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Statement

The goal of *Aussenwirtschaft* is to publish high quality analyses of important international economic policy matters that affect Switzerland. Given the integration of many Swiss firms and markets into the European and global economy, articles published in this journal may relate to policy initiatives taken in foreign countries as well. Furthermore, reflecting the many forms of cross-border commerce in the twenty-first century, the range of policies considered is not confined to traditional international trade policies. The journal seeks to inform deliberations by decision-makers – political, corporate, employees, as well as civil society – in Switzerland and abroad.

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In this paper, I estimate the aggregated ex-post effect of Switzerland's free trade agreements on the prospects for imported goods and quantify the implied consumer benefits. Applying a difference-in-difference approach to highly disaggregated import data, I find no effects on the quality and variety dimensions but a significant reduction of 8.41% in quality-adjusted prices. Using the share of imports in consumer expenditure, I calculate an average consumer price reduction of 1.43%. The price reduction implies a positive consumer gain. However, I perform a pre-trend test to validate the required parallel trend assumption and document a potential underestimation of the actual effect on consumer gains.

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This paper investigates whether sanctions imposed in the wake of the Ukraine crisis by Western countries and Russia have been evaded by analyzing monthly product-level trade patterns. Consolidating different methods from the literature related to the detection of illicit trade, I find that goods facing sanctions imposed by the Russian government in particular have most likely been evaded. While the detected amounts do not question the general effectiveness of the sanctions, they are non-negligible. Roughly US\$482 million, or 8.56% of the total estimated trade loss of \$5.633 billion from the Russian sanctions, may have been smuggled either directly or through its neighboring countries. As more than half of the estimated evasion involves trade flows through Belarus and Kazakhstan, the findings highlight the importance of trade policy coordination with third countries, especially if these are part of the same customs union.

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Wenn eine geldpolitische Nebensache zur politischen Hauptsache wird: Das riesige Vermögen der Schweizerischen Nationalbank

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Die aussergewöhnliche Geldpolitik des vergangenen Jahrzehnts hat der Schweizerischen Nationalbank (SNB) ein grösseres politisches Problem eingebrockt. Im Bemühen, den Schweizer Franken vor schädlichen Aufwertungsschüben zu bewahren, hat sie ihre Devisenbestände in kürzester Zeit mehr als verzehnfacht. Das hat ihr Vermögen derart massiv erhöht, dass es in zunehmendem Masse zum Objekt politischer Begehrlichkeiten wird; die jüngste Flut parlamentarischer Vorstösse belegt dies. Obwohl es sich dabei um einen reinen Nebeneffekt geldpolitisch motivierter Operationen handelt, steht dieses gigantische Vermögen zunehmend im Zentrum der öffentlichen Aufmerksamkeit. Das Papier analysiert den Aufbau des SNB-Vermögens und ordnet die politischen Forderungen in diesem Zusammenhang ein. Mithilfe einer stilisierten Bilanz der SNB analysieren wir die verschiedenen Möglichkeiten, das Vermögen und seine Erträge zu behandeln. Daraus leiten wir Empfehlungen ab, wie die SNB materiell und kommunikativ mit dieser Herausforderung umgehen könnte.

JEL codes: monetary policy, SNB, foreign currency reserves

Key words: E52, E58, F31

1 Einleitung

Zentralbanken und ihre Finanzmittel waren schon immer das Objekt finanzpolitischer Begierden: Riesige Beträge, die scheinbar nutzlos in den Bilanzen schlummern, grosse, wiederkehrende Gewinne und eine Institution, die nicht Konkurs gehen kann. Für Politikerinnen und Politiker, die sich in mühsamen politischen Aushandlungen um immer zu knapp scheinende Finanzmittel für staatliche Ausgaben balgen müssen, ist das verständlicherweise eine grosse Verlockung. Entsprechend waren schon in der Vergangenheit öfter Forderungen zu hören, die Gewinne und/oder Mittel der SNB direkt für die Finanzierung von Staatsausgaben im weitesten Sinne beizuziehen – also indirekt die Notenpresse für den Fiskus anzuwerfen.

Mit der deutlich angewachsenen SNB-Bilanz seit der Finanzkrise – inzwischen ist das Vermögen grösser als das Jahres-BIP der Schweiz – und insbesondere seit dem massiven Finanzbedarf im Zusammenhang mit der Bewältigung des Corona-Schocks, haben solche Forderungen stark an Intensität gewonnen.

¹ Wir danken Marius Brülhart, David Burgherr, Sara Fontanet, Björn Hartmann, Daniel Kaufmann, Sarah Lein, Dirk Niepelt, Meret Staub und Daniel Steffen für hilfreiche Kommentare und Unterstützung.

Quer durch die politischen Parteien kommt die Forderung, in grösserem Ausmass auf SNB-Mittel zurückzugreifen. Auffallend ist dabei, dass die genauen Mechanismen, wie der Transfer von Mitteln aus der SNB ablaufen soll, nur wenig besprochen werden. Zudem thematisiert diese Diskussion die geld- und wirtschaftspolitischen Konsequenzen solcher Ideen oft gar nicht oder noch schlimmer missverständlich. Ausserdem hat das in kurzer Zeit um den Faktor 10 angestiegene Nationalbankvermögen das politische Interesse an der Anlagepolitik, also an der Frage, in welchen Vermögenskategorien die SNB investiert, sprunghaft gesteigert.

Die jüngste Flut an parlamentarischen Vorstössen, die sich mit all diesen Themen befassen, zeigt, dass die SNB in bisher ungekanntem Ausmass im politischen Schaufenster angekommen ist. Die Parlamentarier und Parlamentarierinnen interessieren sich dabei insbesondere für die Themen Ausschüttungen, Anlagepolitik und Negativzinsen. Bei den ersten beiden Themenblöcken geht es explizit um die Behandlung des Vermögens der SNB. Im Anhang findet sich eine Zusammenstellung der jüngeren politischen Vorstösse bei denen die SNB thematisiert wird. Auffallend ist, der starke Anstieg des parlamentarischen Interesses in jüngerer Vergangenheit. Von den 72 angeführten Vorstössen seit Anfang 2014 wurden 24 alleine im Jahre 2020 eingereicht; an zweiter Stelle liegen hier abgeschlagen die Jahre 2015 und 2018 mit je 9 Vorstössen.

Wir wollen vor diesem Hintergrund zwei Beiträge leisten. Erstens geht es uns darum, die zugrundeliegenden Mechanismen, wie Geldmittel aus der SNB transferiert werden können, etwas genauer zu erläutern. Welche Konsequenzen haben verschiedene Varianten von Mitteltransfers, also Ausschüttungen im weitesten Sinne, auf die finanzielle Situation der SNB einerseits und auf ihren geldpolitischen Spielraum andererseits? Dies soll mithilfe der Analyse der Konsequenzen dieser Transfers auf die stilisierte SNB-Bilanz dargestellt werden, um mit einem einfachen «didaktischen» Ansatz Klarheit über die Mechanismen zu schaffen, die in der wirtschaftspolitischen Diskussion oft zu wenig explizit gemacht werden. Zweitens wollen wir auf dieser Basis eine wirtschaftspolitische und politökonomische Beurteilung vornehmen. Dabei geht es vor allem um die Fragen, inwieweit bei Transfers die Unabhängigkeit der SNB und ihr geldpolitischer Handlungsspielraum beeinträchtigt werden. Neben den Transfers analysieren wir auch die politischen Forderungen an die SNB in Sachen Anlagepolitik.

Es wird schon länger diskutiert, wie Notenbankgewinne aufgrund der Geldschöpfung (sogenannte Seigniorage) entstehen können; siehe etwa die klassischen Referenzen Cagan (1956) oder Neumann (1992). In der Schweiz ist mit der starken Zunahme der Währungsreserven der SNB neues Interesse

an dieser Frage entbrannt. Föllmi und Schnell (2016) argumentieren, dass sehr hohe Währungsreserven den Nutzen der Geldpolitik für eine stabile Konjunktur beeinträchtigen, was eine unendliche Bekämpfung einer Aufwertung unglaublich erscheinen lässt. Niepelt (2020) legt dar, dass Gewinnausschüttungen das Nettovermögen des Staates eigentlich gar nicht tangieren, weil Fiskus und Zentralbank beide letztlich zur öffentlichen Hand gehören. Kaufmann (2021) analysiert die Volatilität der SNB-Gewinnausschüttungen unter der jetzigen Ausschüttungsregel. Unsere Arbeit möchte das Gewinnpotential der Zentralbank insgesamt beleuchten und insbesondere auf die oft vernachlässigten politökonomischen Auswirkungen der Gewinnausschüttungen eingehen.

Wir kommen zur Schlussfolgerung, dass eine ernsthafte Gefahr besteht, dass zusätzliche politische Eingriffe die Unabhängigkeit der SNB und damit die Glaubwürdigkeit der Geldpolitik gefährden könnten. Dieser Gefahr einer Politisierung der SNB und der daraus entstehenden Kosten und Gefahren sollten sich die politischen Entscheidungsträger bewusst sein. Bei allen Vorschlägen, die über eine nicht-gebundene Gewinnausschüttung in die Bundeskasse hinausgehen, bestehen nämlich substantielle Gefahren für die klare Trennung zwischen Geld- und Fiskalpolitik; wenn man nicht aufpasst, wird dadurch einer der Eckpfeiler der erfolgreichen Wirtschaftspolitik der Schweiz ausgehöhlt. Unsere Empfehlung deshalb: Will man Mittel ausschütten dann sollte das ausschliesslich über die regulären Gewinne gehen und die Ausschüttungen sollten nicht mit der Finanzierung konkreter Staatsaufgaben verknüpft werden. Entweder sollten diese Mittel wie bisher in die allgemeine Bundeskasse fliessen oder in eine breite Senkung unspezifischer Steuern (alternativ: pro Kopf-Auszahlung an die Bevölkerung). Angesichts der infolge der jüngst massiv ausgedehnten Bilanz gestiegenen Anlageerträge sollte man sich einer zusätzlichen Ausschüttung aus den regulären Gewinnen in unserer Einschätzung nicht grundsätzlich widersetzen aber es sollte proaktiv eine Regelung angestrebt werden, bei der die SNB ihre politische Unabhängigkeit wahrt und der wirtschaftspolitische Flurschaden von hohen Ausschüttungen begrenzt bleibt. Zudem kommen wir vor diesem Hintergrund zum Schluss, dass die SNB ihre Anlagepolitik noch verstärkt erklären sollte.

Der Rest des Papiers ist wie folgt aufgebaut. Teil 2 erläutert die Kernaufgaben der SNB, diskutiert wie und mit welchen institutionellen Grundlagen sie diese erfüllt und zeigt, dass in Erfüllung dieser Aufgaben im vergangenen Jahrzehnt ein gewaltiges Vermögen in Form von Devisenanlagen aufgebaut wurde. Teil 3 verwendet das Konzept der stilisierten SNB-Bilanz, um den Aufbau des Vermögens, die Verwendung des Vermögens sowie die Entstehung und Verwendung von Gewinnen zu analysieren. Teil 4 diskutiert auf dieser Basis

die wirtschafts- und geldpolitischen Risiken, die aus dem gewaltigen Vermögen entstehen und schlägt vor, wie mit diesen Risiken in Zukunft materiell und kommunikativ umgegangen werden könnte. Als Schlussfolgerungen formulieren wir in Teil 5 auf Basis dieser Analysen wirtschaftspolitische Empfehlungen.

2 Kernaufgaben der SNB und der jüngst gewaltige Vermögensaufbau

2.1 Mandat, Ziele und Unabhängigkeit der SNB

Welche Aufgabe hat die SNB? Die Bundesverfassung bestimmt, dass sie die Geld- und Währungspolitik im Gesamtinteresse des Landes führen soll. Das Nationalbankgesetz führt das SNB-Mandat genauer aus. Sie muss primär die Preisstabilität sichern, dabei aber die konjunkturelle Entwicklung im Blick behalten.

Wie jede wirtschaftspolitische Institution sollte die SNB so handeln, dass sie die gesamtwirtschaftliche Wohlfahrt im Blick hat und damit für die Schweiz den grösstmöglichen Nutzen stiftet. Der Nutzen einer erfolgreichen Geldpolitik besteht in zweierlei Hinsicht: Erstens wird ein stabiles Inflationsumfeld geschaffen; für langfristige Investitions- und Sparentscheidungen ist dies zentral und es vermeidet unbeabsichtigte Umverteilungswirkungen, weil etwa Sparer von Inflationsschwankungen besonders negativ betroffen wären. Zweitens kann die Geldpolitik konjunkturelle Schwankungen abfedern und damit Beschäftigung und Einkommen möglichst stabil halten.

Warum steht nun die Preisstabilität an erster Stelle? Hohe Inflation ist stets mit Inflationsschwankungen verbunden. Diese Unsicherheit hat wie eben beschrieben auch negative Auswirkungen auf die Realwirtschaft. Wird die Inflation auf tiefem Niveau stabilisiert, werden auch Konjunktur und Beschäftigung am wenigsten gestört. Die Volkswirtschaftslehre hat diesen Umstand mit «Divine Coincidence» beschrieben.² Wenn die Zentralbank Preisstabilität mittelfristig gewährleistet, hilft sie der realen Wirtschaft bestmöglich.

Seit den 1980er-Jahren ist die Inflation deutlich zurückgegangen. Die Erfahrung dieser letzten 40 Jahre zeigt, dass eine verlässliche Geldpolitik nur mit einer möglichst unabhängigen Notenbank geführt werden kann. Auch eine unabhängige Notenbank wird die Anliegen der verschiedenen Interessengruppen in den geldpolitischen Entscheid einfließen lassen, direkte Forderungen über den

² Siehe Blanchard und Galí (2007).

politischen Prozess wären aber mit einem Verlust der Glaubwürdigkeit verbunden. Würde der Bundesrat direkt oder indirekt die Geldpolitik führen, würden sich Änderungen der politischen Stimmungslage möglicherweise rasch auf Zinsen und Wechselkurs auswirken, oder schlimmer noch, im Zweifelsfall könnte sich der Fiskus direkt aus der Notenbankschatulle bedienen. Die Nationalbank müsste dann in ihrer Geldpolitik simultan auf verschiedene kurzfristige Interessen und direkte Forderungen von Anspruchsgruppen Rücksicht nehmen: Exportfirmen, Gewerkschaften, Einzelhaushalte oder die öffentliche Hand selbst. Das würde die SNB aber überfordern. Die sogenannte Tinbergen-Regel besagt, dass die Anzahl der wirtschaftspolitischen Ziele der Anzahl Instrumente entsprechen muss. Die SNB kann den kurzfristigen Zins (oder wie in der gegenwärtigen Nullzinsphase direkt die Geldmenge) steuern, um unter Berücksichtigung der Konjunktur die Inflation zu beeinflussen; sie kann aber nicht gleichzeitig Einkommensverteilung, Arbeitslosenzahlen und die Entwicklung von Einzelbranchen steuern und dabei auch noch möglichst hohe Gewinne erzielen. Eine abhängige Nationalbank wird also ein stärkeres Augenmerk auf für Politiker attraktive Ziele wie Arbeitslosenzahlen richten und damit die Preisstabilität gezwungenermassen vernachlässigen müssen. Langfristig wird das aber Konjunktur und Beschäftigung nachhaltig schaden, wie die Beispiele von Notenbanken zeigen, die gleichzeitig mit hoher Inflation und Wirtschaftsschwankungen kämpfen müssen.

Eine unabhängige Notenbank kann ein geldpolitisches Ziel zudem viel besser durchsetzen, weil nicht dem klassischen Problem der Zeitinkonsistenz unterliegt.³ Ex ante ist es z.B. sinnvoll, in der Hochkonjunktur die Zinsen erhöhen zu wollen, denn ein zu starker Boom birgt die Gefahr einer Überhitzung. Wenn wir uns aber im Boom befinden, ist es für eine abhängige Notenbank viel schwieriger, eine Zinserhöhung tatsächlich politisch durchzusetzen: Die Hypothekarschuldner treffen höhere Zinsen direkt und die Exportindustrie wird die damit verbundene Aufwertung der Währung spüren. Ex post wird eine abhängige Notenbank darum möglicherweise von der an sich optimalen Politik abweichen. Das werden die Marktteilnehmer antizipieren. Das bedeutet aber, dass sie bereits ex ante die optimale Politik nicht verfolgen kann, weil diese eben – gegeben die Umstände – nicht glaubwürdig ist. Diese breit gültigen Erkenntnisse führen dazu, dass die Zentralbanken der Industrieländer seit den 1980er Jahren bewusst institutionell immer unabhängiger von der Regierung gemacht wurden. Das tiefere Niveau und die gesunkene Volatilität der Inflation sind sicher mit darauf zurückzuführen. Umgekehrt zeigen die Probleme von Schwellenländern wie Argentinien oder der Türkei, wie schwierig es sein kann, einen glaubwürdigen «Track Record» der Notenbank aufzubauen. Das gleiche galt für viele Vorläuferwährungen des Euro.

³ Erstmals so beschrieben von Kydland und Prescott (1977).

2.2 Der jüngst explosionsartige Anstieg des SNB-Vermögens

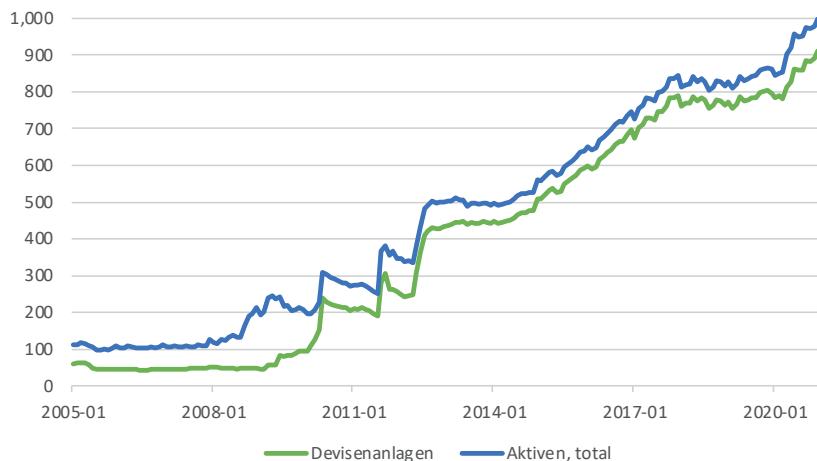
Seit dem Ende des Bretton Woods Systems 1973 und besonders seit der Grossen Finanzkrise 2007/2008 tendiert der Schweizer Franken ständig zur Aufwertung. Einerseits weist die Schweiz eine äusserst produktive Exportwirtschaft auf, die Exportpreise stiegen stärker als die Importpreise, was eine Währung auch real erstarken lässt. Andererseits führt die SNB eine erfolgreiche Geldpolitik mit tiefer Inflation. Der starke Franken ist eigentlich ein Sinnbild einer generell soliden Wirtschaftspolitik und diese Erwartungen sind in den Finanzmärkten so nachhaltig verankert, dass der Franken als «sicherer Hafen» gerade in Krisenzeiten gilt. Eine schockartige Aufwertung von diesem hohen Niveau aus würde aber der Exportindustrie und damit der Konjunktur möglicherweise grossen Schaden zufügen. Ausserdem würde ein noch stärkerer Franken über sinkende Importpreise eine negative Teuerungsrate bewirken, was auch nicht mit Preisstabilität vereinbar wäre. Weil zinsseitig kaum mehr Spielraum bestand, war die SNB zur Verfolgung der Stabilitätsziele in den letzten Jahren gezwungen, massiv Fremdwährungen zu kaufen, um eine zu rasante Aufwertung des Schweizer Frankens zu verhindern. Da sie neues Geld aus dem Nichts schaffen kann, ist das für die SNB grundsätzlich unbegrenzt möglich. Sie hat das «Notenmonopol» und kann damit die Geldmenge durch Kauf von Wertschriften erhöhen und ihre Bilanz verlängert sich, wie wir im nächsten Abschnitt zeigen. Umgekehrt führt ein Verkauf von Wertschriften zu einer Verkürzung der Bilanz: Das eingenommene Geld geht vom Privatsektor zurück zur SNB, was die Notenbankgeldmenge auf der Passivseite reduziert.

Mit den Käufen von ausländischen Währungen, um die Aufwärtsbewegung des Frankens abzuschwächen, häufte die Nationalbank in den letzten Jahren immer mehr Vermögen, auch Währungsreserven genannt, an und zwar in Form von ausländischen Anleihen oder Aktien. In «normalen» Zeiten spielt dieses Vermögen nur eine untergeordnete Rolle. Die damit verbundenen Erträge und allfälligen Wertschwankungen sind moderat und fallen für den Staatshaushalt kaum ins Gewicht. Abbildung 1 zeigt aber, wie massiv die SNB-Bilanz in den letzten Jahren gewachsen ist. Vor der Grossen Finanzkrise 2007/2008 betragen die Währungsreserven lediglich etwa CHF 50 Milliarden, im Sommer 2011, als der Mindestkurs von 1.20 zum Euro eingeführt wurde, erreichten sie CHF 200 Milliarden. Nach der Aufhebung der Untergrenze anfangs 2015 betragen die ausländischen Devisenanlagen bereits über CHF 550 Milliarden. Obwohl die Jahre 2016 bis 2019 wirtschaftlich etwas ruhiger waren und die Rolle des Schweizer Frankens als «safe haven» damit etwas weniger spielte, stiegen die Währungsreserven tendenziell weiter. Mit den diversen Lockdowns in Europa und der vorübergehenden Talfahrt an den Börsen im Jahr 2020 nahm deren Wachstum auch in der Schweiz wieder Fahrt auf und erreichte bald die

900-Milliarden-Grenze. Die Währungsreserven machen mittlerweile über 90% der gesamten SNB-Aktiven aus. Wenn diese Entwicklung weitergeht, ist das Erreichen der symbolträchtigen Billion Franken in Devisenanlagen nur eine Frage der Zeit. Diese Entwicklung erhöhte natürlich das Interesse daran, wie und wie nachhaltig aus diesem Vermögen Erträge generiert werden und welche wirtschaftspolitischen Konsequenzen dies hat.

Abbildung 1: Bilanzpositionen der SNB 2005–2020

Devisenanlagen und totale Aktiven (in Milliarden, CHF)



Quelle: Schweizerische Nationalbank (data.snb.ch)

3 Die grundlegende Mechanik des SNB-Vermögens und seiner Verwendung

In der politischen Diskussion um die verschiedenen Formen der SNB-Ausschüttungen, scheinen die zugrundeliegenden Mechanismen oft nicht ganz klar zu sein. Was ist also dieses Vermögen, wie entsteht es und wie können daraus Mittel ausgeschüttet werden? Um diese Fragen für verschiedene Fälle konzeptionell einzuordnen, arbeiten wir mit dem Konzept einer stilisierten Bilanz der SNB.

3.1 Wie entstehen Gewinne der SNB?

Abbildung 2 zeigt eine auf das absolute Minimum vereinfachte Bilanz der SNB.⁴ Auf der Aktivseite finden sich die Anlagen der SNB. Sie bestehen zur Hauptsache aus Devisen, also ausländischen Wertpapieren. Die Passivseite setzt sich stark vereinfacht zusammen aus der Notenbankgeldmenge M0 (die für die SNB Fremdkapital darstellt) und dem Eigenkapital.⁵

Abbildung 2: Stilisierte Bilanz der SNB

Verwendung	Herkunft
Aktiven	Notenbank- geldmenge
	Eigenkapital

Vereinfacht ausgedrückt «macht» die SNB Geldpolitik indem sie die Bilanz verlängert (expansive Politik) oder verkürzt (restriktive Politik). Will sie etwa die Liquidität im Umlauf erhöhen – also eine expansive Geldpolitik betreiben – so kauft sie einen Vermögenswert und zahlt mit neu geschaffenem Geld. In der Bilanz führt das zu einer Erhöhung der Notenbankgeldmenge (NBGM) auf der Passivseite und einer gleich starken Erhöhung des Bestandes an Vermögenswerten auf der Aktivseite. Verkauft sie umgekehrt einen Vermögenswert, so reduziert

⁴ Eine Bilanz stellt in einem T-Diagramm dar, was jemandem gehört («Aktiven», die auf der linken Seite stehen) und wie das finanziert wird («Passiven», die auf der rechten Seite stehen). Da alle Vermögenswerte finanziert sein müssen, steht per bei einem solventen Unternehmen Definition auf beiden Seiten der Bilanz der gleiche Betrag.

