subasat suggests that another possible cause of price inequality may have to do with the Balassa-Samuelson effect (BSE) hypothesis:

> a country that experiences productivity increase in its exportables experiences exchange rate appreciation that increases the price of non-tradables as well as average prices in international currency (US Dollars) … This does not imply, however, that the country with lower average prices (with low exportable productivity) is exploited more than the one with higher average prices. (Subasat, 2013, p. 375)

Subasat acknowledges there are problems with the BSE (namely, that it fails to explain price differences between countries exporting different types of commodities), but he argues that productivity differences may play a role (Subasat, 2013, p. 377). There is little evidence, however, to suggest that the North does in fact have a productivity advantage over the South when it comes to production for international trade (Fischer 2011). Most Southern export industries use advanced technologies provided by foreign capital. According to Amin (1976, p. 143), at least 75% of the South's exports in 1966 were produced in 'the ultra-modern capitalist sector (oil, mining and primary processing of minerals, modern plantations – like those of United Fruit in Central America, or of Unilever in Africa and Malaysia).' Given the extent of offshoring since the 1980s, it is likely that the proportion has only increased.

Furthermore, while Balassa (1964) and Samuelson (1964) consider the impact of technology and capital on productivity, we should also consider the impact of different modes of labour control. Workers in the South are subject to rigid Taylorist rules that would fall foul of labour law in the North. Chinese workers who produce smart phones describe being 'trapped in a concentration camp of labor discipline' where foreign corporations 'sacrifice our dignity as people for production efficiency' (Foxconn workers, quoted in Ngai and Chan, 2012, p. 398). Indeed, the US business press admits Apple outsources manufacturing to China because repressive labour control grants the 'efficiency needed to race products out the door' (Goldman 2012). In terms of the model proposed by Balassa and Samuelson (where prices are determined by relative productivity) the highly efficient labour discipline in Chinese factories should be associated with high wages and prices. Yet Clelland (2014, p. 103) estimates the price of an iPad is US$1,077 below its true labour and ecological value, due to Apple's monopsonistic control over its supply chain. Contra Balassa and Samuelson, prices are not determined by productivity, but by the monopoly power of Northern governments and multinational corporations.

Claims about productivity differences could also be used to critique Cope's approach to unequal exchange. One might argue that the higher wages of workers in the North reflect their greater productivity. Yet this assumption is belied by a 1971 study of export processing zones in Mexico, which found that Mexican metal workers, electronics workers and seamstresses produced 10%-40% more output in an hour than their US counterparts (Baerresen 1971, p. 33). Presumably, this productivity advantage has increased as the US has offshored plants and equipment to Mexico. If so, we can

conclude that Southern wages are lower than Northern wages despite the fact that Southern workers *are more productive and efficient*.

Smith (2010, p. 198) has criticised the use of exchange rates to estimate unequal exchange on the grounds that 'southern exporters are actually paid in 'overvalued' dollars, they therefore enjoy the full domestic benefits of the dollar's greater domestic purchasing power.' This may be a fair critique of theorists who argue that unequal exchange is driven by imbalances in currency markets (e.g. Köhler 1998; Reich 2007). However, it does not undermine the validity of ERDI as a measure of value transfer. ERDI simply tells us how much higher a country's *prices* need to be to reach parity with the US. Regardless of whether Southern exporters are paid in dollars, their *prices* remain low. Ecuador's national currency is the US dollar. Nevertheless, Ecuador had an ERDI of 1.73 in 2017, because prices are lower in Ecuador than the US.[11]

In fact, Smith's analysis confirms that ERDI is a meaningful proxy measure for the undervaluation of Southern exports. In his critique of the BSE, Smith (2010, p. 205–206) argues it is the 'suppression of international labour mobility' combined with 'the destitution of a large part of the [South's] working population' which explains 'why a haircut or a bus journey in Dhaka is so much cheaper than in Amsterdam,' not 'the allegedly so much lower productivity of workers in the tradeable goods sector.' If Smith is correct that differences in price levels reflect structural inequalities in labour markets, then ERDI is suitable for measuring unequal exchange.

It is worth noting that estimates of unequal exchange may not be correlated to GDP growth rates. In other words, some countries (like China) that suffer substantial losses due to unequal exchange may grow faster than countries with lower losses. Subasat (2013, pp. 376–377) has suggested that this implies Köhler's method lacks 'empirical validity.' However, there is no reason we should expect value transfer to correlate with GDP growth. As Köhler (1998, p. 167) points out, countries that do not trade with the core may be worse-off because they cannot access the resources controlled by Northern monopoly capital. This dilemma is comparable to that of an employee who must either submit to exploitative working conditions or face unemployment and severe deprivation.

Unequal exchange represents a loss for the South. But it is not a loss relative to exclusion from the world-economy; rather, it is a loss relative to an alternative world of fair-trade. The closest we have come to such a world was during the 1960s and 1970s, when the Non-Aligned Movement was on the rise and international prices (as measured by ERDI) were relatively equal. During those decades, the economic growth achieved by the South was, on average, higher than what has been achieved since (Chang 2008, p. 27–28). If the North's monopoly power were dismantled, the South's capacity to finance development would likely be even greater. Our estimates give some indication as to how large these gains might have been.