⁵ Für die weitere Analyse benötigen wir nur diese grobe Unterteilung; eine etwas detailliertere Aufteilung der Aktiven und Passiven der SNB findet sich in Box 1.

sich das Geld im Umlauf (die NBGM wird kleiner) und gleichzeitig reduziert sich der Bestand an Vermögenswerten um den gleichen Betrag⁶.

Obwohl das gar nicht ihr primäres Ziel ist, macht die SNB mit dieser sehr speziellen Bilanz in der Regel substantielle Gewinne. Anders als Banken, die mit dem Trading (Eigenhandel) de facto ein sehr ähnliches Geschäft betreiben (wenn aber natürlich auch mit einem ganz anderen Ziel), muss die SNB für die Finanzierung ihrer Wertpapierkäufe keinen Zins zahlen; sie kann sich diese Finanzmittel, zusätzliches Notenbankgeld also, aus dem Nichts schaffen. Im Wesentlichen stellt sie damit einen Schulschein oder eben eine (meist elektronische) Banknote aus, die als gesetzliches Zahlungsmittel verwendet wird. Zusammengefasst erzielt die SNB einen Gewinn aus diesem Zinsdifferenzgeschäft, indem sie sich mit Geld, das sie umsonst «herstellen» kann (dem Notenbankgeld NBGM), Wertpapiere kauft, auf denen sie Renditen erzielt. Kurzfristig kann die Nationalbank aber natürlich auch Verluste erleiden. Der Gewinn hängt nicht nur von den Auszahlungen der Schuldner (Zinsen, Dividenden) ab, sondern auch von der Veränderung des Marktwerts der Wertpapiere. Da die Nationalbank – wie oben gezeigt – die meisten Wertpapiere in Fremdwährungen als Währungsreserven hält, entsteht ein Verlust in Franken, wenn sich dieser aufwertet, wie z.B. nach der Aufhebung der Euro-Untergrenze im Januar 2015. Haben wir alternativ einen starken Einbruch der Vermögenspreise – etwa in einer Finanzkrise – dann kann die SNB ebenfalls einen Verlust machen; die Einnahmen aus den Zinserträgen und Dividenden reichen dann nicht aus, um für den Preiseinbruch der Vermögenswerte zu kompensieren. Im Moment sind die Risiken zu einem weiten Teil währungsbedingt, die Währungsschwankungen kann die SNB allerdings zumindest in der kurzen Frist mitbeeinflussen. Mittel- und langfristig entsteht aber ein Gewinn auf den Aktiven, weil den Risiken auf den Wertpapieren auch entsprechende Erträge gegenüberstehen. Je länger die Bilanz, desto höher ist das Gewinnpotential.⁷

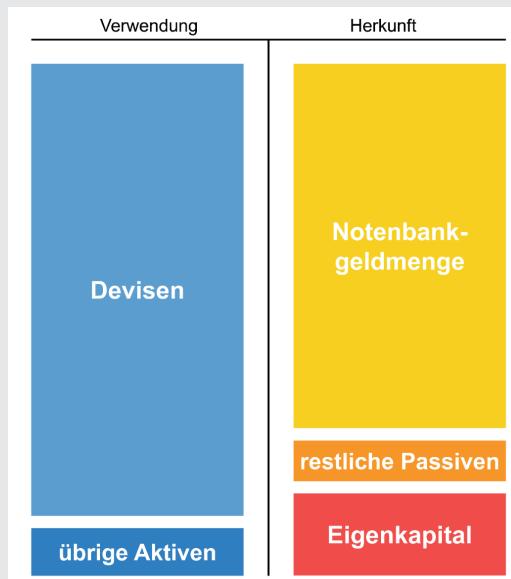
6 Eine restriktive Geldpolitik ist auch durch die Herausgabe von «SNB Bills», also verzinsten Schuldverschreibungen der SNB, möglich. Diese entziehen dem Markt Liquidität (Notenbankgeld), ohne die Länge der SNB-Bilanz formell zu verkürzen; auf der Passivseite ersetzen die SNB-Bills das weggefallene Notenbankgeld. Auch wenn die SNB nicht direkt Devisen verkaufen müsste, um die Liquidität im Umlauf zu reduzieren, würde sich der Franken indirekt über die mit geringerer Liquidität einhergehenden höheren Zinsen aufwerten.

7 Wie Drazen (1985) ausführt, entsteht Seigniorage grundsätzlich aus zwei Quellen: Erstens, über die Einnahmen aus der Erhöhung der nominalen Geldmenge und zweitens über die Erträge auf den Anlagen der Notenbank. Wir fokussieren in unseren Ausführungen auf die zweite Quelle. Baltensperger und Jordan (1998) argumentieren darüber hinaus, dass Notenbankgewinne u.a. wegen den Wertschwankungen nicht gleich der klassischen Seigniorage sein müssen.

Box 1: Mehr Details zur SNB-Bilanz

Für die Analysen in diesem Papier verwenden wir eine stilisierte Bilanz der SNB, die so stark vereinfacht wie es möglich ist, um die essentiellen Effekte zu verstehen. In dieser Box wollen wir etwas mehr Details geben und die Größenordnungen zeigen.

Abb. 2b: Etwas detailliertere SNB-Bilanz



Die Zusammensetzung der Aktiven der SNB widerspiegelt die Prioritäten ihrer Geldpolitik. In den letzten Jahren massiver Ausweitung der Bilanz war immer klar ein Ziel im Vordergrund: eine übermässige Aufwertung des Frankens zu verhindern. Die dafür notwendigen Devisenkäufe führten dazu, dass die Vermögensanlagen der SNB heute beinahe ausschliesslich aus Devisenanlagen bestehen. Wie in Abbildung 2b gezeigt, machen sie mehr als 90% der Aktiven aus, die Grösse der Flächen entspricht stilisiert den tatsächlichen Größenordnungen Stand Ende 2020. Der Rest («übrige Aktiven») besteht zum Löwenanteil aus Gold und einigen Restposten wie Wertschriften in Franken oder Forderungen aus Repogeschäften in Franken. Auf der Passivseite setzt sich die Notenbankgeldmenge aus dem Notenumlauf und den Giroeinlagen inländischer Banken zusammen; insgesamt macht das beinahe 70 % der Passiven aus. Die NBGM und die restlichen Passiven – also

das Fremdkapital – der SNB beläuft sich auf etwas über 80%.⁸ Die restlichen knapp 20% der Passiven sind das Eigenkapital der SNB. Dieses besteht vor allem aus den Ausschüttungsreserven (als Basis der Gewinnausschüttungen an Bund und Kantone) und den Rückstellungen für Währungsreserven (als Sicherheitspolster, um Wechselkursschwankungen aufzufangen). Das Aktienkapital ist mit 25 Mio. CHF (0.003 % der Passiven!) verschwindend klein.

3.2 Gewinnverwendung und ausserordentliche Ausschüttungen

Die aus den beschriebenen Gründen entstehenden Gewinne kann die SNB grundsätzlich auf zwei Arten verwenden. Entweder sie behält sie ein oder sie schüttet sie aus. Welche Auswirkungen haben diese Varianten auf die Bilanz?

Behält sie den Gewinn, thesauriert sie ihn also, so verlängert sich – wie in Abbildung 3 dargestellt – ihre Bilanz. Auf der Aktivseite der SNB steigt der Bestand an Vermögenswerten um den Gewinn an. Und auf der Passivseite erhöht sich ihr Eigenkapital um den gleichen Betrag. Damit verbessert sich also die Kapitalausstattung der SNB. Die Geldpolitik bleibt unverändert, da sich an der geldpolitisch relevanten Notenbankgeldmenge durch diese Transaktion gar nichts ändert.

Schüttet die SNB den Gewinn hingegen aus, so bleibt ihre Bilanz unberührt. Der Bestand an Vermögenswerten auf der Aktivseite ändert sich dann ebenso wenig wie das Eigenkapital oder die NBGM auf der Passivseite.

In der Regel wählt die SNB eine Mischung der beiden Verwendungsformen. Ein Teil der Gewinne wird an Bund und Kantone ausgeschüttet,⁹ den Rest behält sie und wird dem Eigenkapital unter der Position der Ausschüttungsreserven gutgeschrieben. Damit verlängert sich ihre Bilanz und verbessert sich ihre Kapitalausstattung.

⁸ Die restlichen Passiven sind Verbindlichkeiten der SNB, die nicht zur NBGM gezählt werden, vor allem Verbindlichkeiten gegenüber dem Bund und Girokonten ausländischer Finanzinstitute.

⁹ https://www.efv.admin.ch/efv/de/home/themen/waehrung_gewinnaussch_int/gewinnausschettung_snb.html

Abbildung 3: Bilanzeffekte einer Einbehaltung des SNB-Gewinns



Gewinnausschüttungen der SNB an Bund und Kantone sind üblich; einzig über die Höhe wird kontrovers debattiert, das heisst über den Prozentsatz des Gewinns, der ausbezahlt (und damit nicht dem Eigenkapital der SNB zugeschrieben) wird.¹⁰ Ganz etwas anderes wären hingegen ausserordentliche Ausschüttungen der SNB.¹¹ Dann würde nicht der jährliche Zuwachs ausbezahlt, sondern das ginge an die Substanz der Vermögenswerte. Abbildung 4 demonstriert dies.

In einem solchen Fall würde die SNB einen Teil der Vermögenswerte auf der Aktivseite veräussern und den Ertrag an die Behörden auszahlen. Damit würde sich das Eigenkapital der SNB um den ausbezahlten Betrag reduzieren. Diese Operation hätte keinen Effekt auf die Notenbankgeldmenge, würde aber die Kapitalisierung der SNB verschlechtern.¹² Wenn die SNB allerdings für eine massive Ausschüttung ausländische Vermögenswerte in substantieller Weise veräussern müsste, würde dies zudem zu einer Aufwertung des Frankens führen und damit die Geldpolitik konterkarieren.

¹⁰ Mit höheren Gewinnen steigt also die absolute Höhe der SNB-Ausschüttungen auch bei gleichbleibendem Prozentsatz an.

¹¹ Den Begriff «ausserordentliche Ausschüttung» verwenden wir für eine Ausschüttung, die nicht aus den Gewinnen des laufenden Jahres kommt.

¹² Der Bilanzeffekt ist übrigens der Gleiche, wie wenn die SNB einen Verlust auf den Vermögenswerten verbuchen müsste.

Abb. 4: Bilanzeffekte einer ausserordentlichen Ausschüttung

Eine ähnliche Wirkung haben Postulate, beispielsweise der AHV oder den Pensionskassen die Negativzinsen zu erlassen. Dies kommt einer zweckgebundenen zusätzlichen Ausschüttung gleich. Je nach Ausmass können derartige Sonderausschüttungen aus dem Gewinn (Abb. 3) oder müssen aus der Substanz (Abb. 4) finanziert werden.

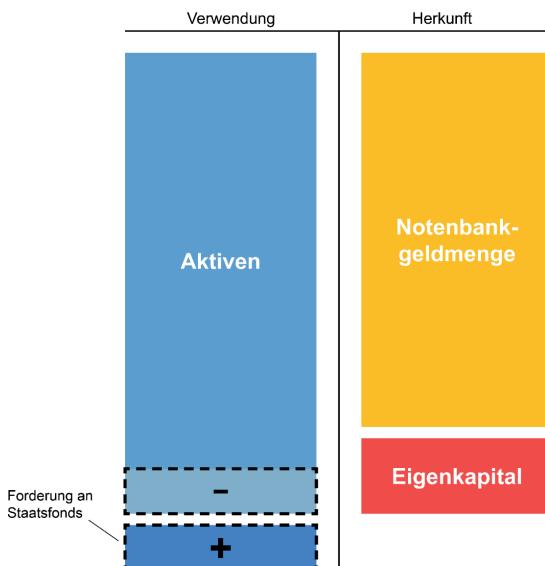
3.3 Auslagerung von Vermögenswerten an einen Staatsfonds

Schliesslich wird oft die Idee diskutiert, einen Teil der «nicht benötigten» Vermögenswerte der SNB in einen Staatsfonds auszugliedern. Die Mittel dieses Fonds könnten dann – mit unterschiedlichen politischen Zielsetzungen – angelegt oder für die Finanzierung konkreter Investitionen z.B. in Infrastruktur verwendet werden. Wie würde sich eine solche Operation auf die Bilanz der SNB auswirken? Es sind zwei Fälle zu unterscheiden: (i) Die SNB bleibt Besitzerin des Staatsfonds oder hat eine Forderung an den Staatsfonds in dessen Höhe und (ii) die SNB hat keine Ansprüche an den Staatsfonds mehr. Fall 1 ist in Abbildung 5 schematisch dargestellt.¹³

¹³ Wir nehmen hier vereinfachend an, dass das Eigenkapital des Staatsfonds aus den Bundesfinanzen stammt. Denkbar wäre auch, dass die SNB übernimmt, womit ihr Eigenkapital entsprechend schrumpfen würde.

Falls die SNB Besitzerin des Staatsfonds bliebe, würde diese Aktion die Passiven der SNB nicht berühren, aber zu einer anderen Zusammensetzung der Aktiven führen. Ein Teil der Vermögensanlagen würde in den Staatsfonds transferiert und die SNB erhielte dafür einen Schulterschein, also eine Forderung an den Staatsfonds in identischer Höhe. Ändert würde sich aus ökonomischer Sicht die geldpolitische Manövriertfähigkeit der SNB. Anstatt leicht auf liquiden Märkten veräußerbare, diversifizierte Wertpapiere erhielte sie eine nur schwer handelbare Forderung an einen einzelnen Schuldner. Müsste sie etwa eine stark restriktive Geldpolitik verfolgen, wäre sie wegen der ausgelagerten Vermögenswerte nur eingeschränkt handlungsfähig bzw. müsste den Weg über verzinsliche SNB-Bills gehen; Vermögenswerte in der Bilanz kann sie jederzeit verkaufen, Forderungen an einen Staatsfonds aber nicht oder nur eingeschränkt.

Abb. 5: Bilanzeffekte der Schaffung eines Staatsfonds aus SNB-Mitteln



Ökonomisch äquivalent wäre eine Kreditvergabe der SNB an einen Staatsfonds (oder an irgendeine andere Stelle); auch hier fände ein entsprechender Aktivtausch statt. Anstatt dass die SNB direkt das Wertpapier transferiert, würde sie in diesem Fall dieses zuerst verkaufen und dann aus den Erträgen einen Kredit vergeben,

für den sie eine weniger gut handelbare Kreditforderung erhielte.¹⁴ Die Effekte auf die Bilanz wären äquivalent zu den in Abbildung 5 dargestellten.

Bleibt der zweite Fall, wenn die SNB alle Ansprüche an den Staatsfonds verliert, also eine «Vollauslagerung» eines Teils der Währungsreserven an den Staatsfonds vorgenommen wird. Aus der Diskussion oben ist die Konsequenz offensichtlich. Dies käme einer ausserordentlichen Ausschüttung wie in Abb. 4 gleich. Die Auslagerung der Vermögenswerte an den Staatsfonds ginge in diesem Falle zu Lasten des Eigenkapitals der SNB.

3.4 Wie gross sind die Ausschüttungen an Bund und Kantone?

Relevant ist natürlich, in welcher Grösseordnung sich die oben angesprochenen Ausschüttungen bewegen; erst wenn die Gewinne eine gewisse Höhe erreichen, werden sie zu einem echten politischen Thema. Sehr hohe Gewinnausschüttungen der SNB sind in ihrer über 100-jährigen Geschichte ein relativ neues Phänomen. Von 1933 bis 1991 wurden neben der minimalen Dividende an die Aktionäre nur ein symbolischer Betrag von 80 Rappen pro Kopf der Bevölkerung an die Kantone ausgerichtet.¹⁵ Vor 1973, also bis zum Ende des fixen Wechselkurssystems von Bretton Woods, bestanden die Aktiven hauptsächlich aus Gold, das ausser Wertänderungen keine Erträge abwirft.

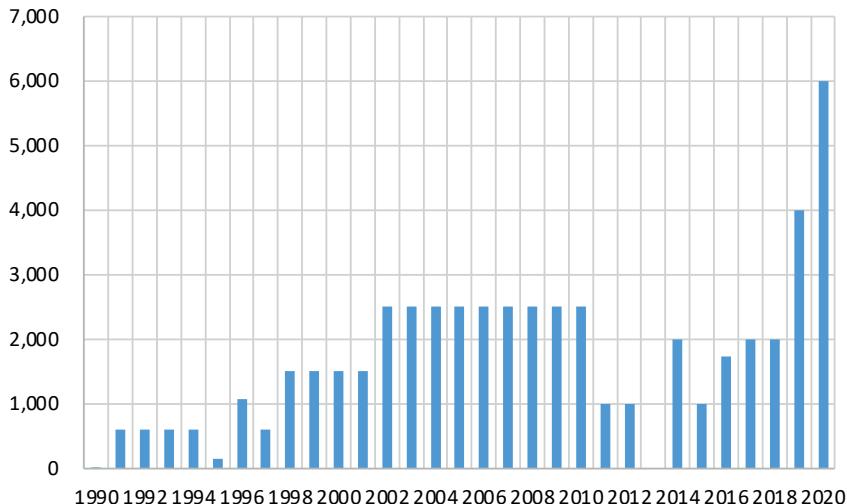
Die höheren Währungsreserven im System flexibler Wechselkurse änderten das grundsätzliche Ertragspotential der SNB. Ab 1991 werden regelmässig Gewinnausschüttungen an Bund und Kantone ausgerichtet. Bis 1997 beliefen sich diese auf CHF 600 Mio. pro Jahr. Ab 1998 überstiegen sie die Milliardengrenze. In den Jahren 1995 und 2013 lag ein zu geringer Bilanzgewinn vor, weshalb die Ausschüttung reduziert oder auf sie verzichtet wurde; im Folgejahr wurde sie aber nachgeholt. Eine grössere Sonderausschüttung der Vergangenheit war der Verkauf von 1'300 Tonnen Gold, das bisher durch die SNB gehalten, aber für die Geldpolitik nicht mehr benötigt wurde. Ausserdem war der gesamte Goldbestand zum historischen Preis des Jahres 1971 von CHF 4'595 pro kg bilanziert. Diese stillen Reserven führten in den 90er Jahren zu einer breiten Diskussion, was mit dem Aufwertungsgewinn und dem «nicht mehr benötigten» Gold passieren sollte. Die aufgeworfene Idee einer Solidaritätsstiftung scheiterte aber in der Volksabstimmung vom Herbst 2002. In der Folge wurden in den

¹⁴ Die Einlagen in den Staatsfonds müssten natürlich ebenfalls in Fremdwährung erfolgen, ansonsten würde mit dem Verkauf der Devisen die eingeschlagene Währungspolitik der SNB direkt beeinflusst.

¹⁵ Ausgenommen sind die Sonderausschüttungen von insgesamt beträchtlichen CHF 575 Mio. in der Phase des 2. Weltkrieges, die aus Aufwertungen der Goldreserven getätigt wurden. In diesem Rahmen wurden im Jahre 1940 eine Ausschüttung für Kriegskosten sowie im Jahre 1946 eine Zahlung im Rahmen des Washingtoner Abkommens geleistet, siehe Bordo und James (2007), S. 76.

Ausschüttungsjahren 2003 und 2004 die Verkaufserträge mittels zweier Tranchen von CHF 0.4 Mrd. und CHF 21.513 Mrd. an Bund und Kantone ausbezahlt. Wegen der hohen Reserven schüttet die SNB auf Basis einer Zusatzvereinbarung mit dem EFD in den Jahren 2019 und 2020 maximal CHF 4 Mrd. aus. Ende Januar 2021 wurde dieses Maximum ab dem Jahr 2020 auf CHF 6 Mrd. erhöht.

Abb. 6: Gewinnausschüttung der SNB 1990-2020 (in Millionen, CHF)



Hinweis: In den Jahren 2003 und 2004 erfolgte außerdem eine Sonderausschüttung von 0.4 Mrd. bzw. 21.513 Mrd. aus den Erträgen der Goldreserven. Die totale Ausschüttung für das Jahr 2004 betrug demnach 24.013 Mrd. Die Ausschüttungen erfolgen immer im Folgejahr.

Quelle: Jahresberichte SNB.

4 Wirtschaftspolitische Risiken von hohen Währungsreserven

Die wirtschaftspolitischen Risiken von hohen Währungsreserven liegen auf zwei Ebenen. Einerseits hat die Anlage der Reserven wirtschaftspolitische Konsequenzen. Andererseits wecken die Erträge auf den hohen Währungsreserven politische Begehrlichkeiten.

4.1 Anlage der Währungsreserven – Klumpenrisiko für die ganze Volkswirtschaft?

Die Währungsreserven sind aus durchaus guten Gründen entstanden, um eine zu abrupte Aufwertung des Frankens zu verhindern oder zumindest abzuschwächen. Der Aufwertungsdruck hat viele Ursachen: die Rolle des Frankens als sicherer Hafen, das fehlende Vertrauen in die europäische Währung gerade in der Euro-Krise und nicht zuletzt der andauernde Erfolg der Schweizer Exporteure auf den Weltmärkten. Verbunden mit den Erträgen aus Überschüssen der Vorjahre, hat die Schweiz darum seit vielen Jahren ausserordentlich hohe Überschüsse der Leistungsbilanz.

Über mehrere Jahre lag die Zunahme der Währungsreserven in derselben Grössenordnung wie der Überschuss der Leistungsbilanz, der in den letzten Jahren zwischen 60 und 80 Milliarden pro Jahr schwankte. Um die Aufwertung des Frankens abzuschwächen, hat die SNB also netto den ganzen Leistungsbilanzüberschuss im Ausland angelegt. Die SNB schlüpfte damit, damals sicher notgedrungen, in die Rolle der Anleger. Denn zu diesem Euro- oder Dollarkurs wollten und konnten Privatanleger oder Pensionskassen die Währungsrisiken nicht tragen und legten ihre Ersparnisse vorwiegend im Inland an, wo sie stattdessen z.B. Schweizer Immobilien kauften.

Die Herausforderung aus dieser Entwicklung liegt nun darin, dass eine kleine Gruppe von durchaus qualifizierten Angestellten der SNB Anlageentscheide von immensem Ausmass treffen muss. Das kleine Anlagekomitee muss dies quasi repräsentativ als Treuhänder für die Gesamtbevölkerung tun. Dies wirft mindestens zwei Probleme auf: Erstens muss das Komitee über die Risikopräferenz einer ganzen Volkswirtschaft mitentscheiden und zweitens werden die weitreichenden Entscheide eines solchen Komitees in der politischen Debatte hart diskutiert.

Problem 1: Portfoliostruktur und Risikoprofil der Währungsreserven

In einer Marktwirtschaft treffen im Normalfall viele Einzelanleger – Privatpersonen, Unternehmen, Pensionskassen, aber auch Stiftungen – solche Entscheide. Einzelanleger entscheiden sich, wieviel Risiko sie nehmen wollen und beispielsweise wieviel Aktien sie kaufen wollen. Die SNB legt ebenfalls in ihrer Anlagepolitik fest, welchen Anteil der Bilanz sie beispielsweise in Staatsanleihen, Firmenanleihen oder Aktien investieren will. Solange die Bilanz im Vergleich zu den ganzen Vermögenswerten der Volkswirtschaft relativ klein ist, stellt dies kein weiteres Problem dar. Im jetzigen Zeitpunkt aber beeinflusst die SNB das Anlageportfolio der ganzen Volkswirtschaft wesentlich mit. Nimmt

die SNB weniger Risiken als die Schweizer Durchschnittsanlegerin sind weniger Einkünfte (aber auch weniger Schwankungen) und damit Ausschüttungen an Bund und Kantone zu erwarten, als diese Anlegerin sonst erzielen würde. Vice versa natürlich für den Fall, dass die SNB mehr Risiken eingeht.

Um die Verzerrungen in den nationalen Vermögen möglichst klein zu halten, sollte die SNB in ihrem Anlageportfolio der Struktur der gesamten Haushaltsvermögen folgen. Die SNB sollte also gleich viel in Aktien investieren wie der Durchschnitt der Volkswirtschaft. Die einzige Ausnahme von dieser Anlageneutralität würden wir bei der Liquidität sehen. Falls die resultierende Liquidität für die Erfüllung der Geldpolitik zu niedrig ist, soll die SNB entsprechend einen grösseren Teil des Vermögens in dieser Form halten können. Eine Abweichung vom Prinzip der Anlageneutralität würde implizieren, dass die SNB mit genügend grossem Volumen die Marktrisikoprämien und damit die Anreize für Unternehmertum und Innovation beeinflusst. Die Geldpolitik führender Industrieländer macht dies zu einem gewissen Grad, indem sie mit Quantitative Easing ganz bewusst die Zinsen von langfristigen Anlagen senken wollen, um die Wirtschaft anzukurbeln. Will man dies jedoch verstetigen und darüber hinaus die Preisaufschläge von riskanten Anlagen gezielt beeinflussen¹⁶, handelt man sich aber neue Risiken ein.

Denn gerade auch in der Corona-Krise basierten die Preise von Aktien oder Immobilien darauf, dass ein Käufer mit der tiefen Rendite zufrieden ist, weil er anderswo mit der Anlage auch nicht mehr verdient. Der Hebel von tieferen Zinsen ist gewaltig: Sinkt bei gleichen Mieten der geforderte Kapitalisierungssatz z.B. von 4% auf 3%, nimmt der Wert eines Mehrfamilienhauses um einen Drittel zu. Und je tiefer die geforderte Verzinsung sinkt, desto stärker nimmt die Wertsteigerung zu. Das Hauptproblem ist also die Unsicherheit darüber, was denn eigentlich die «faire» Verzinsung für eine langfristige Investition dieser Art ist. Zentralbanken tragen hier mit den gesunkenen Risikoprämien zum mindesten Mitverantwortung dafür, dass ihre Geldpolitik zu einer Quelle der Unsicherheit geworden ist. Dieses Problem ist kaum lösbar, solange die Reserven so hoch sind. Wichtig ist sicher, dass man sich dieses Problems bewusst ist und es bei einer möglichen Ausweitung der Währungsreserven in die Kalkulation miteinbezieht.

Problem 2: Auswahl der Einzelanlagen in den Währungsreserven

Auch wenn der Aktienanteil im obigen Sinne richtig gewählt wird, tritt ein zweites Problem auf: In welche Anlagen soll die SNB im Detail investieren? Einzelanlegern steht es frei, bewusst z.B. in Gesundheitsprojekte oder Technologien mit weniger CO2-Verbrauch zu investieren. Die besten Lösungen setzen sich im freien

¹⁶ Die EZB tat dies in jüngerer Vergangenheit, indem sie bewusst grosse Mengen von Staatsanleihen von Ländern kaufte, deren Marktzinsen besonders hoch waren. Siehe z.B. ECB (2017).

Wettstreit der Ideen im Markt durch. Das SNB-Anlagekomitee hingegen ist genau identifizierbar und gerät darum unter politischen Druck, gewisse Branchen zu meiden oder bei der Anlageauswahl spezifische Ziele zu berücksichtigen. Je nach politischen Präferenzen kann es sich dabei um Green Finance, Diversity, Nachhaltigkeit oder aber auch strategische Industriepolitik handeln.

Wenn wir also ehrlich sind, haben wir gewissermassen bereits einen Staatsfonds, der aber von der SNB selber verwaltet wird. Bis jetzt erlegt sie sich dabei Zurückhaltung auf und investiert wie ein Indexfonds in den Gesamtmarkt. So hat die SNB denn auch namhafte Beteiligungen z.B. in Microsoft und Apple erworben, weil diese Firmen eben eine grosse Marktkapitalisierung aufweisen. Als Einzelpersonen können wir bewusst Einzelbranchen bevorzugen. Die SNB darf dies nicht, sonst wird ihr Entscheid für die ganze Volkswirtschaft zum Klumpenrisiko, weil sie kollektiv aufs falsche Pferd setzen könnte. Ganz zu schweigen vom politischen Druck der Staaten, der entstehen würde, wenn sie im Ausland in «strategischen» Industrien anlegt.

Die im Anhang aufgeführte Liste mit politischen Vorstössen zeigt die Problematik, etwa in Form der Forderung, die Klimaverträglichkeit der SNB-Anlagen zu überprüfen. Und als Beispiel für strategische Industriepolitik kursierten auch schon Ideen, ausländische Häfen zu erwerben.

Lösungsvorschläge für die aufgeworfenen Probleme

Die offene Frage ist natürlich, wie wir mit dieser Situation umgehen können. Es ist leicht gesagt, die Notenbankbilanzen müssten wieder kleiner werden. Die SNB kann ihre Politik jedoch nicht völlig unabhängig von der EZB und dem Fed betreiben, wo der Trend, wie erwähnt, in die andere Richtung geht.

Erstens sind die hohen Währungsreserven dem anhaltenden Aufwertungsdruck geschuldet. Es braucht also mehr Vertrauen, auch im Ausland zu investieren. Institutionelle Beschränkungen für Pensionskassen, einen hohen Anteil im Inland zu investieren, sollten fallen. Oftmals wird der existierende Spielraum aber ohnehin gar nicht ausgenutzt. Ein gewisser Anteil an internationalen Anlagen wären für die Anlagerendite und auch die Risikodiversifikation langfristig besser.

Zweitens muss die SNB dem politischen Druck widerstehen, in der Anlage der Währungsreserven zu fest von einer marktneutralen Strategie (also deckungsgleich zum Gesamtmarkt zu investieren) abzuweichen. Tut sie dies, würde sie mit ihrer Geldpolitik beginnen, wirtschaftspolitische Entscheide zu treffen, die eigentlich gewählten Volksvertretern vorbehalten sind. Die SNB hat bereits

gewisse Ausnahmeregelungen zur Anlage,¹⁷ diese sind aber konzeptionell nicht ganz stringent, weil sie eben von der Marktneutralität abweichen und die Frage aufwerfen, wo dann die Grenze gezogen wird. Argumentiert wird vage mit einem gesellschaftlichen Konsens.¹⁸ Entwicklungs- oder klimapolitische Ziele müssen im normalen demokratischen Prozess diskutiert und wie jede Staatsaufgabe im Sinne der Kostenwahrheit über den normalen Staatshaushalt finanziert werden. Es ist nicht nur so, dass die SNB keine demokratische Legimitation hat, hier aktiv tätig zu werden; es ist auch aus Sicht einer effizienten Wirtschafts- und Finanzpolitik nicht wünschbar. Wenn Massnahmen zur Erreichung gewisser politischer Ziele scheinbar nichts kosten (weil sie von der SNB und nicht über Steuern finanziert werden), führt das zu problematischen und kostspieligen Verzerrungen von Ausgabeentscheiden der Politik.

Weil – wie unser Titel anspricht – die Nebensache Währungsreserven zur politischen Hauptsache geworden ist, genügt drittens die Standardkommunikation der SNB nicht mehr. Sie muss der Öffentlichkeit mehr erklären, wie sie zur Höhe ihrer Währungsreserven steht und warum sie diese Gelder marktneutral anlegt. Das gehört wie oben beschrieben zum Mandat der SNB, die Geldpolitik im Gesamtinteresse des Landes zu führen. Ihre Anlagen dürfen nicht Marktpreise verzerrn oder politische Entscheide vorwegnehmen. Es fehlen nachvollziehbare ökonomische Argumente, dass die Schweiz mit einer aktiven Anlagepolitik eine angebliche strategische, ethische oder ökologische Überrendite erzielen könne. Dieser falschen Erwartungshaltung ist auch in der politischen Arena mit Nachdruck entgegenzutreten.

4.2 Gewinnausschüttung möglichst weit von der Tagespolitik entfernt halten

Wie wir in Abschnitt 3.4 gesehen haben, sind die Gewinnausschüttungen gestiegen und mit den hohen Währungsreserven sind noch höhere Ausschüttungen mittelfristig möglich. Das ist zwar positiv für die Staatsfinanzen, stellt aber eine Herausforderung für die Geldpolitik dar. Besonders gefährlich wird es dann, wenn sich hohe Ausschüttungen so verstetigen, dass eine fixe Ausschüttungserwartung im schlimmsten Fall noch für eine konkrete Aufgabe entsteht. Denn wenn die SNB am Devisenmarkt interveniert, kann sie nicht gleichzeitig auch noch die Erträge beispielsweise für die AHV im Blick haben.

17 Seit 2013 werden Anlagen von Firmen ausgeschlossen, die u.a. «Umweltschäden» verursachen. Seit Dezember 2020 wird auch die Kohlebranche ausgeschlossen. Siehe SNB (2020).

18 Die EZB begründet eine Präferenz für Anlagen in Klimaprojekte mit den ökonomischen Risiken des Klimawandels. Das ist ökonomisch stringenter, weil es zumindest im Grundsatz empirisch überprüfbar ist. Die EZB-Präsidentin Christine Lagarde schlägt kontroverseweise bereits vor, vom Prinzip der Marktneutralität abzuweichen; siehe ECB (2021).

Eine zu hohe Ausschüttungserwartung engt damit den Spielraum der SNB ein. Angenommen, sie will die Währungsreserven aus geldpolitischen Gründen in Zukunft zurückfahren, reduzieren sich auch die Erträge daraus. Eine verstetigte Ausschüttung an ein Sozialwerk sendet damit ein fatales geldpolitisches Signal, dürften doch dann die Währungsreserven womöglich gar nicht zu weit fallen, weil sonst die Ausschüttungen in Gefahr wären. Noch problematischer wäre, wenn die SNB am Schluss systematisch zur Finanzierung von Staatsschulden herangezogen würde, dann nähme die Glaubwürdigkeit der Geldpolitik grossen Schaden. Es stellen sich also zwei Fragen. Erstens, wieviel soll die SNB auszahlen und zweitens in welcher Art soll die Ausschüttung erfolgen?

Wenden wir uns zunächst der ersten Frage nach der Ausschüttungshöhe zu. Die SNB ist keine Geschäftsbank und kann nicht Konkurs gehen, wie sie selber mehrfach betont hat. Allerdings würde ein negatives Eigenkapital implizieren, dass die NBGM nur ungenügend durch Aktiven gedeckt wäre, was der Glaubwürdigkeit der Währung sicher abträglich wäre. Ohnehin ist die SNB Teil der öffentlichen Hand, weil ihre Gewinne immer Bund und Kantonen zu Gute kommen. Eine sehr hohe Ausschüttung heute führt damit zu tieferem Ausschüttungspotential morgen und geht folglich auf Kosten der kommenden Generationen. Es macht damit stabilitätspolitisch und von der Generationengerechtigkeit her Sinn, dass die Ausschüttungshöhe moderat bleibt, so dass die SNB im Verhältnis zur Bilanzgrösse genügend Eigenkapital aufweisen kann. Vom Generationsausgleich abgesehen gibt es kein ökonomisches Optimum für die genaue Höhe. Wir schlagen vor, einen nicht allzu hohen Fixbetrag (z.B. CHF 4 Mrd.) und einen ex ante festgelegten Prozentsatz des ggf. darüberhinausgehenden SNB-Gewinnes auszuzahlen. Dies gibt Bund und Kantonen eine gewisse Planungssicherheit, und macht nicht abhängig von sehr hohen Ausschüttungen, da diese variabel abhängig von den SNB-Gewinnen erfolgen.

Wie soll aber die SNB mehr auszahlen, um uns der zweiten Frage zu widmen, ohne breiten wirtschaftspolitischen Flurschaden anzurichten und ohne auf Dauer von der Politik an ein überhöhtes Ausschüttungsniveau gebunden zu werden, das geldpolitisch auf lange Frist nicht haltbar wäre? Das Problem der hohen Ausschüttungen fusst wie oben dargelegt darauf, dass gut organisierte Interessengruppen ihre Einzelforderungen leicht als gratis darstellen können. Abzulehnen sind auch einmalige Sonderausschüttungen z. B. wegen der Covid-19-Krise. Die Einmaligkeit geht im politischen Prozess rasch vergessen und kommende Sonderzahlungen z.B. wegen einer starken Wirtschaftskrise oder einer Krise der Sozialwerke wären vorprogrammiert. Damit würde die Glaubwürdigkeit von regelbasierten Ausschüttungen untergraben.

Die Ausschüttung muss daher an eine möglichst breite Gruppe gehen, die im politischen Prozess nicht instrumentalisierbar ist. Eine Möglichkeit ist, bei der heutigen Regelung zu bleiben, die Mittel ohne jede Zweckbindung in die allgemeine Bundeskasse und an die Kantone fliessen zu lassen.¹⁹ Falls dies wegen politischem Druck immer schwieriger würde, wäre eine möglicherweise noch weniger manipulierbare Version denkbar, indem man direkt an die Steuerzahler ausschüttet. Die Währungsreserven sind ja aufgrund der Bemühungen entstanden, den Franken nicht zu stark aufwerten zu lassen. Netto hat also die SNB - statt Privatunternehmen oder Einzelpersonen - einen wesentlichen Teil des Schweizer Leistungsbilanzüberschusses im Ausland investiert. Die SNB ist ein Teil der öffentlichen Hand. Das Ausschüttungspotential der SNB reduziert die Steuerlast, weil Staatsausgaben auch teilweise über SNB-Ausschüttungen finanziert werden. Eine Ausschüttung direkt an die steuerzahlenden Haushalte und Firmen wäre darum verteilungsneutral; das ist die breitest mögliche Gruppe und man verhindert so, dass Partikularinteressen bedient werden. Ein Mehrausschüttung könnte folgendermassen ausgestaltet werden: Auf den Mehrwertsteuern oder einfacher auf den Einkommens- und Gewinnsteuern wird ex post aufgrund der Ausschüttung ein Steuerrabatt gewährt, der aus Konjunkturgründen über mehrere Jahre verteilt sein sollte. Dank dem Steuerrabatt würden die Erträge aus dem SNB-Vermögen so teilweise direkt in die Privatwirtschaft zurückfliessen. Alternativ oder in Kombination ist auch eine Prokopfausschüttung an alle Einwohner denkbar, womit die Auszahlungen möglichst weit von konkreten (wirtschafts-) politischen Anliegen zu liegen kämen. Diese wäre im Vergleich zur jetzigen Ausschüttung an Bund und Kantone egalärer, was den Spielraum für Senkungen der Steuerprogression und damit Abbau von Verzerrungen ermöglichen würde. Das Wirtschaftswachstum dank der verminderten Steuerlast oder -progression dürfte eine Rückführung der angewachsenen Staatsschuld erleichtern, allerdings ohne toxische Nebenwirkungen für eine verlässliche Wirtschaftspolitik und ohne die Glaubwürdigkeit der Geldpolitik in Frage zu stellen.

Zusammengefasst: Die hohen Reserven und die jüngsten Sonderausschüttungen der SNB haben schon jetzt den Effekt, dass kurzzeitig politische Wünsche aller Art quasi gratis finanziert scheinen. Welche Bereiche besonders förderungswürdig erscheinen, wechseln aber selbstredend im Verlaufe der Zeit. Erhöhen sich nun die Ausschüttungen der SNB, liegt es für die Politik nahe, eine Zweckbindung für eine bestimmte Interessengruppe zu fordern, weil dies im jährlichen Budgetprozess weniger angreifbar sind und man das Geld ja scheinbar niemand anderem wegnehmen muss. Dies führt aber nur zu weiteren Begehrlichkeiten und letztlich dazu, dass schlechte Ideen im politischen Prozess weniger aussortiert

¹⁹ Dies hätte auch den stabilisierungspolitischen Vorteil, dass die SNB für die Ausschüttungen nicht indirekt prozyklische Konjunkturpolitik betreibt. Zumindest im Falle des Bundes gilt die Schuldenbremse, so dass höhere SNB-Ausschüttungen nicht in der Hochkonjunktur zu tiefen Steuern oder höheren Staatsausgaben führen.

werden. Ein solcher Teufelskreis eines politischen «Rent-Seeking» kann nicht im Interesse der Schweiz sein.

5 Schlussfolgerungen

Der massive Anstieg der Währungsreserven im vergangenen Jahrzehnt hat die Anlage- und Ausschüttungspolitik der SNB zunehmend in den Fokus politischen und medialen Interesses gerückt. An sich eine Nebensache der Geldpolitik, ist das wegen geldpolitisch motivierter Aktionen inzwischen enorm angewachsene Vermögen der SNB zunehmend ins Schaufenster gerückt. Das stellt die SNB insbesondere in ihrer Kommunikation zunehmend vor Herausforderungen.

Vor dem Hintergrund des Ziels einer möglichst wohlfahrtssteigernden Wirtschaftspolitik bereitet die mit dieser Entwicklung einhergehende zunehmende Politisierung der Geldpolitik Sorgen. Die SNB kann ihre wichtigen Beiträge zu stabilen und effizienten wirtschaftspolitischen Rahmenbedingungen nur effektiv leisten, wenn sie sich mit ihrem beschränkten Instrumentarium auf das durch die Verfassung vorgegebene Ziel der Preisstabilität unter Berücksichtigung einer ausgeglichenen konjunkturellen Entwicklung konzentrieren kann. Verlangt die Politik von der SNB noch zusätzliche Ziele zu verfolgen, so beeinträchtigt das ihre Effektivität in ihren Kernaufgaben. Vor diesem Hintergrund sollte alles unternommen werden, damit die enorm gewachsenen Devisenreserven nicht zu einer teuren Unterminierung der politischen Unabhängigkeit der SNB führen.

Am einfachsten wäre natürlich eine Rückführung der Devisenbestände auf ein wesentlich tieferes Niveau; das ist aber aus geldpolitischen Gründen in naher Zukunft kaum realistisch. Es gilt also auf absehbare Zukunft Wege zu finden, wie man das weiterhin massiv hohe SNB-Vermögen möglichst weitgehend vor übermässiger politischer Einflussnahme schützen kann. Auf Basis unserer Überlegungen sehen wir hier drei Ansatzpunkte, zwei zu den Ausschüttungen und einen zur Anlagepolitik:

- Beharren auf einer Gewinnausschüttung strikt ohne Zweckbindung
- Klare Regeln für Erhöhungen der Gewinnausschüttungen
- Stringente Begründung der Anlagepolitik

Erstens sollte strikt daran festgehalten werden, die Gewinne der SNB nicht mit irgendwelchen konkreten staatlichen Ausgaben zu verknüpfen. Sie sollten wie bisher in die allgemeinen Bundes- und Kantonskassen gehen. Will man hier

etwas anpassen, um die Ausschüttungen noch stärker von politischen Entscheiden entfernt zu halten, dann könnte man die Gewinne auch direkt an die Steuerzahler verteilen, in Form von Steuerrabatten, was im Vergleich zum jetzigen System verteilungsneutral wäre. Egalitärer wäre eine Prokopfausschüttung, was den Spielraum für Steuerreformen erhöhen würde.

Angesichts der gigantischen Vermögenswerte gilt es zweitens zu akzeptieren, dass das Gewinnpotential in absehbarer Zukunft viel höher sein wird als zuvor. Der bisher vereinbarte jährliche Ausschüttungsbetrag von CHF 2 Milliarden ist kaum mehr politisch akzeptiert. Idealerweise würde man einen ex ante festgelegten Prozentsatz des SNB-Gewinnes auszahlen. Da dies Bund und Kantonen möglicherweise zu wenig Planungssicherheit gibt, ist eine Kombination sinnvoll: Jedes Jahr wird fix mindestens ein zuvor festgelegter Betrag (z.B. CHF 4 Milliarden)²⁰ ausbezahlt und dazu kommt ein ebenfalls ex ante festgelegter Prozentsatz des darüber hinaus gehenden Gewinnes des entsprechenden Jahres. Die jüngst vereinbarte Gewinnausschüttungsregel (SNB, 2021) für die Jahre 2020-2025 ist von der Philosophie her nahe der hier angedachten Version.²¹

Drittens sollte angesichts des grossen Vermögens die SNB klarer als bisher erläutern, nach welchen Kriterien sie ihre Anlagen tätigt. Dabei gilt es proaktiv zu betonen, dass es aus den in diesem Beitrag erläuterten Gründen im Interesse der Bevölkerung und darum volkswirtschaftlich angezeigt ist, das Vermögen möglichst deckungsgleich zum Gesamtmarkt anzulegen; damit nimmt die SNB ihre Rolle als sozusagen treuhänderischer Verwahrer eines substantiellen Teils des Volksvermögens ein, das als unbeabsichtigter Nebeneffekt bei der Verfolgung ihrer geldpolitischen Ziele entstanden ist.

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20 Dies fixe Komponente müsste natürlich angepasst werden, wenn sich die Länge der SNB-Bilanz signifikant verändert; das sollte aber kaum allzu oft der Fall sein, so dass eine gewisse Planungssicherheit bleibt.

21 Konkret vorgesehen ist hier eine fixe Komponente von CHF 2 Mrd. Ausschüttung (sofern ein Bilanzgewinn von mindestens CHF 2 Mrd. ausgewiesen wird) und dazu kommen vier mögliche Zusatzausschüttungen von maximal CHF 4 Mrd., abhängig von der Höhe des Gewinnes; für das Jahr 2020 wird der Maximalbetrag von CHF 6 Mrd. ausgeschüttet.

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Anhang: SNB-relevante parlamentarische Vorstösse seit 2014

Die Tabelle nennt alle parlamentarischen Vorstösse seit 2014, die sich im weiteren Sinne mit der SNB beschäftigen und gibt einige Informationen dazu. Die Einteilung nach Themengebiet (letzte Spalte) zeigt die überragende politische Bedeutung der beiden Themen Ausschüttung und Anlagepolitik, die im Fokus dieses Beitrags stehen.