Another critique that Subasat (2013, p. 376) levels against Köhler's method is that it implies poor countries were not exploited through trade prior to 1980, 'the years when unequal exchange theory [was] particularly popular.' Subasat presents two scatter charts showing that there was no positive correlation between price levels and GDP per capita in 1960 or 1980. However, our calculations indicate that Northern prices were in fact higher than Southern prices in those decades. As Figure 3 shows, from 1960 to 1980, the average annual price distortion factor was 1.54. In other words, the South's losses from unequal exchange amounted to 54% of their export earnings. Why Northern prices were relatively high, despite the lack of a correlation between price and income levels, is a question for future research.

While an investigation of global price differences before 1960 is beyond the scope of this paper, a brief overview of the economic history literature contradicts Subasat's notion that exchange rate asymmetries only developed post-1980. Robert Allen (2001, p. 424) finds that from the fifteenth through to the late-eighteenth century, there was a 'great divergence' in consumer prices between Western and Eastern Europe. Similarly, Allen et al. (2011, p. 23) find that a major price gap arose between Europe and China in the mid-nineteenth century. While these examples are

not conclusive, they indicate core–periphery price inequalities have their roots in monopolistic trading relationships established in the colonial period.

Ultimately, these critiques remind us that it is not possible to determine deviation of export prices from 'real' values, because 'real' values are an abstraction, and the proxy measures we use (wage deviation and ERDI) are not perfect. Measuring drain from the periphery is inherently difficult because it is, by definition, hidden in the price structure of the world-economy. Nevertheless, the South's wages and real exchange rates indicate that Southern prices have been kept artificially low, which enables patterns of imperial appropriation that remain a dominant feature of the world economy.

Notes

1. We calculated this figure using data from Köhler 2003, p. 384.
2. The ratio of GDP, PPP to GDP, MER (i.e. ERDI) is equivalent to the inverse of the price level (Köhler and Tausch 2002, p. 96 - 97). As such, we calculate each country's ERDI by finding the inverse of the price level of their GDPe (denoted as PL_DA in PWT9.1). Since PWT's GDP, PPP data is rendered in 2011 prices, ERD indices calculated as the inverse of PL_DA indicate how much higher a country's prices would be if they were at parity with the US in 2011. This does not mean that we estimate the Northern value of Southern exports by inflating the export figures to 2011 prices. Since we multiply the market price of exports by the ratio of the peripheral ERDI to the core ERDI, the Northern value of exports is always measured at the Northern price level in the relevant year.
3. We calculated the poverty gap in 2017 with data from the World Bank (2021).
4. To exclude China from the price distortion factor we sum the Northern value of all exports from peripheral countries other than China, and then divide that figure by the market price of the same exports.
5. PWT9.1 does not contain data on GDP, MER (constant 2011 dollars). We therefore calculated GDP, MER by dividing each country's GDP in constant 2011 local currency units (the q_gdp variable), by their 2011 exchange rate (XR_2). The q_gdp and XR_2 variables are in the 'National Accounts data' file on the PWT website. For GDP, PPP we used RGDPe.
6. One limitation of these time series is that the availability of data changes over time. For instance, with the exception of 1961, we do not have export data for China until 1978. Since these and other export flows are left out of our calculations, we may underestimate unequal exchange in the early years. Nevertheless, the trends we have discussed here can be observed for countries that have data for the entire series.
7. Tables 1 and 2 include per capita figures calculated with population data from the World Bank (2020). When calculating total population, we excluded countries without unequal exchange data.
8. For instance, we assume that if the South's 1961 losses ($29.7 billion) were invested in Southern development in 1962, they would have grown at the South's 1962 growth rate (6%), yielding a total of $31 billion at year's end. In 1963, the South would then be able to re-invest this $31 billion plus the scale of value transfer in 1962 ($25 billion), with this entire sum growing by the 1963 growth rate (7%). Our calculations here include years of negative returns. For instance, in 1961 the South's growth rate was −0.5%. As such, we assume that, if the South had invested their 1960 losses ($23 billion) in 1961, they would have lost $115 million. These growth rates are calculated with the RGDPe variable from PWT9.1.
9. Another reason Figure 8 records higher estimates in the 1960s and early-1970s is that we calculated Figure 1 as the sum of all country-level peripheral losses. By contrast, we calculated Figure 8 by multiplying aggregate exports by *d1*. This means Figure 1 only includes exports from countries with corresponding ERDI data, whereas Figure 8 includes all available export data. This is not, however, the primary cause of the discrepancy.
10. We filtered the ILO data by economic activity: 'Aggregate Total,' by sex: 'Total,' and by currency: 'US dollars.' This ensures that, as much as possible, we are comparing average wages across all economic activities and both sexes, in US dollars.
11. Ecuador's ERDI is calculated as the ratio of the US price level (PL_DA) to Ecuador's price level (PL_DA).

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