Name	Eingereicht am	Stand	Art	Kurzbeschrieb	Eingereicht von	Themengebiet
SNB investiert in nukleare Energie trotz klarer Willensäusserung der Schweizer Bevölkerung. Warum?	20.09.21	Erledigt	Fragestunde	Fragen zu Anlagestrategie in Hinsicht zu Kohle und nuklearer Energie	Munz, Martina	Anlagepolitik
Transparenz im Wahlverfahren für den Bankrat der SNB	16.06.2021	Erledigt	Interpellation	Fragen zur Transparenz des Wahlverfahrens des SNB-Bankrats	Regazzi, Fabio	Wahlverfahren
Zusatzausschüttungen der SNB dem Amortisationskonto gutgeschreiben	18.05.2021	Erledigt	Motion	Zusatzausschüttungen sollen als ausserordentliche Einnahmen dem Amortisationskonto gutgeschrieben werden	Finanzkommission SR	Ausschüttung
Anwendung der neuen NGFS-Empfehlungen durch die SNB und die FINMA	18.03.2021	Erledigt	Interpellation	Fragen zur Zusammenarbeit der SNB und FINMA mit dem «Network for Greening the Financial System» (NGFS)	Widmer, Céline	Anlagepolitik
Neue Reservenbildung der SNB gefährdet Gewinnausschüttung an Bund und Kantone.	18.03.2021	Erledigt	Interpellation	Fragen zur Gefährdung der Gewinnausschüttung aufgrund der aktuellen Zuteilungsregel	Widmer, Céline	Ausschüttung
Sorgfaltspflicht und «Marktneutralität» der SNB bei der Berücksichtigung von Klimarisiken im Anlageportfolio	18.03.2021	Im Rat noch nicht behandelt	Interpellation	Frage zur Berücksichtigung von Klimarisiken im Anleihenportfolio	Badran, Jacqueline	Anlagepolitik
Berücksichtigung von Umweltrisiken durch SNB und FINMA in internationalen Gremien	09.12.2020	Erledigt	Fragestunde	SNB und FINMA sollen sich in internationalen Gremien proaktiv für die Berücksichtigung von Umweltrisiken einsetzen	Pult, Jon	Anlagepolitik
Negativzinsen der Schweizerischen Nationalbank bei Schweizer Sparen und Sozialwerken aufheben	02.12.2020	Erledigt	Fragestunde	Keine Negativzinsen für Sparer, AHV und BVG	Schläpfer, Therese	Negativzins
Umweltbezogene Anlagerichtlinien der SNB, Diamondback Energy und Klimakrise	30.10.2020	Im Rat noch nicht behandelt	Interpellation	Anlage der SNB in umweltschädigende Firmen vereinbar mit Anlage-Richtlinien?	Badran, Jacqueline	Anlagepolitik

Name	Eingereicht am	Stand	Art	Kurzbeschrieb	Eingereicht von	Themengebiet
Marktneutralität der Aktienanlagen der SNB und Klimarisiken	30.10.2020	Im Rat noch nicht behandelt	Interpellation	Fragen zu Anlagestrategie in Hinsicht zu Marktneutralität und Klimarisiken	Badran, Jacqueline	Anlagepolitik
Erträge aus Negativzinsen der Schweizerischen Nationalbank gehen an die Altersvorsorge	19.09.2020	Erledigt	Parlamentarische Initiative	Artikel 99 Absatz 4 der Bundesverfassung, der die Verwendung des Reingewinns der Schweizerischen Nationalbank (SNB) regelt, ist so zu ändern, dass die Erträge aus Negativzinsen gesondert erfasst werden, nicht dem Reingewinn zugeschlagen werden und stattdessen voll der eidgenössischen Altersvorsorge zukommen.	Reimann, Maximilian	Ausschüttung
Kleinsparer vor Negativzinsen schützen	12.09.2020	Erledigt	Interpellation	Wird der Bundesrat Massnahmen ergreifen sobald Negativzinsen an Kleinsparer weitergegeben werden?	Müller, Leo	Negativzins
Gewinne aus den Direktinvestitionen der SNB zurück an die Schweizer Bevölkerung	20.08.2020	Vorprüfung – Behandelt vom Ständerat	Standesinitiative	Erträge aus Negativzinsen an Klimafonds	Kanton Jura	Ausschüttung
Demokratisch nicht kontrolliertes Unterstützungsangebot der SNB für multinationale Unternehmen. Weiss der Bundesrat davon, und akzeptiert er die damit verbundenen Risiken?	19.06.2020	Erledigt	Interpellation	Anlagepolitik der SNB bei Kauf von Anleihen/ Aktien multinationaler Unternehmen: Risiko für SNB und welche Unternehmen sind dies?	Bendahan, Samuel	Anlagepolitik
Schulden ärmerer Länder bei Schweizer Gläubigern. Beträge und Perspektiven	19.06.2020	Im Rat noch nicht behandelt	Interpellation	Ist (unter anderem) die SNB Gläubiger von ärmeren Staaten und könnten diese Staatsschulden erlassen werden?	Prezioso Batou, Stefania	Anlagepolitik
Welche Gewinne der Nationalbank sind eigentlich "verfügbar"?	18.06.2020	Erledigt	Interpellation	7 Fragen zu Inflationsrisiken, Ausschüttungshöhe, Zweckbindung, etc)	Bischof, Pirmin	Ausschüttung
Obere Grenze für den Erwerb von Aktiven durch die Nationalbank?	18.06.2020	Erledigt	Interpellation	Verschiedene Fragen zur Anlagepolitik und Risiken, sowie die Frage, ob man der SNB nicht erlauben kann, an öffentliche Körperschaften und Haushalten Notenbankgeld schuldenfrei zu verteilen.	Brélaz, Daniel	Anlagepolitik

Name	Eingereicht am	Stand	Art	Kurzbeschrieb	Eingereicht von	Themengebiet
Gewinne aus den Negativzinsen in der beruflichen Vorsorge gehören den Versicherten	17.06.2020	Im Rat noch nicht behandelt	Motion	Jährlich 500 Millionen Schweizer Franken aus der Gewinnausschüttung der SNB an den Bund dem Sicherheitsfonds BVG zuzuführen.	Müller, Damian	Ausschüttung
Ist die Schweizerische Nationalbank an das Pariser Klimaabkommen gebunden?	17.06.2020	Im Rat noch nicht behandelt	Interpellation	Fragen im Zusammenhang von Anlagepolitik und Einhaltung des Klimaabkommens	Fischer, Roland	Anlagepolitik
Anlageentscheide der SNB müssen in der Schweiz getroffen werden	15.06.2020	Im Rat noch nicht behandelt	Motion	Einsetzung von Ehtikkommission, welche Anlagen nach ethischen Kriterien ausschliessen kann und das Stimmrecht von Aktien der SNB ausüben kann	Hurni, Baptiste	Anlagepolitik
Unterstützung von Grossunternehmen mit Sitz in der Schweiz durch die Schweizerische Nationalbank	10.06.2020	Erledigt	Fragestunde	Gezielter Ankauf der SNB von Anleihen von Schweizer Unternehmen um Liquidität zu gewährleisten.	Bendahan, Samuel	Anlagepolitik
Muss die Schweizerische Nationalbank mit dem Geld unseres Landes das Kiffen unterstützen?	09.06.2020	Erledigt	Fragestunde	Beteiligung von SNB an Unternehmen, die auf Cannabis spezialisiert sind, vereinbar mit Gesetz?	Addor, Jean-Luc	Anlagepolitik
Gewinne der Schweizerischen Nationalbank aus den Straf- respektive Negativzinsen der AHV zuweisen	11.05.2020	Im Rat noch nicht behandelt	Parlamentarische Initiative	Die Erträge der Schweizerischen Nationalbank aus Negativzinsen sind gesondert zu erfassen, nicht dem Reingewinn zuzuschlagen und stattdessen ausschliesslich und volumnfänglich der AHV zuzuweisen.	Kommision für Wirtschaft und Abgaben NR	Ausschüttung
Ausschüttungsreserven und Eigenkapital der SNB	06.05.2020	Erledigt	Interpellation	Frage zum Zusammenhang von Eigenkapital und Höhe der Ausschüttungen	Brélaz, Daniel	Ausschüttung
Covid-19. Wer übernimmt die Kosten der gesundheitlichen, sozialen und wirtschaftlichen Krise, die die Pandemie verursacht hat?	06.05.2020	Im Rat noch nicht behandelt	Interpellation	Ist es denkbar, einen Teil der Gewinne der Schweizerischen Nationalbank zur Deckung des Defizits zu verwenden?	Prezioso Batou, Stefania	Ausschüttung

Name	Eingereicht am	Stand	Art	Kurzbeschrieb	Eingereicht von	Themengebiet
Wege, die die SNB in der Covid-19-Krise beschreiten könnte	06.05.2020	Im Rat noch nicht behandelt	Postulat	Der Bundesrat wird beauftragt, in Zusammenarbeit mit der Schweizerischen Nationalbank (SNB) und den Kantonen zu prüfen, welche Möglichkeiten die SNB hat, mit einer ausserordentlichen Finanzintervention zur Bewältigung der Covid-19-Krise beizutragen.	Grüne Fraktion	Ausschüttung
Errichtung eines souveränen Staatsfonds zur Stabilisierung und Stärkung der Wirtschaft	06.05.2020	Im Rat noch nicht behandelt	Motion	Vom Bundeshaushalt unabhängiger gemeinwohl- und ertragsorientierter Fonds mit Zugang zu SNB-Krediten	Rieder, Beat	Staatsfonds
Buchführung der SNB	05.05.2020	Im Rat noch nicht behandelt	Interpellation	Frage zur Verwendung der Reserve der Gewinnausschüttungen für Ausgleich von Währungsschwankungen	Andrey, Gerhard	Ausschüttung
Welche Funktion haben die Ausschüttungsreserven in der Bilanz der SNB?	04.05.2020	Im Rat noch nicht behandelt	Motion	Änderung der Bezeichnung "Ausschüttungsreserve" oder daraus Reserve machen, die vollständig an Bund und Kantone bezahlt wird	Feller, Olivier	Ausschüttung
Gewinnausschüttungen der SNB an den Bund. Der für das Geschäftsjahr 2019 zusätzlich ausgeschüttete Betrag soll zur Bewältigung der Corona-Krise eingesetzt werden	12.03.2020	Erledigt	Interpellation	Ausschüttungen der SNB 2019 an den Bund sollen vollauf zur Deckung der Kosten, die das Coronavirus verursacht, eingesetzt werden.	Feller, Olivier	Ausschüttung
Welche Investitionen tätigt die SNB genau?	12.03.2020	Im Rat noch nicht behandelt	Interpellation	Frage nach Arten von Anlagen in der Bilanz der SNB und mehr Transparenz	Hurni, Baptiste	Anlagepolitik
Nachhaltigkeitsziele für die Schweizerische Nationalbank	24.02.2020	Angenommen	Postulat	Der Bundesrat wird beauftragt, einen Bericht zu verfassen und aufzuzeigen, wie die Nationalbank den Bund bei der Erreichung seiner Nachhaltigkeitsziele unterstützen kann, und welche proaktive Rolle sie in der Koordination von Klimamassnahmen im Finanzsektor einnehmen kann.	Kommision für Wirtschaft und Abgaben NR	Anlagepolitik
Stand und Risiken klimaschädlicher Anlagen im SNB-Portfolio	20.12.2019	Im Rat noch nicht behandelt	Interpellation	Fragen zur Anlagepolitik und CO2-Emissionen von Unternehmen in den Büchern der SNB	Widmer, Céline	Anlagepolitik

Name	Eingereicht am	Stand	Art	Kurzbeschrieb	Eingereicht von	Themengebiet
Schweizerische Nationalbank. Mehr Gewinn an den Bund und die Kantone ausschütten	24.09.2019	Erledigt	Interpellation	Frage, warum nicht der Anteil der Ausschüttungen am Gewinn sinkt und ob eine Anpassung angestrebt wird	Quadri, Lorenzo	Ausschüttung
Finanzierung von Massnahmen zur (Wieder-)Eingliederung von über 50-Jährigen und von jungen Leuten in den Arbeitsmarkt	22.03.2019	Erledigt	Parlamentarische Initiative	Zweckbindung eines Teils der Ausschüttung für Weiterbildung und Eingliederung von Ü50-Arbeitslosen	Somma-ruga Carlo/Rey-nard, Mathias	Ausschüttung
SNB. Gewinnverteilung an die Realität der Zahlen anpassen	20.03.2019	Erledigt	Postulat	Höhere Ausschüttungen der SNB an Bund und Kantone aufgrund der hohen Gewinne	Addor, Jean-Luc	Ausschüttung
Betreibt die Schweizerische Nationalbank eine klimafreundliche Anlagepolitik?	11.03.2019	Erledigt	Fragestunde	Ist die SNB an Ölkonzernen, Kohlekraftwerken etc. beteiligt und falls ja, wie ist dies mit der Anlagepolitik der SNB keine gravierenden Umweltschäden zu verursachen vereinbar?	Chevalley, Isabelle	Anlagepolitik
Negativzinsen der SNB in die AHV	14.12.2018	Erledigt	Motion	Der Bundesrat wird beauftragt, die Grundlagen der Gewinnverteilung zwischen Bund und Kantonen und der SNB so zu ändern, dass die von der Nationalbank erhobenen Negativzinsen volumnfänglich, zulasten des Bundesanteils am SNB-Gewinn, in die AHV fließen.	Heer, Alfred	Ausschüttung
Könnte oder sollte die SNB die klimabedingten Risiken nicht mit einbeziehen?	14.12.2018	Erledigt	Interpellation	Fragen zur Anlagepolitik in Bezug auf klimabedingte Risiken	Thorens Goumaz, Adèle	Anlagepolitik
Wie beurteilt der Bundesrat die volkswirtschaftlichen Konsequenzen der SNB-Billiggoldpolitik?	06.12.2018	Erledigt	Interpellation	Fragen zur Ausweitung der Bilanz und unter anderem die dazugehörigen Risiken und die Folgen der Eingriffe der SNB in die Marktwirtschaft beim Kauf von Aktienportfolios	Reimann, Lukas	Anlagepolitik
AHV-Finanzierung durch die Schweizerische Nationalbank	26.11.2018	Erledigt	Parlamentarische Initiative	Es sind die notwendigen gesetzlichen Grundlagen zu schaffen, damit die Hälfte des Eigenkapitalzuwachses der Schweizerischen Nationalbank (SNB) seit dem 31. Dezember 2007 einmal der AHV überwiesen wird.	Matter, Thomas	Ausschüttung

Name	Eingereicht am	Stand	Art	Kurzbeschrieb	Eingereicht von	Themengebiet
Die SNB soll Mitverantwortung für den Klimaschutz übernehmen und für die diesbezügliche Finanzmarktstabilität sorgen	27.09.2018	Erledigt	Motion	Der Bundesrat ist aufgefordert, die gesetzlichen Grundlagen so anzupassen, dass die Schweizerische Nationalbank (SNB) eine Finanzsystem-Stabilitätspolitik und Anlagepolitik verfolgt, die kohärent ist mit den Zielen des Pariser Klimaschutz-Abkommens.	Badran, Jacqueline	Klima
Treuhänderische Pflicht der Nationalbank	15.06.2018	Erledigt	Interpellation	Frage, ob die SNB ihren treuhänderischen Pflichten nachkommt, wenn Klimarisiken bei Investitionsentscheiden nicht genügend beachtet würden?	Jans, Beat	Anlagepolitik
Der Bundesrat wird beauftragt zu prüfen, welche Voraussetzungen gegeben sein müssen, damit die Schweizerische Nationalbank Konten für Privatkundinnen und -kunden führen kann.	14.06.2018	Erledigt	Postulat	Der Bundesrat wird beauftragt zu prüfen, welche Voraussetzungen gegeben sein müssen, damit die Schweizerische Nationalbank Konten für Privatkundinnen und -kunden führen kann.	Leuteneg-ger-Ober-holzer, Susanne	Privatkonten
Ist die Verteilung des Gewinns der Schweizerischen Nationalbank verfassungskonform?	16.03.2018	Erledigt	Interpellation	Frage, ob Verteilung des Gewinns der SNB verfassungskonform sei (Knackpunkt Währungsreserven).	Addor, Jean-Luc	Ausschüttung
Negativzins-Milliarden der SNB sind Volksvermögen	08.03.2018	Erledigt	Interpellation	Rückzahlung der Gewinne an Bevölkerung/AHV	Keller, Peter	Ausschüttung
Schluss mit der Stop-and-go-Politik in der Finanzplanung. Neuer Finanzierungsmodus für die ETH	29.09.2017	Erledigt	Interpellation	Unter anderem die Frage, ob die ETH auch mit den Gewinnen der SNB finanziert werden könnte	Fathi, Derder	Ausschüttung
Für eine gerechte Verwendung der überflüssigen Reserven der SNB	28.09.2017	Erledigt	Interpellation	Fragen zur Höhe von SNB Reserven und ob diese nicht ausgeschüttet werden müssten.	Sommaru-ga Carlo	Ausschüttung
Verwendung des Bundesanteils am Bilanzgewinn der Nationalbank für die zusätzliche Finanzierung des BFI-Bereichs	27.09.2017	Erledigt	Motion	Der Bundesrat wird beauftragt, den Teil des Bilanzgewinns der Nationalbank zusätzlich zu den separat mit der BFI-Botschaft zu beschliessenden Mitteln vollumfänglich dem BFI-Bereich zukommen zu lassen.	Eymann, Christoph	Ausschüttung
Schweizer Staatsfonds aus den Reserven der Nationalbank	16.06.2017	Erledigt	Motion	Gründung eines von der SNB unabhängigen Staatsfonds aus den Reserven der SNB.	Leuteneg-ger-Ober-holzer, Susanne	Ausschüttung

Name	Eingereicht am	Stand	Art	Kurzbeschrieb	Eingereicht von	Themengebiet
Verfassungsgemässes Geschäft der SNB im Zeichen der Nachhaltigkeit	15.06.2017	Erledigt	Parlamentarische Initiative	Anlagepolitik der SNB soll nachhaltiger werden.	Thorens Goumaz, Adèle	Anlagepolitik
Ist die Anlagepolitik der SNB mit dem Pariser Klimaabkommen vereinbar?	27.02.2017	Erledigt	Interpellation	Anlagepolitik der SNB und Nachhaltigkeitsziele	Thorens Goumaz, Adèle	Anlagepolitik
Produktionsfonds	16.03.2016	Erledigt	Motion	Schaffung eines Fonds für Innovationen und ökologischem Umbau. Die Einlagen werden von der SNB garantiert.	Pardini, Corrado	Ausschüttung
Die Nationalbank investiert weiterhin in Rüstungsfirmen, die Landminen und Streumunition herstellen	15.12.2015	Erledigt	Interpellation	Anlagepolitik: Investitionen in Rüstungsfirmen	Streiff-Feller, Marianne	Anlagepolitik
Prüfung eines Staatsfonds	17.06.2015	Erledigt	Postulat	Staatsfonds unter der Hoheit des Bundes (evtl. Kantone) aus den Währungsreserven der SNB	Fraktion BD	Ausschüttung
Gewinne der Schweizerischen Nationalbank. Verwendung und Auswirkung	18.03.2015	Erledigt	Postulat	Der Bundesrat wird beauftragt, Bericht zu erstatten, für welche Zwecke in den vergangenen 10 Jahren ausbezahlt Gewinne der Schweizerischen Nationalbank (SNB) bei den Empfängern (Bund und Kantone) verwendet wurden, und zu prüfen, ob Massnahmen zu treffen sind, um deren Verwendung zu steuern.	Hadorn, Philipp	Ausschüttung
Negativzinsen für Vorsorgeeinrichtungen	18.03.2015	Erledigt	Interpellation	Folgen von Negativzinsen auf Vorsorgeeinrichtungen und Massnahmen zu deren Eindämmung.	Maire, Jacques-André	Negativzinsen
Negativzinsen für Sozialversicherungen vermeiden. Keine Ungleichbehandlung bei den Kantonen	18.03.2015	Erledigt	Motion	Vorlage unterbreiten, die erlaubt Vorsorgeeinrichtungen und obligatorische Versicherungen von Negativzinsen für ihre betriebsnotwendigen Liquiditätsbestände auszunehmen.	Kuprecht, Alex	Negativzinsen
Negativzinsen und Einrichtungen der beruflichen Vorsorge	17.03.2015	Erledigt	Interpellation	Folgen der Negativzinsen auf Vorsorge und folgen der Ausnahme von bestimmten öffentlichen Körperschaften von Negativzinsen	Berberat, Didier	Negativzinsen
Wirkung und Folgen der Negativzinsen der Schweizerischen Nationalbank	12.03.2015	Erledigt	Interpellation	Folgen Negativzinsen und Sozialversicherungen und allenfalls Aufhebung der Negativzinsen auf ebendiese.	Gutzwiler, Felix	Negativzinsen

Name	Eingereicht am	Stand	Art	Kurzbeschrieb	Eingereicht von	Themengebiet
Keine Negativzinsen auf Volksvermögen	11.03.2015	Erledigt	Motion	Der Bundesrat wird beauftragt, zusammen mit der SNB eine Lösung vorzuschlagen, damit die SNB Gelder der institutionellen Anleger (2. Säule) bzw. der Sozialwerke (AHV-Ausgleichsfonds, Säule 3a usw.) ohne Negativzins entgegennimmt und bis zum Abruf zur Verfügung der institutionellen Anleger bzw. Sozialwerke hält.	CVP-Fraktion	Negativzinsen
Negativzins trifft Pensionskassen hart. Warum ist die Publica nicht betroffen?	11.03.2015	Erledigt	Interpellation	Folgen Negativzinsen Vorsorge und warum einzig Publica nicht betroffen?	Stolz, Daniel	Negativzinsen
Negativzinsen. Folgen für Pensionskassen, Kleinsparer und Kantone	11.03.2015	Abgeschrieben	Postulat	Folgen der Negativzinsen und Frage, ob Vorsorge/ Sozialwerke davon ausgenommen werden könnten	Bischof, Pirmin	Negativzinsen
Freigabe des Mindestkurses. Wirtschaftliche und soziale Fragen	04.03.2015	Erledigt	Interpellation	Vielzahl an Fragen zur Aufhebung des Mindestkurses. Darunter Fragen zur Verwendung der Gewinne für ALV	Sozialdem. Fraktion	Ausschüttung
Frankenstein. Stärkung der Schweizer Wirtschaft und Sicherung der Sozialwerke	04.03.2015	Erledigt	Dringliche Interpellation	Neben vielen anderen Fragen: Negativzinsen für Vorsorge/Sozialwerke aufheben?	CVP-Fraktion	Negativzinsen
Ausländische Devisen der SNB	11.12.2014	Erledigt	Anfrage	Anfrage nach genauer Aufteilung der Devisen nach Regionen Arten von Anlagen.	Freysinger, Oskar	Anlagepolitik
Gewinnausschüttungen der Schweizerischen Nationalbank. Schuldenabbau statt Mehrausgaben	19.03.2014	Erledigt	Motion	Der Bundesrat wird beauftragt, Massnahmen zu ergreifen, damit künftige Gewinnausschüttungen der Schweizerischen Nationalbank (SNB) an den Bund nicht in der ordentlichen Rechnung budgetiert, sondern für den Schuldenabbau verwendet werden.	FDP-Liberale Fraktion	Ausschüttung

Name	Eingereicht am	Stand	Art	Kurzbeschrieb	Eingereicht von	Themengebiet
Anlagen der Schweizerischen Nationalbank. Schutz der Reserven und des Klimas	05.03.2014	Erledigt	Motion	Der Bundesrat wird beauftragt, die gesetzlichen Grundlagen zu schaffen bzw. dahingehend zu ändern, dass die Schweizerische Nationalbank (SNB) keine Anlagen in Konzernen tätigen darf, welche fossile Energieträger wie Erdöl, Erdgas oder Kohle fördern oder entsprechende Rohstoffreserven besitzen.	Leutenegger-Oberholzer, Susanne	Anlagepolitik

Switzerland's system of free trade agreements: Assessing the impact on imported goods

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In this paper, I estimate the aggregated ex-post effect of Switzerland's free trade agreements on the prospects for imported goods and quantify the implied consumer benefits. Applying a difference-in-difference approach to highly disaggregated import data, I find no effects on the quality and variety dimensions but a significant reduction of 8.41% in quality-adjusted prices. Using the share of imports in consumer expenditure, I calculate an average consumer price reduction of 1.43%. The price reduction implies a positive consumer gain. However, I perform a pre-trend test to validate the required parallel trend assumption and document a potential underestimation of the actual effect on consumer gains.

JEL codes: Switzerland, free trade agreements, imports

Key words: F1, F6

1 Introduction

Free trade is seen as an opportunity to mutually improve the welfare of the participating parties. Economic tenet predicts trade liberalization will positively influence imported products through channels such as reduced prices, improved quality and increased variety. Research on the potential welfare consequences of changes in specific import dimensions is limited, as most existing work focuses on the aggregated welfare gains from trade.

Free trade agreements (FTAs) are one of the main tools to reduce trade barriers. Since the 1990s, the proliferation of these agreements has led to a continuously growing network of FTAs across the world. The economic consequences of trade agreements are a central topic of research, and the evidence shows that FTAs increase bilateral trade flows between participating countries.

Switzerland is no exception to the international tendency to use FTAs as a central instrument in trade policy. During the last two decades, the country has established its own trade agreement system involving more than 30 individual FTAs. In 2018, over 80% of imported goods came from countries participating in an FTA. Consequently, the trade agreements have wide-ranging implications for Switzerland's economy.

¹ This paper is based on my Master's thesis in the Department of Economics at the University of Zurich. I thank my adviser Ralph Ossa for his guidance, comments and support.

Most existing studies examining FTAs focus on either the effect of trade flows or on self-sustaining economies with substantial market power, such as the United States or the European Union. Switzerland, on the other hand, is a small open economy whose welfare and revenue depend strongly on bilateral trade. Providing evidence for the case of a trade-dependent economy is important, as there may be crucial implications for the gains from trade.

In this paper, I assess the effects of Switzerland's FTAs on import prices, while also controlling for effects on quality and changes in import variety. In order to do so, I apply the two-step method of BREINLICH ET AL. (2016) to disaggregated import data that cover the time period from 1996 to 2019. First, I extract measures for the import characteristics from the trade data. Then, I use a difference-in difference (DiD) regression model to identify the effects of Switzerland's trade agreement system on the constructed measures of interest.

In contrast to studies on other FTA systems, I do not find a significant effect of the Swiss system on either import quality or variety changes. However, I observe a persistent negative effect on quality-adjusted import prices. The price adjustment indicates a positive welfare gain, as the improved market access and the reduction of trade costs might cause exporting firms in partner countries to reduce the prices of their exports.

In the last part of the paper, I quantify the price consequences for consumers and the implied welfare gains, by further following the approach of BREINLICH ET AL. (2016) to obtain an import data set containing only final consumption goods. Combining the effects on import prices with data on consumer expenditure allows me to calibrate the influence on consumer prices. I find an average yearly consumer price reduction of 1.43%. Based on the consumer expenditure in 2017, this reduction corresponds to yearly consumer savings of CHF4.9 billion due to Switzerland's FTAs.

While the results illustrate the welfare benefits for Swiss consumers, I may underestimate the price reduction associated with the FTA system. In a pre-trend test, I find the partner countries to already be on a negative trend prior to the conclusion of the trade agreements. This test indicates a potential violation of the parallel trend assumption and points to a positive bias in the estimated price coefficient.

The remaining of this study proceeds as follows. Section 2 reviews the existing literature on the benefits of free trade. Section 3 outlines the empirical framework applied to the data described in Section 4. Section 5 reports on and discusses the baseline results. Section 6 describes the procedure to quantify the effect on

consumer prices and summarizes the corresponding estimates. Finally, Section 7 concludes.

2 The benefits of free trade

This paper relates to a wide range of literature examining the merits of free trade. Within this broad picture, it mainly contributes to two major branches of research, namely, the evaluation of the welfare gains from free trade and the quantification of the effects of FTAs.

In ARKOLAKIS ET AL. (2012), the aggregated welfare gains from trade are computed following a principle of sufficient statistics. The authors quantify the aggregated gains based on two statistics: the share of expenditure spent on domestic goods, and the elasticity of trade flows with respect to trade costs. Regardless of the underlying micro-level channels, they find relatively small gains across most countries. OSSA (2015) explores the potential of an aggregation bias of the formula used by ARKOLAKIS ET AL. (2012). Taking into account the different emphasis of imports for an economy, he documents gains from trade that are more than three times larger. In his quantification, the effects for Switzerland are especially pronounced, as a move to autarky would reduce real income by more than 50%. HEPENSTRICK (2016) looks further into the particular case of Switzerland and calibrates an adapted version of the quantitative Ricardian model. He observes a relatively low importance for Switzerland's welfare of single trade partners, due to the abundance of other similar trading partners. When he looks at groups of countries such as the European Union, however, he finds large welfare effects.

Besides the research on the aggregated view, there is a broad range of studies on different micro-level channels. The literature can be broken down into three main contributors: variety changes, reduced markups and self-selection among firms. BRODA and WEINSTEIN (2006) measure the welfare benefit from an increase in import variety for the United States. They adapt the methodology first developed by FEENSTRA (1994) to identify the variety changes based on trade data and calculate the implied changes for an import price index. They find positive consumer gains, but the estimates may underestimate the real gains. Based on more detailed, market-based data from the automobile industry, BLONIGEN and SODERBERY (2010) find even larger variety gains. Their work is an indicator of the importance of the granularity of the underlying data and how it affects the scope of variety gains. MOHLER (2011) applies BRODA and WEINSTEIN's (2006) framework to Swiss data and finds consumer gains of a small magnitude. The main reasons stated for the dispensable effect are a low level of differentiation among Swiss imports and low growth in the set of new import varieties.

FEENSTRA and WEINSTEIN (2017) study the gains from reduced markups in the case of the United States. They assess the effect on variety and prices by changing the commonly used assumption of constant elasticity of substitution (CES) to translog preferences, which allows for non-constant markups. Their estimates suggest a pro-competitive effect of globalization, which leads to consumer welfare gains. In particular, they find that half of the welfare gains associated by BRODA and WEINSTEIN (2006) with variety gains are due to reduced markups.

The third micro-level channel is the self-selection of the most productive firms engaged in trade. TREFLER (2004) analyzes the concept of domestic productivity increases due to import competition. He examines the Canada–US FTA to measure productivity and employment effects within affected firms. The study successfully connects tariff cuts with significant efficiency and productivity adjustments, leading to strong welfare gains. In contrast, HSIEH ET AL. (2016) show that, in the case of the Canada–US FTA, domestic variety losses offset the domestic productivity increases. Further, productivity losses in foreign firms counteract the welfare gains from newly available foreign varieties. Their results suggest that Canada lost more from exiting domestic firms than it gained from foreign firms entering. Overall, however, there are still positive gains from the Canada–US FTA due to reduced import prices.

Besides the evaluation of welfare gains from trade, this paper also contributes to research exploring the economic consequences of FTAs. In particular, the effects on trade flows have been extensively reviewed and documented in recent years. BAIER and BERGSTRAND (2007) were among the first to account for the non-random conclusion of trade agreements. They introduce fixed effects to the commonly used gravity equation to account for the endogeneity problem. Their estimation suggests much more pronounced effects on trade through FTAs than predicted with previous approaches. Within a ten-year time period, the establishment of an FTA can nearly double the trade volume between the affected countries. In a follow-up study, BAIER and BERGSTRAND (2009) improve the approach with matching econometrics, and more robust estimates of the relationship between trade and FTAs are obtained. While most studies document positive ex-post effects on trade flows, in the specific case of Switzerland’s trade agreements, NUSSBAUMER (2017) finds inconclusive evidence on the influence on aggregated trade.

More recently, consequences other than the effect on trade flows, such as the impact on welfare, have started to become the focus of research on trade agreements. The above-mentioned studies by TREFLER (2004) and HSIEH ET AL. (2016), who investigate the gains from the Canada–US FTA, are common examples. ANDERSON and YOTOV (2016) examine the global terms of trade effects of FTAs implemented

in the 1990s using a gravity equation approach and panel data on manufacturing goods. They find both winners and losers, but an overall increase in efficiency in manufacturing trade of 0.9%. BUSTOS (2011) analyzes the MERCOSUR regional FTA and the effect on technology upgrading by Argentinian firms. She documents that firms facing higher tax reductions increase their investments and the rate of quality upgrading. BADINGER (2008) provides reduced-form evidence of the welfare effects of FTAs. He proposes an instrument based on the probability of entering an FTA due to the geographical characteristics of the involved countries. The estimates indicate sizable effects of FTAs on per-capita income for a large sample of countries. IACOVONE and JAVORCIK (2010) examine the North American Free Trade Agreement (NAFTA) and its relationship with the export quality of Mexican plants. They use a unique data set, incorporating both exports and domestic sales, to show that Mexican plants increased product quality in response to the improved access to US markets.

Finally, BREINLICH ET AL. (2016) examine the influence of the trade agreements concluded by the European Union on various import measures and their welfare consequences. They characterize the effect for both the United Kingdom and the European Union, and find a large influence on welfare through the import quality and price channels. The range of the effects varies depending on the specification and data sample, but in their baseline estimation they find quality increases of 23% for the United Kingdom and 24% for the European Union. They also attribute an import price reduction of 35% for the United Kingdom and 19% for the European Union to the FTA system. BERLINGIERI ET AL. (2018) apply a similar approach, but they restrict the impact of an FTA to the five-year period after its conclusion. They find modest results ranging from 4–8% for quality and -6.4% for prices.

3 Empirical framework

The methodology I apply to quantify the impact of Switzerland's trade system on the import properties follows the two-step approach outlined in BREINLICH ET AL. (2016). Section 3.1 describes the first step, in which I construct the measures for quality, quality-adjusted prices and variety changes based on disaggregated import data. Section 3.2 explains the second step, consisting of the difference-in-difference (DiD) identification strategy.

3.1 Construction of the import measures

The construction of different import characteristics is essential to identify potential welfare gains through changes in import dimension. I focus on separating the channels of quality increases, price reductions and variety improvements. Since the quality dimension is not directly observable, I follow a commonly used technique to segregate quality and quality-adjusted prices from trade data (KHANDELWAL, 2010; KHANDELWAL ET AL., 2013; HALLAK AND SCHOTT, 2011).

Before explaining the construction of the import characteristics, the term “variety” needs to be clarified, as its use varies widely across the literature. I define a variety as the pairing of a product line and its country of origin. I treat the same product lines from different countries as separate varieties, as they are likely to be perceived differently from a consumer’s perspective. This definition allows the most precise measurement of variety changes, given the level of disaggregation of the data set.

Since I lack trade data at the firm level, I assume all firms in a country produce identical goods across the same product lines. This assumption implies a lower-end scope for the variety gains, compared to the case of a more optimal differentiation at the firm level. The measures for quality and quality-adjusted prices therefore represent the average of all firms within a country producing said product.

A standard proxy for the quality of imported goods in trade literature is unit values.² Since changes in unit values reflect fluctuations in both import price and quality, unit values are not suited to separating welfare gains implied by these channels. Instead, the unit values need to be further segregated to identify the effects of trade policy on either of the two channels.

To separate quality and prices, I start by specifying the CES import demand function of a variety:

$$x_{ojt} = (p_{ojt}/q_{ojt})^{1-\sigma_j} P_{jt}^{\sigma_j-1} E_{jt}, \quad (1)$$

where x_{ojt} is the value of a product line j , imported in year t from country of origin o . σ_j is the elasticity of substitution and is the margin of differentiation of a product line across different countries of origin.³ Further, q_{ojt} represents the level of quality and p_{ojt} is the unit value. P_{jt} is the price index of the aggregated

² A unit value is the value of a product divided by its quantity.

³ As an example, consumers are likely to perceive Italian coffee differently from German coffee. The demand elasticity of coffee will thus be low and the demand will depend less on quality or price.

varieties of a product line and E_{jt} is the consumer expenditure on the varieties of a product line.

To infer quality q_{ojt} , the natural logarithm of the demand function in Equation (1) is taken. Then, the equation can be rewritten as:

$$\ln x_{ojt} = \alpha_{jt} + (1 - \sigma_j) \ln p_{ojt} + \epsilon_{ojt}. \quad (2)$$

The notation of α_{jt} represents the aggregated price index and consumer expenditure, $\alpha_{jt} = (\sigma_j - 1) \ln P_{jt} + \ln E_{jt}$. The error term contains the desired quality level, $\epsilon_{ojt} = (\sigma_j - 1) \ln q_{ojt}$. The construction of the quality measure therefore requires the demand elasticity σ_j and the error term ϵ_{ojt} from the regression in Equation (2), as in:

$$\ln q_{ojt} = \frac{\epsilon_{ojt}}{(\sigma_j - 1)}. \quad (3)$$

Although I could estimate the regression in Equation (2) to obtain the demand elasticity, the estimated elasticity would be biased due to the two-way causality between quantity and price.

I obtain unbiased estimates of the demand elasticities by applying the approach first developed by FEENSTRA (1994) and further refined by BRODA and WEINSTEIN (2006). This methodology is the standard procedure in the trade literature for estimating demand elasticities based on trade data. It builds on the assumption that shocks to the demand and supply curves are uncorrelated at the variety level. Applying their methodology to panel data allows me to differentiate the demand and supply of a variety to a reference country and solve the endogeneity problem of the demand function. For more details on the methodology and descriptive statistics of the estimated elasticities, see Appendix A.

With the estimated elasticity of substitution $\hat{\sigma}_j$, I am able to construct the quality measure defined in Eq. (3). I obtain the predicted residuals by moving the price component to the left-hand side of Equation (2) and adding partner-fixed effects. This transformation leads to the following regression:

$$\ln x_{ojt} + (\hat{\sigma}_j - 1) \ln p_{ojt} = \alpha_{jt} + \alpha_o + \epsilon_{ojt}, \quad (4)$$

which requires the predicted demand elasticities as well as data of quantities and prices. The partner-fixed effects α_o are added to account for time-invariant characteristics. The residuals ϵ_{ojt} contain the quality levels, which I compute as in Equation (3). I can then calculate quality-adjusted prices as $\ln p_{ojt} - \ln q_{ojt}$.

After obtaining measures for quality and quality-adjusted prices, changes in import variety are the final potential channel for changes in consumer welfare without an appropriate measure. Simply looking at the change in the number of varieties would not reflect the differing importance and value of new varieties for the consumer (BREINLICH ET AL., 2016). Given this shortcoming, I prefer to use the lambda ratio first defined in FEENSTRA (1994) as an expenditure-based measure of variety changes.

The lambda ratio represents a trade-weighted measure of variety growth that reflects the importance of both new and disappearing varieties relative to total expenditure. Let I_{jt} be the total amount of varieties of a product line j in period t . Then, defining $I_j = I_{jt} \cap I_{j,t-1}$ as the set of common varieties across periods t and $t-1$, the lambda ratio can be computed as:

$$\frac{\lambda_{jt}}{\lambda_{j,t-1}} = \frac{\left(\sum_{o \in I_j} p_{ojt} x_{ojt} \right) / \left(\sum_{o \in I_{jt}} p_{ojt} x_{ojt} \right)}{\left(\sum_{o \in I_j} p_{oj,t-1} x_{oj,t-1} \right) / \left(\sum_{o \in I_{j,t-1}} p_{oj,t-1} x_{oj,t-1} \right)}. \quad (5)$$

λ_{jt} represents the importance of new varieties. Varieties that are new additions in period t are included in the total set I_{jt} but not in the intersection I_j . Therefore, expenditure on new varieties lowers λ_{jt} and the whole ratio. The same logic applies to the denominator $\lambda_{j,t-1}$ but with exiting varieties. It captures the welfare loss of the disappearing varieties between period $t-1$ and period t . Exiting varieties will lower $\lambda_{j,t-1}$ and hence increase the lambda ratio. Taking expenditure on both appearing and disappearing varieties into account, the ratio is a measure that quantifies variety changes relative to a base year.

3.2 Identification strategy

I use the constructed measures for quality, quality-adjusted prices and variety changes to identify the welfare consequences of Swiss trade agreements. I follow the identification strategy of BREINLICH ET AL. (2016), who use a DiD approach to estimate the average treatment effects. The regression model is specified as:

$$m_{ojt} = \alpha_{oj} + \alpha_t + \beta \text{FTA}_{ot} + \varepsilon_{ojt}, \quad (6)$$

where m_{oit} stands for either one of the constructed measures. α_{oj} are origin-product fixed effects and α_t are time fixed effects. FTA_{ot} is an indicator variable, which takes the value of 1 if Switzerland and the country of origin have a trade agreement in place. ε_{oij} is the error term. I estimate this regression model to obtain the treatment effect β of Switzerland's trade agreement system on the specified import dimension.

The FTA dummy captures market access effects outside of tariff reductions, which is the main advantage over tariff changes as a regressor (BERLINGIERI ET AL., 2018). Many recent trade agreements go beyond tariff reductions and tackle modern market access issues such as regulations on investments, e-commerce or intellectual property rights. Measuring the effect with a dummy variable includes the consequences of these theamics, which would otherwise be hard to measure based on import data. Using an FTA dummy, the model is therefore less likely to underestimate the welfare gains caused by new market access features.

The DiD approach compares the change in import characteristics from FTA partners to non-FTA partners. The treatment group comprises all imports that originate from an FTA partner country. The specified regression model compares these observations to the control group, which consists of imports from all other trading partners and the FTA partners before the implementation of the trade liberalization. This approach reduces concerns over omitted variable bias compared to a simple “before and after” estimation, as global trends can be eliminated.

More specifically, the regression model uses the nature of panel data to control for variables that differ across varieties but are constant over time (e.g., distance between countries) and variables which differ over time but are constant across varieties (e.g., global economic trends). As an example, increased globalization and innovations in transport are likely to reduce quality-adjusted prices across all countries over time, as the cost of transportation becomes smaller. The specified model in Equation (6) accounts for global trends with the inclusion of the time fixed effects α_t and therefore eliminates this potential positive bias.

The identification strategy also reduces concerns about two-way causality. FTAs should not be treated as an exogenous variable, as the probability of a trade agreement could be influenced by the variable of interest. For instance, looking at the quality of imports, Switzerland might prefer to conclude trade agreements with countries producing high-quality goods. In this scenario, a naive estimation approach would lead to an overestimation of the actual effect of trade agreements. The included variety fixed effects α_{oj} reduce the threat of bias by controlling for origin-product characteristics.

The DiD approach requires the treatment to be the only time-origin varying difference between the control and treatment group affecting the variables of interest. This “parallel trend assumption” implies that all systematic differences between control and treatment group can be attributed to the effect of FTAs. A potential violation of this constraint would be if agreements were more likely to be signed with countries that were expected to upgrade the quality of their exported goods in the near future. In this case, the estimation approach would result in an overestimation of the actual effect. Unfortunately, it is not possible to directly test whether the parallel trend assumption is satisfied due to the non-observability of the non-FTA counterfactual. Nevertheless, I perform a pre-trend test in Section 5.2.1, which helps to judge whether the assumption is likely to be correct.

4 Data

I apply the described methodology to highly disaggregated Swiss import data. Data on the value and quantity for each imported product are necessary to infer the defined import measures. Further, I need the implementation date of all trade agreements to construct the FTA dummy. Regarding the trade data, I use origin-specific data classified at the 6-digit level of the Harmonized System 1996 (henceforth referred to as HS1) goods classification. I choose this specific classification because there exist correspondence tables to a goods categorization system that is based on consumption baskets, which is required to quantify the effects on consumer prices.

The 6-digit level data are the most disaggregated data available and hence provide the most accurate information on the development of available varieties. The time period covered for the baseline results is 1996 to 2019. The data are from the United Nation’s COMTRADE database, accessed through the World Bank’s WITS interface. Additionally, the GDP per capita data used in a robustness check are available from the World Bank’s World Development Indicators (WORLD BANK 2019).

Switzerland is part of the European Free Trade Association (EFTA) and usually concludes FTAs within the EFTA framework. I obtain information on Switzerland’s FTAs and the years they came into effect from the State Secretariat of Economic Affairs (SECO) and the EFTA.⁴

⁴ For the details regarding the implementation dates, see SECO (2018) and EFTA (2019).

Some European countries were party to existing individual free trade agreements before they joined the European Union. These trade agreements were abandoned in favor of the bilateral agreements with the European Union upon the integration of the partner country in the Union. For these countries, the date of the first agreement was taken as the starting point of the FTA cooperation with Switzerland. As an example, Croatia and Switzerland had an FTA in place from 2001 to 2013, when Croatia joined the European Union. In this case, I code the dummy variable to reflect the FTA between 2001 and 2019. For a complete overview of all trade agreements and signature dates, see Appendix B.

In Section 6, I calibrate the effects on consumer prices, which depend on data on yearly consumer expenditure sorted by purpose. Expenditure in Swiss francs is obtained from the Federal Statistical Office (FSO, 2019) and is converted to US dollars by applying a historical series of foreign exchange rates.

5 Results: Import measures

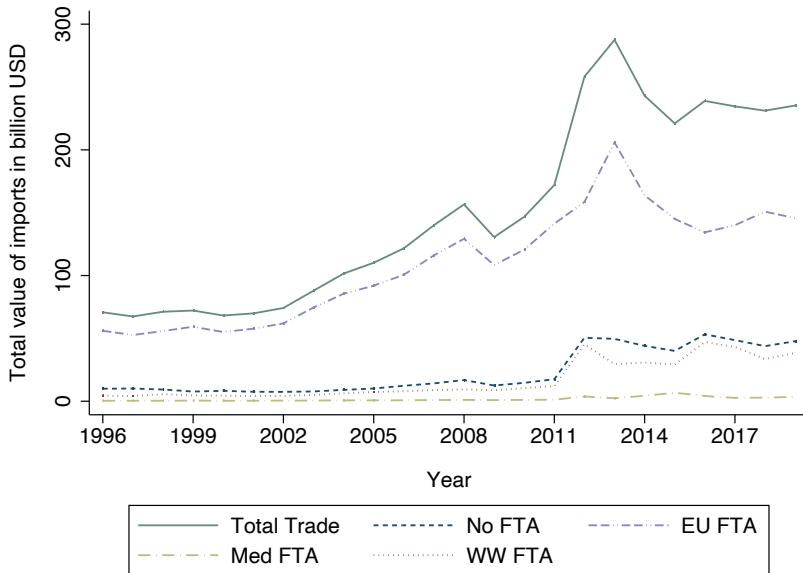
I start by presenting descriptive statistics of Switzerland's trade flows and the constructed import measures in Section 5.1. I then discuss the estimates of the baseline regression in Section 5.2. In Section 5.2.1, I perform robustness checks and examine the validity of the parallel trend assumption.

5.1 Descriptive statistics

Figure 1 plots the yearly value of goods imported by Switzerland in billions of US dollars. In addition to the aggregated trade flow, I segregate the FTAs into categories based on the trade partners' geographic location. To categorize the FTAs, I used the three groups defined by the SECO – “European”, “Mediterranean” and “World Wide” – with the latter including countries such as China, Mexico and Canada.

Most of Switzerland's trade originates in the European area, particularly Germany, which accounted for 20% of total imports in 2016. The share of trade covered by European FTAs is consistently high throughout the observation period, but in most recent years there seems to be a shift towards intercontinental trade. In the “World Wide” and “No FTA” group, the growth in the period between 2011 and 2012 is remarkable. A closer look at the data reveals that this spike is due to imports from the United Arab Emirates and the United States. Since the FTA with the United Arab Emirates was implemented in 2014, it is unlikely that this period of growth is a reaction to a trade agreement.

Figure 1: Switzerland's imports, 1996–2019 (USD billions)



The quality and price properties are difficult to visualize, as the range of the measures depends on the product line. To allow a comparison, I compute relative scores for both measures per country, using Switzerland's top 50 trade partners. Subsequently, I use the notation of quality-adjusted prices but the formulas are also applicable to the quality property. First, I take the time averages of the quality-adjusted prices per variety:

$$\bar{p}_{oj} = \frac{\sum_t^T \ln p_{oxt}}{T}. \quad (7)$$

Then, I normalize \bar{p}_{oj} to be within the range of 0 and 100:

$$\tilde{p}_{oj} = \frac{\bar{p}_{oj} - \min(\bar{p}_{oj})}{\max(\bar{p}_{oj}) - \min(\bar{p}_{oj})} \cdot 100. \quad (8)$$

Finally, I compute the price scores for each country by taking the average of the normalized quality-adjusted prices \tilde{p}_{oj} over all product lines for each country:

$$PS_o = \frac{\sum_j^{I'_o} \tilde{p}_{oj}}{I'_o}, \quad (9)$$

where I'_o is the total number of product lines exported by a country o .

Therefore, the price scores PS_o are the average price rankings of all products exported by a country, relative to the same product lines exported by other countries.⁵

Figure 2 plots the resulting price scores and GDP per capita in 2016. The figure shows a negative correlation between the relative price rankings and the GDP per capita of a country. The correlation suggests that more developed countries generally export lower-price goods, holding quality constant. The United States is the only country with no FTA in place with a score below 50. All other countries with low scores have concluded a trade agreement with Switzerland, suggesting there might be a correlation between trade agreements and lower quality-adjusted prices. Further, the exporters with the lowest rankings are mostly countries with high shares in Switzerland's total trade, namely, Germany, France, Italy, Austria and the United States. Those countries were all among Switzerland's most important trade partners in 2016 and had low price scores.

Figure 3 plots the calibrated quality scores against origin GDP per capita in 2016. Similar to the price scores, the figure indicates a correlation between GDP per capita and import quality. The countries with the highest quality scores are mainly European partners, with the exception of the United States and Japan. The top quality exporters are again countries with high shares in Switzerland's total trade. Exceptions are China and the United Arab Emirates, which had relatively low quality scores compared to their trade volumes.

⁵ For instance, if a country had a price score of 100, all its exported product lines would have the highest average quality-adjusted prices compared to the same product lines from different origins.

Figure 2: Average quality-adjusted price scores across all products and years by country plotted against GDP per capita for 2016

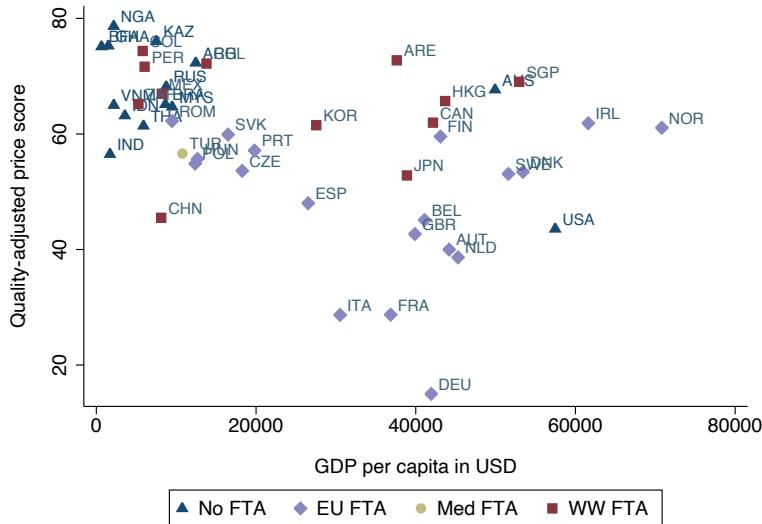


Figure 3: Average quality scores across all products and years by country plotted against GDP per capita in 2016.

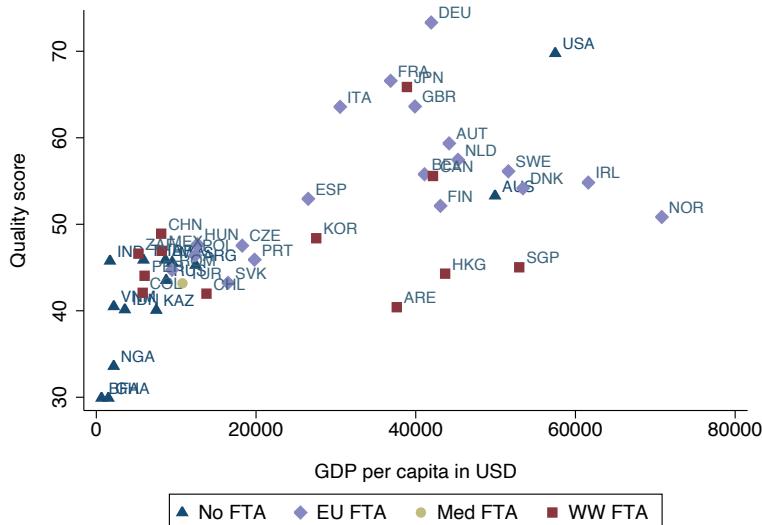
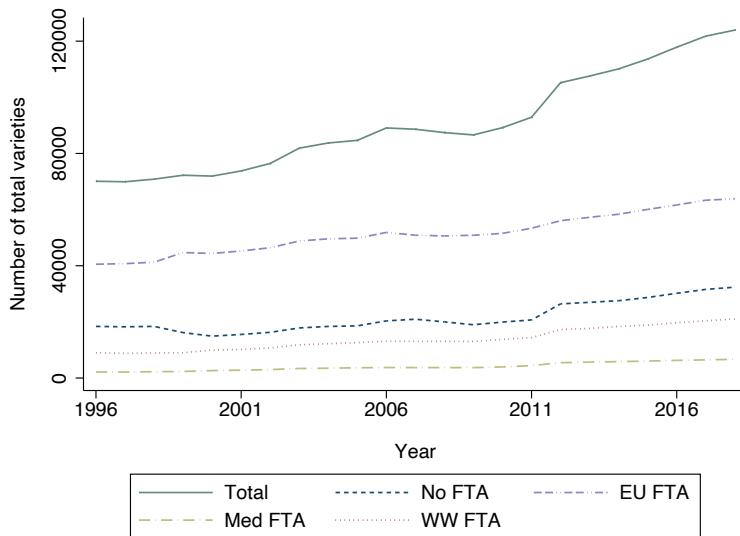


Figure 4 illustrates the development of the total number of imported varieties over the sample period. In 1996, the total number of imported varieties was 70,122. By 2019, the number of varieties had almost doubled to 125,203, showing a constant growth over the examined sample period. The generally high level of varieties stems from both the highly segregated trade data and the inclusive definition of a variety. I define a variety as the pairing of an origin country and a product line, which means that the same product lines coming from different origin countries count as different varieties. Combined with the trade data, which are segregated at the 6-digit level, this results in the pictured high number of varieties.

Figure 4: Number of imported varieties, 1996–2019



The absence of any extraordinary increases within the FTA groups is notable. This observation hints at a lack of influence on consumer gains through the channel of variety gains. If trade agreements did influence the extensive margin of trade (i.e., the number of exporting firms and goods), I would expect to see spikes in the years that trade agreements were concluded.

5.2 Effects on import measures

Table 1 presents the results of the basic regression specified in Equation (6) with the three different import properties as dependent variables.

Table 1: Estimates of the aggregated effects of the FTA system on quality-adjusted prices, quality and variety changes, 1996–2019

	(1) Quality-adjusted price	(2) Quality	(3) Variety
FTA _{ot}	-0.0878*** (0.0058)	0.0078 (0.0074)	-0.0033 (0.0145)
Origin-product FE, α_{oj}	Yes	Yes	Yes
Time FE, α_t	Yes	Yes	Yes
N	2,214,240	2,214,240	2,156,720
R ²	0.0227	0.0000	0.0000

Notes: This table summarizes the estimates of the baseline regression with the dependent variable specified in the top row. Column (1) and (2) report the coefficients of the regressions with the constructed measures for quality and quality-adjusted prices as the LHS variable. In column (3) the variable of interest is the measure for variety change $\lambda_{jt}/\lambda_{jt-1}$. The LHS variables in column (1) and (2) are in natural logarithms. The explanatory variable FTA_{ot} is an indicator variable which equals 1 if an FTA was in place at the time. Additionally, the RHS of the regression contains year and origin-product fixed effects. Robust standard errors, clustered at the product line level, are reported in brackets. *** indicates statistical significance at the 1% confidence level.

Column (1) reports the estimated coefficient with quality-adjusted import prices as the measure of interest. I find an average effect of -8.41%⁶ on quality-adjusted import prices associated with Switzerland's FTA system. The coefficient is statistically significant at the 1% confidence level. Columns (2) and (3) present the estimates with quality and the measure of variety as the dependent variables. The FTA coefficient is not statistically different from zero for either one of these, indicating that there is no traceable ex-post effect of FTAs on import quality or variety over the study period. The definition of the lambda ratio is the reason for the lower number of observations of the specification in column (3). The calibration of the ratio requires data for two consecutive periods. Therefore,

⁶ The percentage is calculated as $\exp(\beta) - 1$.

I cannot calculate the ratio for the first period of the sample, explaining the lower number of observations.

The reported negative price effect is in line with common trade theory, and is likely to be a consequence of the reduction in import tariffs and the improved market access. The elimination of import tariffs leads to a reduction in trade costs for the affected product, which in return is reflected in a reduced price. Additionally, the trade agreement dummy captures effects which go beyond the elimination of import customs. The coefficient reflects price changes arising from all market access improvements in the FTAs. From the perspective of foreign firms, exporting is an investment decision which implies costs. The sunk costs of the investment decision are only worthwhile if the firm expects safe market access. Since an FTA represents guaranteed access to the Swiss market, the conclusion of a trade agreement might lead to an increase in competition for foreign firms that already export. Since most real-world markets are imperfect, the additional competition should lead to price reductions, holding quality constant.

The price coefficient is also in accordance with existing evidence. An example of how tariffs can affect consumer welfare is examined by AMITI ET AL. (2019), who look at the introduction of various new tariffs by the United States in 2018 and find increases in the unit values of affected products ranging from 10% to 30%. There is also evidence of welfare gains due to tariff elimination related to FTAs and under the exclusion of the quality property. BERLINGIERI ET AL. (2018) find a reduction in import prices due to the EU FTA system. Using a similar empirical approach, they find a negative effect on import prices of 6.4%.

The similarity of the magnitude of the reduction documented here and that for the EU case in BERLINGIERI ET AL. (2018) is notable. The size of the effect is to some extent surprising, as Switzerland is a country with historically low import tariffs. As an example, in 2006 the simple average of the most-favorable nation (MFN) customs for non-agricultural goods was only 2.1% in Switzerland, while it was 3.9% for the European Union (WTO, 2019).

There are many potential explanations for why I observe a reduction of similar magnitude, despite Switzerland's low level of import barriers. First, the share of trade covered by FTAs is substantially higher for Switzerland compared to the European Union. In 2018, only 29% of EU imports were affected by a preferential trade agreement (EUROPEAN COMMISSION, 2019). For comparison, Swiss FTAs covered over 80% of total imports in 2018. The wide range of trade covered by FTAs might leverage the effect, as the reported coefficient represents the effect of all trade agreements. Second, while Switzerland has low import customs on average, there are specific categories of goods with high import customs. For

example, in 2006 customs on clothing averaged 6.4% (WTO, 2006). The effect of FTAs might therefore be driven by categories of goods for which the import tariffs outside of trade agreements are substantially higher. This is in line with the categorical results for consumption goods reported in Section 6. Overall, the wide scope of trade affected by Switzerland's FTA system and the high custom barriers for some product categories are potential explanations for the magnitude of the observed price effects.

The statistically insignificant coefficient in the import quality regression is of particular interest, as it contradicts most existing evidence on this subject. Research on acts of trade liberalization tends to find quality upgrading in the export sector of less-developed partners. For example, IACOVONE and JAVORCIK (2010) examine the behavior of export plants after the integration of Mexico into NAFTA. Mexican plants which considered exporting to the US market increased the quality of their products to match the higher quality demands of US customers. There is also evidence of quality upgrading based not on firm-level data but on trade data. BERLINGIERI ET AL. (2018) find quality increases of 4–8% attributed to the EU FTA system. In a heterogeneity analysis of the aggregated effect, they show that the quality upgrading is especially pronounced for products exported to high-income EU members. Following the literature, I would therefore expect to also find a positive influence on import quality of Switzerland's FTAs.

However, my results suggest that Switzerland's system of trade agreements is not associated with any form of import quality upgrading. One potential explanation might be the high share of developed countries in the origin of imported goods. Most of Switzerland's import volume covered by FTAs comes from other high-income countries, such as Germany or the United Kingdom. These exporters are likely to already produce high-quality goods, as they face similar quality demands in their domestic markets. Improved access to the Swiss market would therefore not lead to quality upgrades but to price adjustments, as competition in the partner country's export sectors increases with the reduction of export costs. The significant reduction in prices supports this home-market hypothesis.

In the variety regression, the dependent variable is the lambda ratio. Due to the initial assumption that Switzerland's high dependence on trade might be an indicator of high variety gains through FTAs, I would expect to find a positive effect on welfare. Since the lambda ratio is an inverse measure for welfare, this would be reflected in a negative coefficient. A reduction in the lambda ratio would imply that the expenditure spent on entering varieties compared to expenditure spent on exiting varieties was larger.

The insignificant effect in the variety regression contradicts this expectation. However, it is not an uncommon result for Switzerland in empirical research. MOHLER (2011) finds low variety gains in his analysis of Switzerland's trade flows. There are many potential explanations for the insignificant effect regarding import variety. The first is Switzerland's already high degree of openness at the beginning of the sample period. The country's Impex ratio,⁷ a common measure of an economy's openness, was 79% in 1996. This ranks fairly highly among developed countries. For comparison, in 1996 the Impex ratios for the United Kingdom and the United States were 51% and 22%, respectively. Besides the high degree of openness, there is also the shortcoming of not separating goods at the firm level. As described in Section 3.1, this limitation implies a lower-end measure of variety changes. A third potential reason is the low differentiation in Swiss imports, as mentioned by MOHLER (2011).

As a final note on the baseline results, I want to point out that the welfare benefits are only a low-end measure of the overall potential gains. The estimated effects are the direct benefits through changes in import prices and do not account for any changes within the domestic industry. Potential channels of indirect consumer benefit include improved access to intermediate goods and additional competition for domestic goods. Both might affect the quality and prices of domestically produced goods.

5.2.1 Robustness checks

In this section, I perform three robustness checks to shed light on potential shortcomings of the methodology and the validity of the reported results. First, I look into the required parallel trend assumption. Second, I investigate potential bias from the exclusion of GDP. Finally, in the third test, I look at the robustness of the baseline results with regards to changes in the control group.

The parallel trend assumption requires the FTA partners to hypothetically have the same development in the variables of interest as non-FTA countries in the absence of the FTA treatment. Since it is impossible to observe FTA partners without implemented trade agreements, I cannot directly test the assumption. However, the results can be verified to some extent by assessing the trends leading up to FTAs. If the two groups followed the same trends prior to the signing of the agreements, it is more likely that the identified effects are caused by the trade agreements and not by other time-origin changing factors.

⁷ Imports and exports as a percentage of total GDP; the following numbers are based on data from the World Bank.

I apply the placebo test described in BERLINGIERI ET AL. (2018) to look for any systematically different pre-trends between the treatment and control group. I estimate the baseline DiD regression for each import measure with a modified FTA dummy. I replace the original indicator variable with a different dummy variable that takes the value of 1 if the observation is within a five-year period prior to the actual conclusion of a trade agreement. The new dummy variable therefore indicates whether an FTA was implemented within the near future and measures different pre-trends.

Table 2 presents the estimated results of the placebo test. If there are no different developments influencing the dimensions of imports from countries about to enter into a trade agreement, then the coefficients should be statistically insignificant.

Table 2: Estimates of the pre-trend regression with quality-adjusted prices, quality and variety changes as dependent variables, 1996–2019

	(1) Quality-adjusted price	(2) Quality	(3) Variety
FTA _{ot+5} – FTA _{ot}	-0.0287*** (0.0041)	-0.0021 (0.0063)	-0.0391 (0.0349)
Origin-product FE, α_{oj}	Yes	Yes	Yes
Time FE, α_t	Yes	Yes	Yes
N	2,214,240	2,214,240	2,156,720
R ²	0.0177	0.0000	0.0000

Notes:

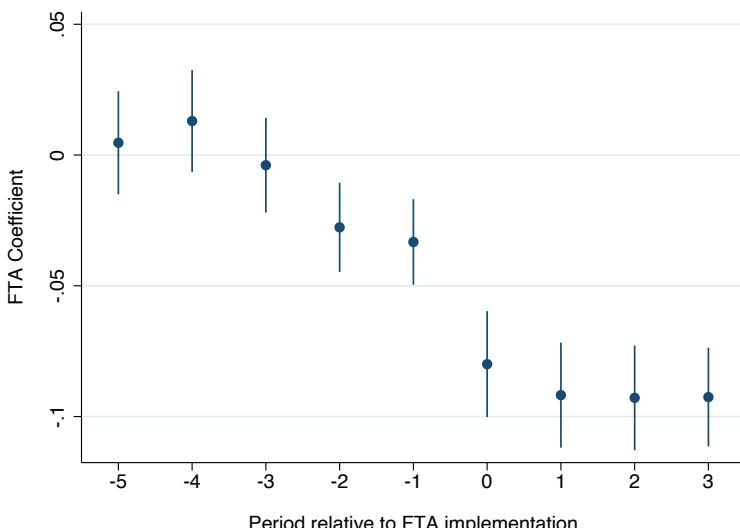
This table presents the estimates of the pre-trend test with the dependent variable specified in the top row. The LHS variables in column (1) and (2) variables are in natural logarithms. The explanatory variable FTA_{ot+5} – FTA_{ot} is an indicator variable which equals 1 if an FTA with country of origin o was implemented within five years from period t . The regression contains year and origin-product fixed effects. Robust standard errors, clustered at the product line level, are reported in brackets. *** indicates statistical significance at the 1% confidence level.

While the coefficients for quality and variety are indeed insignificant, I find a significant negative pre-trend for the quality-adjusted prices of imported goods. The coefficient suggests that prices of goods imported from upcoming partner countries prior to the implementation of an FTA were already on a decreasing gradient compared to the control group. The measured pre-trend indicates a potential underestimation of the negative effect in the baseline regression for quality-adjusted prices.

Additionally, I visually inspect the parallel trend assumption in Figure 5. The figure plots the development of the average treatment effect over the time periods close to the FTA implementations. The pictured observations are the point estimate of a regression similar to the baseline model in Equation (6). For each relative time period before and after the treatment, I add a dummy variable indicating whether a trade agreement was in place or not. This new set of dummy variables replaces the aggregated FTA dummy in the baseline estimation. The resulting coefficients for each period are less powerful, as the model only compares observations in the same relative time period. However, the individual coefficients can help to find potential pre-trends, as I would expect the treatment effects to be close to zero for the periods prior to the conclusion of the trade agreements.

Figure 5 shows the coefficients for the periods close to the implementation of a trade agreement together with the 5% confidence intervals. The variable of interest in the underlying model are the quality-adjusted prices. The time period zero represents the implementation period of the trade agreements. The figure illustrates that, in the two years prior to implementation, the trade agreements already had a price-reducing effect. Therefore, the visual inspection fortifies the suspected negative pre-trend, suggesting a violation of the parallel trend analysis.

Figure 5: Treatment effect on quality-adjusted prices against the time period relative to the implementation of trade agreements



The negative pre-trend might be a consequence of the fixed FTA definition. The implementation of an FTA also influences the period before the conclusion, as the negotiations prior to the conclusion are likely to have an effect on anticipating firms' investment decisions. If firms expect improved market access provided by the conclusion of an FTA, then the observed pre-trend and the implied consumer benefit could be a positive spillover of the anticipation of the trade agreement.

The second robustness check adds GDP as an additional control variable. The empirical approach does not account for factors varying across time and country of origin. If they have an influence on the measure of interest and the conclusion of trade agreements, there might be potential omitted variable bias.

The previously presented descriptive statistics show the tendency for origin GDP and the dimensions of imported goods to correlate. The trade literature also documents a positive relationship between quality and origin GDP (SCHOTT, 2004; FEENSTRA and ROMALIS, 2014). Further, BAIER and BERGSTRAND (2004) evaluate the determinants of FTAs and find that countries are more likely to conclude trade agreements if they share a similar level of GDP. Since it is a time-origin varying variable, the DiD approach may attribute the effect of GDP on prices and quality to the trade agreement system.

However, GDP is not necessarily a bias concern as trade agreements are also supposed to affect the GDP of a partner country through the improved export opportunities (TREFLER, 2004). Therefore, controlling for GDP might eliminate the passive effect of trade agreements on prices and quality through GDP.

Table 3 summarizes the estimates of the baseline regression, extended with a control variable containing the natural logarithm of GDP per capita. I find a reduced negative effect on quality-adjusted prices and a significant negative effect on quality. The effect on variety changes is still statistically insignificant. As expected, the coefficient for the origin country's GDP per capita is negative for quality-adjusted prices and positive for quality. The number of observations is smaller than in the baseline results because the data for the year 2019 were dropped due to missing GDP figures.

While the damped results are in line with the above reasoning of the passive effect of GDP, the negative effect on quality also contradicts the predictions of common trade models. Nevertheless, there exists evidence of quality reductions in response to trade liberalization. Specifically, HARRIGAN and BARROWS (2009) present the case of quality downgrading as a result of the liberalization of import quota limitations. They look at the end of the Multi Fiber Agreement, which regulated global trade in apparel and textiles industry through quota limitations.

While Switzerland did not impose any quantitative restriction under this particular agreement (SILBERSTON, 1990), the elimination of quotas cannot be ruled out as the potential driver behind the reported negative effect on quality. A conclusive statement requires in-depth analysis of the individual trade agreements, which would go beyond the scope of this robustness check.

Table 3: Estimates of the aggregated effects of the FTA system on the import dimensions with GDP per capita as additional control variable, 1996–2018

	(1) Quality-adjusted price	(2) Quality	(3) Variety
FTA _{ot}	-0.0520*** (0.0058)	-0.0175** (0.0079)	-0.0038 (0.0176)
l_GDPpc _{ot}	-0.2722*** (0.0093)	0.3061*** (0.0087)	-0.0737 (0.0766)
Origin-product FE, α_{oj}	Yes	Yes	Yes
Time FE, α_t	Yes	Yes	Yes
N	1,967,992	1,967,992	1,917,457
R ²	0.0209	0.0494	0.0000

Notes:

This table presents the estimates of the baseline regression with additionally controlling for the effect of GDP and the dependent variable specified in the top row. The LHS variables in column (1) and (2) variables are in natural logarithms. The explanatory variable FTA_{ot} is an indicator variable which equals 1 if an FTA was in place at the time. The RHS of the regression contains year and origin-product fixed effects, as well as the natural logarithm of GDP per capita. Robust standard errors, clustered at the product level, are reported in brackets. *** indicates statistical significance at the 1% confidence level. ** signals statistical significance at the 5% confidence level.

In the final robustness check, I exclude all data points for FTA partners prior to the implementation of the trade agreement from the control group. In the baseline regression, the control group also included imported products from countries which would be treated in the future. For example, imports from Croatia are in the control group if they are imported prior to 2001, and in the treatment group afterwards. To see how the inclusion of FTA partners in the control group influences the baseline results, I estimate the model without goods from FTA partners in the control group.

Table 4: Estimates of the aggregated effects of the FTA system on the import dimensions, excluding FTA partner countries from the control group, 1996–2019

	(1) Quality-adjusted price	(2) Quality	(3) Variety
FTA _{ot}	-0.1353*** (0.0212)	0.0396 (0.0253)	0.0428 (0.0275)
Origin-product FE, α_{oj}	Yes	Yes	Yes
Time FE, α_t	Yes	Yes	Yes
N	1,517,794	1,517,794	1,483,275
R ²	0.0213	0.0000	0.0000

Notes:

This table presents the estimates of the baseline regression. All imports from FTA partner countries, prior to the implementation of the trade agreement, have been excluded from the control group. The LHS variables in column (1) and (2) variables are in natural logarithms. The explanatory variable FTA_{ot} is an indicator variable which equals 1 if an FTA was in place at the time. The RHS of the regression contains year and origin-product fixed effects. Robust standard errors, clustered at the product level, are reported in brackets. *** indicates statistical significance at the 1% confidence level.

Table 4 shows the results of the baseline regression with the altered control group. The effects on quality and variety are still insignificant. The reduction in quality-adjusted prices increases to 12.65%. If the development of the import characteristic is only compared between FTA partners and non-FTA partners, I find an overestimation of the price effect. This suggests that price developments in FTA partner countries prior to the implementation were on a positive trend. The overestimation shows the importance of including and accounting for imports by future FTA partners.

6 Results: Consumer prices

The reported reduction in import prices represents a channel for consumer welfare gain, but it does not quantify the price effects faced directly by consumers. A translation from the import price effect to the consumer price impact will allow me to calibrate the direct savings for consumers associated with Switzerland's FTAs.

Proceeding with the approach of BREINLICH ET AL. (2016), I map the HS1 classified data to a product classification that is based on the baskets of a consumer price index (CPI). After this transformation, the underlying data set will only contain imports used for final consumption (the original set also included intermediate goods in the analysis). I estimate the quality-adjusted import price changes for each sub-index category separately. Combining each price coefficient with the annual import share in the respective CPI sub-index expenditure results in yearly price changes for each category. Ultimately, I will aggregate these annual changes in consumer prices by sub-indices to obtain the overall price effect faced by consumers.

BREINLICH ET AL. (2016) determine two assumptions that need to be fulfilled to identify valid consumer price changes with this approach. First, it requires that wholesalers do not change their markups in response to changes in the quality-adjusted import price. Second, the change in quality-adjusted prices of imported consumption goods does not affect the price component of domestically produced consumption goods. I argue that the second condition is unlikely to hold, as a reduction of the import prices increases the competition and price pressure for similar domestically produced goods. The calibrated consumer price change will therefore not reflect the potential downward adjustment of prices of domestic consumption goods induced by the additional import competition.

The mapping of the HS1 data to a classification allows me to allocate and link product lines to different expenditure baskets. For this purpose, I use the Classification of Individual Consumption According to Purpose (COICOP), which was developed by the United Nations Statistic Division. COICOP contains twelve different categories at the highest level, of which ten are relevant for import products.⁸

Since there is no direct correspondence table available, I transfer the data in an intermediate step to “Central Product Classification, version 10” (CPCv10). From the CPCv10 categorized data set, the goods are mapped to the COICOP categories. The relevant correspondence tables are available from the UN Statistics Division (UNSD, 2019).

In the mapping process, not all goods classified in the HS1 are matched with a COICOP category. This discrepancy reflects the existence of intermediate goods in the original data, which are not part of consumer expenditure. There are also goods mapped into multiple COICOP groups. The final COICOP classified data

⁸ The categories which had no products allocated were “Education” and “Restaurants and Hotels”.

set contains around 40% fewer unique observations compared to the initial HS1 data set.

Table 5 reports the results for all three measures based on the COICOP data set and allows a direct comparison to the baseline results. The used dataset contains only observations imported prior to 2018, as the data will be combined with consumer expenditure data, which were only available up to 2017. Unlike the analysis in Section 5, the estimates are based on final consumption goods only. The coefficients for quality and variety are still insignificant. The reduction of quality-adjusted prices has changed magnitude, shrinking by 4.02 percentage points to 4.39%. Therefore, a substantial part of the welfare gains through quality-adjusted prices reflects gains from the cheaper access to intermediate goods.

Table 5: Estimates of the aggregated effects of the FTA system on the import dimensions, based on COICOP data, 1996–2017

	(1) Quality-adjusted price	(2) Quality	(3) Variety
FTA _{ot}	-0.0449*** (0.0066)	0.0012 (0.0086)	0.0046 (0.0042)
Origin-product FE, α_{oj}	Yes	Yes	Yes
Time FE, α_t	Yes	Yes	Yes
N	1,279,070	1,279,070	1,242,433
R ²	0.0239	0.0000	0.0001

Notes:

This table summarizes the estimates of the baseline regression based on a consumption goods data set with the dependent variable specified in the top row. The LHS variables in column (1) and (2) variables are in natural logarithms. The explanatory variable FTA_{ot} is an indicator variable which equals 1 if an FTA was in place at the time. Additionally, the RHS of the regression contains year and origin-product fixed effects. Robust standard errors, clustered at the product line level, are reported in brackets. *** indicates statistical significance at the 1% confidence level.

The price change in column (1) indicates a reduction in consumer prices but it does not account for the importance of different consumption categories. For example, in 2016 Swiss consumers spent around CHF12 billion on footwear and clothing, and CHF56 billion on health products. Since I mapped the data set to different COICOP categories, it is possible to weight the individual category effect based on the category's share in total expenditure. The result is an average consumer price change based on the relative importance of the category.

I obtain the individual COICOP category import price effect by estimating the baseline regression based on data samples containing only goods of the respective COICOP categories. The FTA coefficient for each sample and the corresponding robust standard errors are presented in column (3) and (4) of Table 6. Based on the import price changes, the effect on consumer prices of each sub-index, ΔCP_{ct} , is calculated by expanding the coefficients with the expenditure and import shares for each category:

$$\begin{aligned}\Delta CP_{ct} &= [\exp(\beta_c) - 1] \cdot \text{FTA Import Share}_{ct} \cdot \text{Trade Share}_{ct}, \\ &= [\exp(\beta_c) - 1] \cdot \frac{\text{FTA Imports}_{ct}}{\text{Total Imports}_{ct}} \cdot \frac{\text{Total Imports}_{ct}}{\text{Consumer Expenditure}_{ct}},\end{aligned}\quad (10)$$

where c represents the COICOP category.

As an example of this process, I compute the FTA induced consumer price change for COICOP group “03 Clothing and footwear” in 2016 as follows. The estimated FTA coefficient is -0.0860 , indicating an average quality-adjusted price effect of $\exp(-0.0860) - 1 = -8.24\%$. The share of trade covered by FTAs in total clothing and footwear imports was 79.8% .

The share of imports in the total clothing and footwear expenditure in 2016 was 70% . The consumer price change for group 03 in 2016 is then computed as $-8.24\% \cdot 79.8\% \cdot 70\% = -4.6\%$. The reported price changes in column (6) of Table 6 correspond to the average over time of these yearly price effects.

Finally, I quantify the overall effect by weighting each category’s effect by the average share in total expenditure. The result is an aggregated consumer price reduction due to FTAs of 1.43% , presented at the bottom of Table 6. The total number of observations is not identical to the number reported in Table 5, as some HS classified products are ultimately mapped into multiple COICOP categories.

The calculated consumer price reduction is a measure of the direct consumer benefit from Switzerland’s trade policy. To put the effect in perspective, total consumer expenditure in 2017 was CHF348 billion. Based on this expenditure, the average price effect of -1.43% implies yearly savings of around CHF4.9 billion for Swiss consumers.

Table 6 Predictions of the consumer price changes by COICOP category, 1996–2017

(1) COICOP category #	(2) Category name	(3) β_c	(4) S.E.	(5) N	(6) Price change
01	Food and non-alcoholic beverages	-0.0042	0.0154	166,053	-0.00%
02	Alcoholic beverages, tobacco and narcotics	-0.0034	0.0353	42,020	-0.12%
03	Clothing and footwear	-0.0860***	0.0121	310,549	-4.92%
04	Housing, water, electricity, gas and other fuels	-0.0625***	0.0235	89,656	-0.43%
05	Furnishings, household equipment and routine household maintenance	-0.0503***	0.0121	364,771	-7.64%
06	Health	-0.1036**	0.0435	40,797	-0.25%
07	Transport	-0.0391*	0.0214	159,083	-2.19%
08	Communication	0.0717	0.0512	14,173	1.92%
09	Recreation and culture	-0.0510***	0.0141	302,234	-5.92%
12	Miscellaneous goods and services	-0.0482***	0.0159	127,570	-0.55%
<i>Total</i>	<i>All categories pooled by expenditure</i>			1,616,905	-1.43%

Notes:

This table summarizes the estimated import price changes and the average consumer price effects per COICOP category. Column (1) and (2) identify the CPI category. Column (3) and (4) present the estimated coefficient and its standard error for each category. The standard errors are robust and clustered at the product line level. Column (5) reports the number of observation in each category. Column (6) contains the average of the annual price effects over all years, calculated as in Eq. (7). *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

The magnitude of the effects on consumer prices is quite large compared to a similar study for Switzerland. MÜLLER ET AL. (2017) examine the potential effects of an unilateral elimination of all remaining Swiss import customs on industry goods.⁹ They compute a multi-country general equilibrium model to predict effects on GDP and other variables, such as the consumer price level, and estimate a potential reduction of 0.1% in consumer prices due to the elimination of the remaining import tariffs.

While the approaches are not directly comparable, as MÜLLER ET AL. (2017) use a different methodology and set-up, the difference in magnitude is still noteworthy. The sizable difference might be explained by the large amount of trade that is covered by trade agreements and therefore already tariff-free. Therefore, the disparity of the effects highlights how beneficial the tariff eliminations through trade agreements have already been. Also, the greater benefits in my regression approach are consistent with the rationale for an FTA dummy, as it captures not only the cutback on customs but also multiple improvements to market access processed in trade agreements.

As mentioned in the baseline results, the estimated price reduction may be driven by some specific products which have high tariffs outside of FTAs. The underlying category effects in Table 5 support this hypothesis. For example, in the high-tariff group “03 Clothing and footwear”, I report a consumer price reduction of 4.92%. Other categories with strong effects on consumer prices are “05 Furnishings, household equipment and routine household maintenance”, with a price reduction of 7.64%, and “09 Recreation and culture”, with a reduction of 5.92%.

Overall, the point estimates in the categories range from -7.64% up to even slightly positive effects. The positive price changes are computed based on FTA coefficients that are not statistically significant. The reduction of the sample size likely leads to non-significant results for some groups. For the group “01 Food and non-alcoholic beverages”, I even expect an insignificant result, as Switzerland has exceptionally high import barriers in the agriculture sector that are mostly unaffected by the majority of trade agreements.

⁹ Industry goods include also all non-agricultural consumption goods.

7 Conclusion

In this paper, I use a DiD approach to provide evidence on the aggregated effects of Switzerland's FTAs on imported goods and the welfare consequences for consumers. I focus on the changes in quality-adjusted prices while also checking for welfare effects in import quality and variety. Even though Switzerland is a country with low import customs to begin with, I find a substantial price reduction due to the system of trade agreements. Holding quality constant, the import price reduction is 8.41%, indicating a positive welfare gain. Contrary to the existing evidence on the effects of FTA systems, I do not find significant effects on either quality or variety.

I then quantify the price implications directly faced by consumers. After limiting the data set to only final consumption goods, I find a reduction in consumer prices of approximately 1.43%. This price adjustment corresponds to yearly savings of CHF4.9 billion due to Switzerland's FTA system, based on expenditure from 2017. These savings come solely from the reduced prices of imported consumption goods and do not take into account effects on domestically produced consumption goods through additional import competition.

The results should be interpreted with care, as I document a potential violation of the parallel trend assumption. I estimate a negative pre-trend for prices within the treatment group of FTA partner countries, which indicates a potential bias of the price reduction and the associated welfare benefits. Even though I document a positive welfare effect through reduced import prices, the consequences of Switzerland's trade agreements are not entirely clear yet and require further investigation.

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Appendix A: Estimation of the demand elasticities

This appendix provides a summary of the applied method to estimate demand elasticities based on trade data. The methodology was pioneered by FEENSTRA (1994) and advanced by BRODA and WEINSTEIN (2006). The section is based on BERLINGIERI (2009) and FEENSTRA (2010), who explain and summarize the procedure.

Starting by defining the set I_{jt} as the set of all varieties of product line j in period t , the expenditure share s_{ojt} of a variety is:

$$s_{ojt} = \frac{p_{ojt}x_{ojt}}{\sum_{o \in I_{jt}} p_{ojt}x_{ojt}}. \quad (11)$$

Then, the demand equation from Equation (2) can be rewritten in terms of expenditure shares and changes over time:

$$\Delta \ln s_{ojt} = \Theta_{jt} - (\sigma_j - 1)\Delta \ln p_{ojt} + \Delta \epsilon_{ojt}, \quad (12)$$

where Θ_{jt} represents product-time varying effects, Δ are changes from period $t-1$ to t and ϵ_{ojt} contains all unobserved random effects. Due to the two-way causality problem between prices and expenditure shares, estimating the demand elasticity directly from this equation would lead to a biased result. To solve this problem, a supply equation in differences over time is introduced:

$$\Delta \ln p_{ojt} = \omega_j \Delta \ln x_{ojt} + \Delta \epsilon_{ojt}, \quad (13)$$

where ω_j is the inverse supply elasticity and ϵ_{ojt} is the random error of the supply equation. Since the demand equation uses expenditure shares, I combine Equations (11) and (13) to eliminate quantities from the supply curve:

$$\Delta p_{ojt} = \psi_{jt} + \frac{\omega_j}{1 + \omega_j} \Delta \ln s_{ojt} + \Delta \delta_{ojt}, \quad (14)$$

where $\psi_{jt} = \frac{\omega_j}{1 + \omega_j} \cdot \sum_{o \in I_{jt}} p_{ojt}x_{ojt}$ and $\Delta \delta_{ojt} = \frac{\Delta \epsilon_{ojt}}{1 + \omega_j}$.

To proceed further, the identification strategy relies on the assumption:

$$E(\epsilon_{ojt}\delta_{ojt}) = 0. \quad (15)$$

The assumption implies uncorrelated supply and demand error terms at the variety level. It allows me to eliminate the time fixed effects by differentiating Equations (12) and (14) to some reference country k :

$$\Delta^k \ln s_{ojt} = -(\sigma_j - 1)\Delta^k \ln p_{ojt} + \epsilon_{ojt}^k, \quad (16)$$

$$\Delta^k \ln p_{ojt} = \frac{\omega_j}{1 + \omega_j} \Delta^k \ln s_{ojt} + \delta_{ojt}^k, \quad (17)$$

where the superscript k indicates a differentiation of the affected variable to a reference country. Then, Equation (17) can be rewritten as:

$$(1 - \rho_j)\Delta^k \ln p_{ojt} = \frac{\rho_j}{\sigma_j - 1} \Delta^k \ln s_{ojt} + \delta_{ojt}^k, \quad (18)$$

where $\rho_j = \omega_j(\sigma_j - 1)/(1 + \omega_j\sigma_j)$. Multiplying Equation (16) by Equation (18), the estimation equation is obtained:

$$(\Delta^k \ln p_{ojt})^2 = \theta_1 (\Delta^k \ln s_{ojt})^2 + \theta_2 (\Delta^k \ln s_{ojt})(\Delta^k \ln p_{ojt}) + u_{ojt}, \quad (19)$$

Where:

$$\theta_1 = \frac{\rho_j}{(1 - \rho_j)(\sigma_j - 1)^2},$$

$$\theta_2 = \frac{2\rho_j - 1}{(1 - \rho_j)(\sigma_j - 1)},$$

$$u_{ojt} = \frac{\epsilon_{ojt}^k \delta_{ojt}^k}{(1 - \rho_j)(\sigma_j - 1)}.$$

After averaging Equation (19) over time, the demand elasticity σ_j can be consistently estimated by weighted least squares.

Note that the differentiation with respect to the reference country in Equations (16) and (17) requires that each product line has at least one country exporting it in every observation period. In my data set, this condition is not fulfilled for around 20% of the data defined at the 6-digit level. As BERLINGIERI (2009) describes, this leaves the option of either dropping the data or estimating the elasticity at a lower level of disaggregation. Since the affected data are of a significant size, dropping them might result in the loss of valuable information. Therefore, elasticities estimated at the 4-digit level were used in the case of no available reference country at the 6-digit level. If a variety still did not fulfill the condition to perform the differentiation at the 4-digit level, the corresponding

observations were dropped. This approach resulted in a loss of only around 4% of the original data.

For the implementation of the procedure, I followed FEENSTRA (2010), who provides applicable code in the Appendix of his book. With this methodology, it is possible to obtain negative elasticities for some goods. In these cases, I also follow the approach of FEENSTRA (2010) and perform a grid search to obtain a positive value. Table 7 shows summary statistics of the estimated demand elasticities for all product lines. These are similar to the statistics reported in other studies that estimate demand elasticities based on Swiss trade data (MOHLER, 2011). It is not uncommon to see some large outliers with this approach, explaining the relative high mean.

Table 7: Summary statistics of the estimated demand elasticities

Observations	4,807
Mean	21.09
Std. deviation	608.96
Median	4.25
Min	1.2
Max	42,100.9

Appendix B: Free trade agreements

Table 8 Overview of Switzerland's FTA partners and the date of conclusion, grouped by geographic location

Partner country	Year	Partner country	Year	Partner country	Year
European					
Norway	1966	Finland	1966	Austria	1966
Denmark	1966	Portugal	1966	Sweden	1966
United Kingdom	1966	Iceland	1970	Belgium	1973
France	1973	Germany	1973	Italy	1973
Netherlands	1973	Ireland	1973	Spain	1979
Greece	1981	Czech Republic	1992	Poland	1992
Slovak Republic	1992	Romania	1992	Hungary	1993
Bulgaria	1993	Estonia	1995	Latvia	1995
Lithuania	1995	Slovenia	1995	Faroe Islands	1995
Croatia	2001	Macedonia	2002	Cyprus	2004
Malta	2004	Albania	2010	Serbia	2010
Ukraine	2012	Montenegro	2012	Bosnia-Herzegovina	2015
Georgia	2018				
Mediterranean					
Turkey	1992	Israel	1993	Palestinian Authority	1999
Morocco	1999	Jordan	2002	Tunisia	2006
Lebanon	2007	Egypt	2008		
World Wide					
Mexico	2001	Singapore	2003	Chile	2004
Republic of Korea	2006	South Africa	2008	Botswana	2008
Lesotho	2008	Namibia	2008	Swaziland	2008
Canada	2009	Japan	2009	Colombia	2011
Peru	2011	Hong Kong, China	2012	Bahrain	2014
Kuwait	2014	Oman	2014	Qatar	2014
Saudi Arabia	2014	Honduras	2014	China	2014
Panama	2014	Costa Rica	2014	Guatemala	2014
United Arab Emirates	2014	Philippines	2018		

You can smuggle but you can't hide: Sanction evasion during the Ukraine crisis

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This paper investigates whether sanctions imposed in the wake of the Ukraine crisis by Western countries and Russia have been evaded by analyzing monthly product-level trade patterns. Consolidating different methods from the literature related to the detection of illicit trade, I find that goods facing sanctions imposed by the Russian government in particular have most likely been evaded. While the detected amounts do not question the general effectiveness of the sanctions, they are non-negligible. Roughly US\$482 million, or 8.56% of the total estimated trade loss of \$5.633 billion from the Russian sanctions, may have been smuggled either directly or through its neighboring countries. As more than half of the estimated evasion involves trade flows through Belarus and Kazakhstan, the findings highlight the importance of trade policy coordination with third countries, especially if these are part of the same customs union.

JEL codes: sanctions; embargo; smuggling; evasion; foreign policy

Key words: F51, F14, F13

1 Introduction

The past decade in trade policy has seen a return to its politicization. Whether one focuses on the rise of protectionism since the financial crisis of 2008, the active tariff policy introduced by the Trump administration, or China's recent trade restrictions on Australia for pushing for an independent investigation over the Covid-19 outbreak, trade measures have increasingly become an instrument of foreign and industrial policy rather than a multilateral effort to facilitate trade on a level playing field.

This trend often involves – besides targeting of trade with particular countries – forensic interventions aimed at particular sectors, goods, firms, or even individuals. In the case of the United States, for instance, trading partners retaliated to tariffs introduced by the Trump administration by (successfully) targeting goods produced in counties with Republican politicians participating in contested 2018 mid-term elections for Congress (BLANCHARD ET AL., 2019).

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Traditionally, such trade policy measures were restricted to political sanctions, which overtly followed foreign policy objectives and included targeted trade measures (HUFBAUER ET AL., 2008). In particular, so-called smart sanctions have targeted individual firms, products, or persons (CORTRIGHT and LOPEZ, 2002). Apart from more focused targeting, modern sanctions go beyond outright trade bans and instead have expanded to include, for example, licensing requirements or tariffs – some on imports, and others on exports.

This rise in active, targeted trade policy obfuscates the already complex international trading system and offers trade actors ample opportunities (and incentives) to evade the new barriers. For instance, when the United States introduced punitive tariffs on China in 2018, U.S. Customs and Border Protection saw a nearly 50% rise in customs rulings related to the misclassification of goods, as firms tried to exploit the fact that early tariff rounds spared products similar to theirs.² Similarly, when Russia introduced counter-sanctions on Western agricultural products in the wake of the Ukraine crisis, Russian newspapers reported on Belarusian seafood and tropical fruits appearing in local supermarkets, in clear cases of country-of-origin certificates being mislabeled to evade the import sanctions imposed on products from the European Union (YELISEYEU, 2017).

The incentives to evade trade barriers are particularly high for political sanctions, as they aim – in the form of goods sanctions – to economically impact the target economy and key decision makers by minimizing trade flows (EATON and ENGERS, 1992; KAEMPFER and LOWENBERG, 1988), as opposed to import tariffs, which are mainly intended to extract rent and to support the implementing jurisdiction's industry. Therefore, a large string of the sanction literature addresses their effectiveness in the context of their (lack of) enforceability (CARUSO, 2003; MCLEAN and WHANG, 2010; VAN BERGEIJK and BIERSTEKER, 2015). While factors such as missing support from the target's main trading partners (DIZAJI and VAN BERGEIJK, 2013; NOLAND, 2009) or scope of the sanctions (CARUSO, 2003; HUFBAUER and OEGG, 2003) play prominent roles, these factors are directly linked to the question of whether the imposed barriers are evaded. If large trading partners provide economic assistance (BONETTI, 1998) or enable trade routes such that the sanctioned products arrive in the target country anyway (EARLY, 2009), sanctions imposed on any goods are unlikely to achieve their desired effect.

While these sanction evasion concepts are theoretically well-established and have been empirically analyzed for comprehensive sanctions typical of the 20th century, this area of research remains largely unexplored in relation to modern targeted sanctions. Instead of sanctions facing goods, recent research on sanction

² See the U.S. CBP's Customs Ruling Online System (CROSS) and, for example, ruling NY N300833 where beard kits from China had to be reclassified and additional China-specific duties of 10% were incurred.

evasion has focused on the enforceability of person- and firm-related sanctions (AHN and LUDEMA, 2020; HAIDAR, 2017) as well restrictions related to financial flows (BESEDEŠ ET AL., 2017).

I contribute to this literature by analyzing the prevalence of sanction evasion in the context of modern targeted goods sanctions. More precisely, I identify five different channels of sanction evasion and empirically analyze four of them, thus consolidating the various concepts of smuggling and evasion recorded in the literature.

Based on the example of sanctions implemented by Western economies and Russia in 2014 in relation to the Ukraine crisis, I find potential evidence of direct smuggling of agricultural products banned by Russia. Furthermore, certain neighboring countries – particularly those within the same customs union as Russia – significantly increased their trade with Western sanctioning jurisdictions, indicating potential re-exports or indirect smuggling. However, evidence related to Belarus in particular may be hindered by suppressed data, as indicated by the significant increase in the country's net imports with respect to Russian sanctioned agricultural goods. The analysis does not find any evidence of misclassification of goods. Overall, I estimate sanction evasion of up to \$482 million. This represents 8.56% of the estimated decline resulting from the Russian sanctions.

This paper also contributes directly to the literature on the impact of modern sanctions in the context of the Ukraine crisis. For instance, CROZET and HINZ (2020) focus on the direct impact the sanctions had on trade between Western economies and Russia, whereas I look indirectly at whether the impact would have been worse if the sanctions had not been (potentially) evaded.

More broadly, the study offers a contribution to the literature on the effectiveness of modern trade policy. Given how multifaceted trade policy has become in targeting particular product-origin combinations, I provide direct evidence on the degree to which countries are able to enforce the complex network of trade policy instruments. The studied example is particularly interesting, as targeted sanctions also involve the enforcement of trade policy by third countries not directly involved in the trade measures. The findings thus illustrate a further channel through which trade policy may have a political impact on the multilateral stage.

The remainder of the paper is structured as follows. Section 2 summarizes the sanctions introduced in the context of the Ukraine crisis and provides anecdotal evidence on how they may have been evaded. Section 3 details the methodology of the empirical analysis and discusses the various evasion channels, while Section

4 describes the data applied in the analysis. Results are presented in Section 5. Section 6 concludes the paper.

2 Sanctions during the Ukraine crisis

This section first provides an overview of the sanctions introduced during the Ukraine crisis and then contextualizes them in terms of their overall and sector-specific importance. It also illustrates indications of sanction evasion using the anecdotal case of trade in apples involving Belarus.

2.1 History of the sanctions

Following the military invasion of Ukraine by Russia in February 2014, Canada, the European Union, and the United States responded by introducing sanctions against certain Russian and Ukrainian officials³ on 17 March 2014. The measures included asset freezes, a prohibition for local operators to provide financing, as well as travel bans. In the following weeks, similar sanctions were introduced by Australia, Albania, Iceland, Japan, and Montenegro. In addition, diplomatic measures were imposed: Russia's voting rights in the Council of Europe were suspended, regular bilateral talks with the country were halted, and Russia was no longer invited to G8 meetings.

In the coming months, the Western economies expanded the list of individuals and firms that were covered by sanctions. On 26 June 2014, the European Union additionally introduced an import ban on all goods and an export ban on certain goods and technologies from Crimea and Sevastopol. European businesses were also prohibited from offering any tourism services in the two listed areas.

The largest round of sanctions – which is the primary focus of this paper – was introduced at the end of July as a reaction to the downing of the Malaysia Airlines MH17 airplane on 17 July 2014. On 29 July 2014, the European Union introduced a vast set of “economic sanctions” spanning the areas of finance, energy, defense, and dual-use goods.⁴

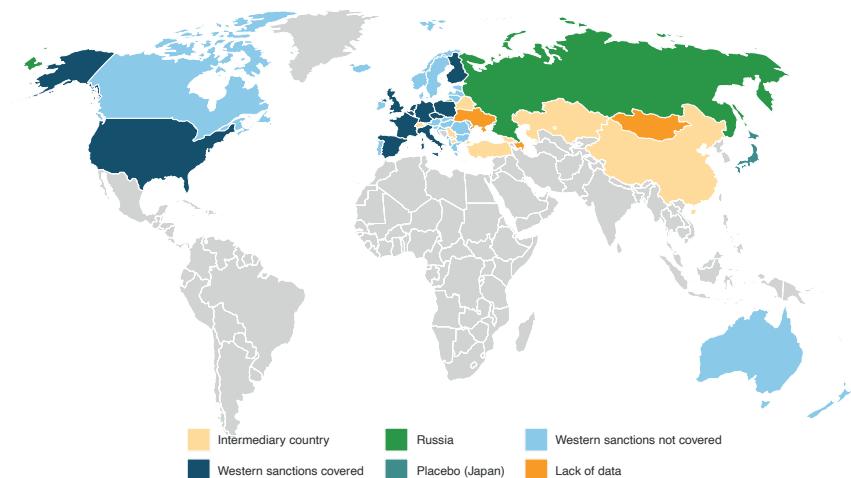
In terms of goods sanctions, this round included an embargo on weapons trade, an export ban for dual-use goods used for military purposes, as well as an export licensing regime for energy-related equipment and technology. A license would

³ These targeted sanctions against individuals and entities were later expanded over time and, in the case of the European Union, for example, involve 177 people and 48 entities as of December 2020.

⁴ Dual-use goods are products and technology which may be used for both civil and military purposes.

be denied in cases where the goods were exported *inter alia* for deep-water oil exploration and production. With respect to financial restrictions, access to EU capital markets was limited for Russian state-owned financial institutions to financial instruments lasting a maximum 90 days.⁵ The European Investment Bank (EIB) and the European Bank for Reconstruction and Development (EBRD) were no longer allowed to provide lending to Russia. These economic sanctions came into force on 1 August 2014 and need to be renewed every six months. As of December 2020, they remain in force.

Figure 1: Map of countries included in the study



Notes:

This figure illustrates the different country groups involved in the sanctions imposed in relation to the Ukraine crisis. Jurisdictions colored blue imposed sanctions on Russia, with the 11 dark blue ones being covered in this study. The identified intermediary countries (see Section 3) are denoted in beige, while Japan serves as a placebo. Azerbaijan, Mongolia, and Ukraine were not included due to a lack of data.

Canada and the United States introduced similar, albeit less extensive, sanctions on the defense, energy and finance industries in July and September 2014, respectively. In August, Ukraine and Japan introduced more individual- and firm-related sanctions, while Norway adopted the same regulations as the European Union's July sanctions. On 28 August 2014, Switzerland passed measures to prevent the circumvention of the EU sanctions (in the form of export licensing regimes) through Swiss territory.⁶

⁵ This was later restricted to a maximum of 30 days through sanctions imposed on 11 September 2014. The September sanctions also introduced a complete ban on transactions with the five major Russian state-owned banks.

⁶ EVENETT ET AL. (2017) found that these measures indeed prevented the circumvention of goods sanctioned by the EU. However, the authors also found some indications of potential circumvention in relation to the Russian sanctions.

In summary, Western sanctions on traded goods may be divided largely into three categories: (i) a full trade ban (on weapons); (ii) a partial ban (on dual-use goods if used for military purposes); and (iii) an export licensing regime (for goods used in the oil sector). Out of the dozen countries studied (see Figure 1), only the EU member states imposed all three categories of sanctions. The United States, on the other hand, covered the first and third category. In total, 39 countries⁷ imposed sanctions against Russia in relation to the Ukraine crisis. This paper focuses on the twelve largest countries based on 2013 trade statistics: Japan, the United States, and ten EU member states (Belgium, Czechia, Finland, France, Germany, Italy, Netherlands, Poland, Spain, and the United Kingdom). While Japan is used as a placebo (having imposed only non-goods sanctions), the other jurisdictions implemented goods sanctions in August 2014, which is applied as the starting point for the sanction analysis.

Russia retaliated against the Western sanctions by introducing on 7 August 2014 an import ban on a large share of agricultural products from the European Union, the United States, Australia, Canada, and Norway. The list of sanctioned countries was expanded a year later – on 13 August 2015, to be precise – to include Albania, Montenegro, Iceland, and Liechtenstein. The update was also to cover Ukraine starting from 1 January 2016 if it joined the EU Association Agreement (which it did). Furthermore, Russia imposed sanctions on Turkey on 1 December 2015 following the shooting down of a Russian jet by the Turkish military. The sanctions on Turkey, similarly to those on Ukraine, came into force on 1 January 2016. Unlike for other targets of Russian measures, the Turkish sanctions were (partially) lifted on 11 October 2016 and on 2 June 2017.

Apart from the clearly announced sanctions, Russia also banned certain meat types from the European Union, Moldova, and Ukraine on health grounds in September and October 2014 (BLANCHARD and WU, 2019). However, these measures were not (officially) politically motivated and are hence not covered in this study as sanctions. Instead, they are accounted for in the policy covariates (see Section 4).

An overview of the HS product codes covered by the sanctions on traded goods is provided in Table A.2. The list excludes sanctions imposed by and on jurisdictions that are not covered in this paper (such as Canada, Norway, or Australia).

⁷ The full set of countries which imposed sanctions on Russia following the Ukraine crisis include the European Union, Japan, the United States, as well as Albania, Australia, Canada, Georgia, Moldova, Montenegro, New Zealand, Norway, and Ukraine.

2.2 Contextualization of the sanctions

As this study abstracts from the analysis of weapons trade due to its special nature,⁸ there are three types of goods sanctions covered in this paper. First, Russia imposed sanctions in the form of a “traditional” import ban on large sections of agricultural produce. Based on 2013 import figures, these concern US\$9.43 billion of Russian imports (39.8% of total agricultural imports). According to Table A.2 in Appendix A, the sanctions target primarily imports from Poland, the United States, Germany, Netherlands, and Spain. However, in terms of their relative share of trade with Russia, Poland, Spain, and the Netherlands are most affected.

Meanwhile, the Western sanctions have a more complex structure. While the export licenses were imposed on between 30 and 50 products worth \$2.4 billion (see Table A.2), the dual-use goods cover over 6,000 different detailed tariff lines classified at the 10-digit CN level (spanning 756 different 6-digit HS codes, or around 15% of all product codes) worth up to \$63.6 billion. Importantly, the information registered in the available trade data does not distinguish between cases where a given dual-use good was exported for civil purposes or whether a good was halted from shipping due to being classified for military purposes. As these data are not publicly available, the analysis of goods facing Western sanctions needs to be interpreted as potentially harmed by the sanctions. Russian sanctions are therefore considered to be more stringent in terms of both their intensity (they cover a complete ban with no exceptions) and their scope (all products within a product category are covered). One may thus expect a larger impact on trade with regard to the Russian than the Western goods sanctions:

Hypothesis 1: Trade declines between Western sanctioning countries and Russia are more pronounced for goods facing Russian than Western sanctions.

Should Hypothesis 1 hold, this implies we would be more likely to observe sanction evasion for goods facing Russian sanctions, assuming that evasion is positively correlated with the amount of trade lost due to the sanction imposition.

In terms of trade covered, roughly a quarter (23.8%) of Russian imports are directly impacted by Western or Russian sanctions, with the majority of this trade relating to dual-use goods. Also, one should take into account that imports from the sanctioning countries represent over half of Russia’s total imports (see Table A.1). Most of the other important trading partners are analyzed as intermediary

⁸ Trade in weapons is often underreported or hidden in official figures and this paper is based on a detailed analysis of trade flows.

countries (see Section 3). As a result, the study includes trade covering around 80% of Russia's imports (in 2013 terms) and all 20 of its most important trading partners with the exception of the Republic of Korea and Ukraine.

With respect to the timing, all goods sanctions were imposed within a week of their announcement, so we are unlikely to observe anticipation effects often seen in the sanctions literature (KAEMPFER and LOWENBERG, 2007). However, this hypothesis is tested in the empirical analysis:

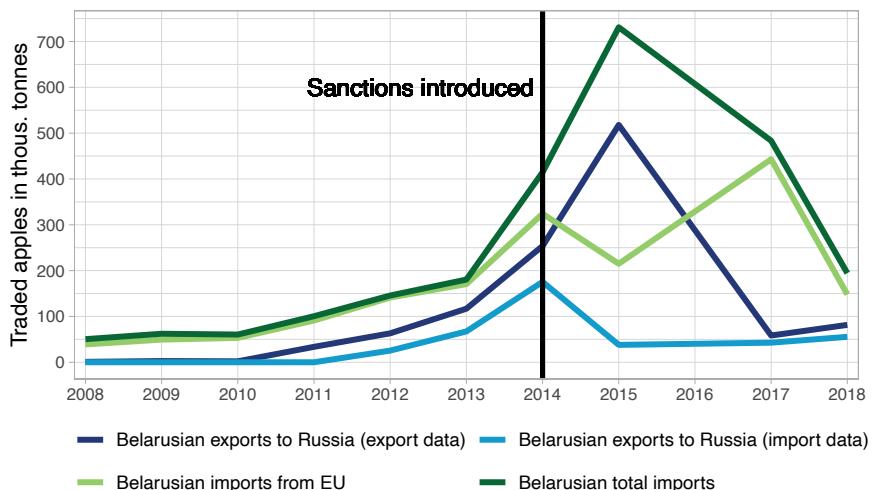
Hypothesis 2: There are no anticipation effects on the imposed goods sanctions by Russia nor on those by the Western countries.

Lastly, one should take into account that trade flows may also have been impacted by sanctions not directly related to goods trade. For instance, Crozet and Hinz (2020) find that over 80% of the trade decline can be attributed to products not directly impacted by the goods sanctions. Their analysis shows also that these declines are positively correlated with those sectors that rely heavily on trade finance. Hence, when estimating the impacts of goods sanctions on trade flows, the paper at hand ought to control for sector-specific effects caused *inter alia* by the financial sanctions (see Section 3).

2.3 Example of evidence of sanction evasion

When Russia imposed its import ban on agricultural products, Belarus and Kazakhstan, which share a customs union with Russia, refrained from introducing similar measures. Instead, shortly after their imposition by their large neighbor, news articles emerged quoting cases of EU products being smuggled through Belarus into the Russian market (YELISEYEU, 2017).

While this paper analyzes the case for sanction evasion more systematically, the example of Belarusian apple trade provides an interesting example of how such smuggling can be identified through irregular patterns in trade data. As Figure 2 illustrates, while in 2014 – the year sanctions were introduced – Belarus' apple exports to Russia doubled, according to Russian import data they quickly returned to pre-sanction levels and remained very stable. Meanwhile, Belarusian export data on the same trade flow saw a five-fold increase, with similar surges for Belarus' total imports. A potential explanation for this pattern could be the (illegal) practice of redirecting EU exports through a third country such as Belarus – which is a member of the same customs union as Russia (the Eurasian Economic Union) – allowing for easier illegal re-exporting into Russia.

Figure 2: Trade in apples during the Ukraine crisis*Notes:*

This figure illustrates annual flows related to the trade in fresh apples (HS code 080810) as reported by Belarus and Russia to UN Comtrade.

Furthermore, Figure 2 indicates that Belarus began sourcing apples from non-EU countries in the years 2014–16, despite nearly all imports previously originating from the European Union.⁹ YELISEYEU (2017) documents how this pattern may be explained by forged certificates of origin, with Belarus officially importing apples from such unlikely countries as Ecuador and Sierra Leone. As these practices repeatedly caught the attention of Russia,¹⁰ Belarus appeared to suppress its export data (and to a lesser degree its import data) after 2015. This led to net imports suddenly reaching 425,000 tonnes in 2017, nearly seven times their pre-sanction amounts.

As this example of sanction evasion shows, indications of such activities can be derived directly from international trade flows. Second, there seem to be numerous methods through which sanctions may be evaded. This paper looks to analyze these points in greater detail and investigate whether sanction evasion

⁹ Polish export data alone show larger apple exports to its Eastern neighbor in 2015 than the figure indicated by the Belarusian data on total imports from the European Union.

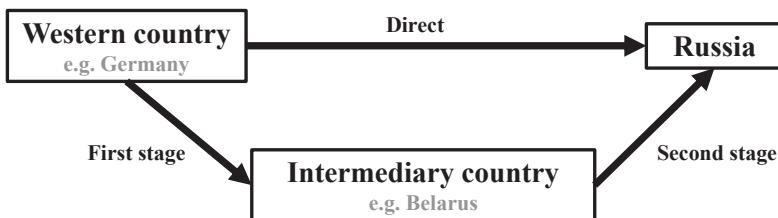
¹⁰ Within weeks after the imposition of agricultural sanctions, Russian newspapers reported the appearance of Belarusian oysters and shrimps in Russian supermarkets, which lead Russia to send veterinary officials to Minsk to monitor the situation (REUTERS, 2014). In November 2014, Russia also banned imports from 23 Belarusian companies accused of smuggling EU produce (SECIERU, 2015, p. 58). Despite these efforts, anecdotal examples of banned products sold in Russian stores continued in the following years. During a joint press conference of the Russian and Belarusian prime ministers on 29 September 2015, Dmitry Medvedev jokingly referred to hopes of replacing the European goods with “good supplies of citrus fruits, papaya, and some other exotic fruits that are grown well on Belarusian territory” (RUSSIAN GOVERNMENT, 2015).

occurred on a broader scale beyond the anecdotal evidence presented above. Thus, a systematic approach to detecting evidence of sanction evasion is presented in the following chapter.

3 Methodology

The sanction evasion analysis is based on trade flows between three country groups: the two parties which imposed sanctions on each other (Russia and the Western countries), as well those countries that have potentially offered a stage to circumvent those sanctions and which are referred to as intermediary countries.

Figure 3: Flow chart of the analyzed trade flows



The Western country group introducing sanctions against Russia has been restricted to the 12 most important trading partners with Russia prior to the imposition of sanctions (see Section 2). This set of a dozen countries includes Japan as a de facto placebo check (as Russia's largest trading partner outside of the three country groups). While Japan did join the remaining G7 member states in imposing (minor) financial sanctions, it refrained from restricting its goods exports to Russia and hence was not targeted by Russia's agricultural counter-sanctions.

Meanwhile, intermediary countries have been chosen either based on a joint border (adjacent countries are well known to trade more which is, for example, manifested by a standard border variable in gravity equations) or based on their role as a trading hub (large ports are often reported as frequent smuggling grounds and have been also investigated in the academic literature; see FISMAN and WEI, 2004). The former category includes Belarus, China, Georgia, Kazakhstan, North Macedonia, Serbia, Switzerland, and Turkey.¹¹ As trading hub countries, the

¹¹ Azerbaijan, Mongolia, and Ukraine were not included due to lack of available monthly data. Also, one should point out that Georgia also imposed sanctions on Russia, but only non-goods-related sanctions. Furthermore, Russia introduced sanctions against Turkey on 1 January 2016.

study includes Hong Kong and Singapore.¹² All country groups are illustrated in Figure 1.

Since the Western economies introduced sanctions on their exports and Russia on its imports, the analysis concerns only trade flowing — directly or indirectly — towards Russia (as indicated by the direction of the arrows in Figure 3).

The following analysis will also refer to trade flows from the Western economies to Russia as “direct flows”. Exports from the Western countries to the intermediary countries are referred to as the “first stage”, and those from the intermediary countries to Russia as the “second stage”.

3.1 Channels of sanction evasion

As described in the examples in Sections 1 and 2, there are numerous channels through which sanctions may be evaded. This paper differentiates between five such channels for potential sanction evasion (see Table 1), which are investigated using direct, first stage, and second stage trade flows. As import and export data for the same trade flow differ according to the reporting jurisdiction, differences between the two variables are also exploited to investigate some channels.

Each sanction evasion channel is analyzed in an event study-type setting, exploiting the variation across products in terms of which trade flows were (directly) impacted by the sanctions. The treatment variables (*sanctions_c*) thus take on unity whenever a given product was targeted and the sanctions are in force. In general, the difference-in-difference regression equation looks as follows:

$$Trade_{ijpst} = \sum_c \beta_c sanctions_{ijpst}^c + \gamma X_{ijpst} + \phi_{ijst} + \kappa_p + \epsilon_{ijpst} \quad (1)$$

for $c = \text{Russia, West}$

where the subscript i denotes the exporter, j denotes the importer, p denotes product (classified in one of 5,206 6-digit HS code products), s denotes the sector (classified into 21 HS sections),¹³ and t denotes time.

¹² United Arab Emirates was also considered but no monthly trade data were available.

¹³ The sectors are relatively broadly defined, as some Russian sanctions covered (nearly) entire 2-digit HS code groups (07 – Vegetables; and largely 08 – Fruits and Nuts). However, robustness checks are conducted with more detailed sector classification.

Table 1: Channels of sanction evasion

Stage Type	Direct		1st stage		2nd stage	
	Import data	Export data	Import data	Export data	Import data	Export data
Data reporter	Russia	Western	Interm.	Western	Russia	Interm.
Direct smuggling	↓/→*	→/↓*	→	→	→	→
Visible reexports	↓	↓	↑	↑	↑	↑
Indirect smuggling	↓	↓	(↑)	↑/→°	→/↑°	(↑)
Misclassification	↓†	↓†	→	→	→	→
Black market	↓	↓	→	→	→	→

Notes:

This table indicates expected changes (or there lack of) in trade flows of sanctioned products in relation to potential channels of sanction evasion. The → represents no expected changes, ↑ a trade increase, and ↓ a trade decline. The combinations containing an asterisk * should see a decline in the export data for goods facing export sanctions (i.e. by Western countries) and no change for other products; and vice versa for goods facing import sanctions (i.e. by Russia) in the case of import data. Similarly, flows marked with an ° should face an increase in trade for Western sanctioned goods in the second stage but no change in the first stage; and vice versa for goods facing Russian sanctions. The † sign relates to an expected increase in trade for similar products (based on neighboring HS codes). Lastly, brackets () are used in cases where the intermediary country may suppress trade statistics or, as in the case of the black market channel, shipments cross borders unreported in any trade figures.

The dependent variable is based on monthly product-level trade flows between a given country pair ij . Some regressions use other variables such as import-to-export-data ratios or net imports as the dependent variable (see the sanction evasion channels below), but they refer to the same $ijpst$ dimensions.

Most specifications contain two treatment coefficients with one *sanctions* variable each for Western and Russian sanctions. In some cases, however, the Western sanctions are split into two categories (partial ban and export licensing), as they varied according to the instrument applied on different products.¹⁴

The coefficient ϕ_{ijst} captures sector- and time-specific fixed effects for each country pair in the given regression. This set of fixed effects is meant to capture any sector-specific trends in trade flows between a pair of countries – in particular, in relation to the effect the financial sanctions imposed on Russia might have had

¹⁴ Note that in trade flows concerning the United States, the Western sanctions cover only the oil sector, as the United States, unlike the European Union, did not sanction exports of dual-use goods.

on trade across sectors. It also implies that the treatment variables explain the variation in trade flows between sanctioned and non-sanctioned products within a given sector. In addition, product-specific fixed effects are captured by the coefficient α_p .

Meanwhile, the set of controls X_{ijpst} is focused on other policy instruments that may have affected specific products in the studied time frame. Based on information concerning tariffs, sanitary and phytosanitary measures (SPS), technical barriers (TBT) as well as other non-tariff barriers, two policy covariates are included to capture other unilateral trade policies:¹⁵

- *Protectionist trade barrier* takes on unity if the given trade flow is facing protectionist at-the-border interventions introduced by the exporting country (e.g., export quotas) or the importing jurisdiction (e.g., a TBT). These interventions may, for example, include tariff increases, new licensing requirements, or import bans.
- *Liberalizing trade intervention* takes on unity if the given trade flow benefits from an at-the-border trade liberalization (e.g., a tariff reduction or the reversal of a previously implemented non-tariff barrier).

While Equation 1 focuses on the identification of the effect sanctions may have on trade flows in general, the event study setup allows the analysis of the strength of any potential effect over time. For that reason, a second regression equation is used where the sanction variables (dummy variables for sanctioned products) are interacted with time dummies:¹⁶

$$Trade_{ijpst} = \sum_c \beta_c sanctions_{ijpst}^c \xi_t + \gamma X_{ijpst} + \phi_{ijst} + \epsilon_{ijpst} \quad (2)$$

for $c = \text{Russia, West}$

The estimated coefficients from the interaction terms are then plotted as a time series to infer the effects of the sanctions over time. One would expect the coefficient to be indistinguishable from zero prior to the implementation of the sanctions (in August 2014) and potentially statistically significant after the treatment.

The regressions are estimated linearly at first. However, as most of the observations contain zero trade values and trade figures are known to be not normally

¹⁵ The covariates abstract from free trade agreements as none of the country pairs introduced new bilateral agreements in the given time frame.

¹⁶ The first period, January 2012, is used as a reference point.

distributed, all regressions are also run using a standard-practice pseudo-Poisson maximum likelihood estimation. This method has been proven to correct for both of the above-mentioned issues (SANTOS SILVA and TENREYRO, 2006) and is used as the baseline specification. Given the large amount of fixed effects, the regressions are conducted using the `ppmlhdfe` package in Stata by CORREIA ET AL. (2020).

The estimation is also repeated for particular country pairs and sectors in order to investigate in detail for which countries or industries the given sanction evasion channel might have played a role.

Direct smuggling

The first investigated channel relates directly to trade flows between the sanctioning countries, i.e., the Western economies and Russia. These flows are, by the very nature of trade statistics, reported by both the exporting and importing nation. While one would expect both figures to be identical, it is well-documented in the trade literature that export and import data often differ (MARKHONKO, 2014). These differences, also referred to as “bilateral asymmetry”, arise from varying accounting methods, where only importers include the related freight and insurance costs of shipments. Other known reasons relate to unclear sources of an import or the time delay between the point of departure and arrival of a good (BERGER and NITSCH, 2012).

While the above-mentioned arguments may explain general discrepancies between export and import data, Bhagwati found as early as 1964 that the level of discrepancy varies starkly across products and may often be associated with illicit trade. This variation in discrepancy is caused by flows being under- or overreported to evade import tariffs or other forms of trade controls. While there is generally a bilateral asymmetry in trade data, this asymmetry tends to increase when goods are smuggled across borders. ROZANSKI and YEATS (1994), FISMAN and WEI (2004), and BERGER and NITSCH (2012) provide more recent evidence that this phenomenon persists in modern trade data.¹⁷ Should such underreporting be present in the case at hand, export data from the Western economies would see declines with respect to goods sanctioned by the West but there would be a less pronounced decline in trade related to goods sanctioned by Russia. On the other hand, Russian import data would show the opposite effect, with the sanctioned agricultural goods collapsing, and the dual-use goods and oil-sector-related products continuing to be imported.

¹⁷ A further method for detecting smuggling in trade, proposed by Demir and Javorcik (2020), involves identifying deviations in the reported trade amounts from Benford’s law. As such an analysis would require transaction-level data (which are not available), this paper focuses on identifying smuggling based on bilateral asymmetry.

This hypothesis of no trade decline for the sanctioned goods in the target country's statistics rests on the notion that none of the firms concerned would enforce the ban and all would engage in the act of direct smuggling. As this notion is rather unlikely, the paper at hand shall instead use as the dependent variable in Equation 1 the logarithm of the ratio of import to export data for a given trade flow (henceforth, *tradegap*). This follows the method of Fisman and Wei (2004), with the difference being that here a unity is added to each value¹⁸ for trade data provided by the exporter and the importer:

$$\begin{aligned} tradegap_{ijpst} &= \log(1 + trade_{ijpst}^{importer}) - \log(1 + trade_{ijpst}^{exporter}) \\ tradegap_{ijpst} &= \sum_c \beta_c sanctions_{ijpst}^c + \gamma X_{ijpst} + \phi_{ijst} + \kappa_p + \epsilon_{ijpst} \end{aligned} \quad (3)$$

for $c = \text{Russia, West}$

As long as there are no accounting reasons for bilateral asymmetry to significantly increase for sanctioned goods compared to non-sanctioned products, changes to the *tradegap* could be attributed to an increase in smuggling behavior, given the mechanism described above. In this setting, one would expect the Western sanction coefficient to be positive and the Russian sanction coefficient to be negative when regressing on the *tradegap* in Equation 3:¹⁹

Hypothesis 3: For goods sanctioned by Russia, importer-based trade figures decline relatively stronger than exporter-based data, and vice versa for goods sanctioned by Western economies.

Furthermore, should direct smuggling be the main channel of sanction evasion, one would not expect a significant increase in trade flowing through the intermediary countries. Hence, one would expect no change in trading patterns between the Western and intermediary economies, or between the intermediary economies and Russia.

Visible re-exports

The second channel of potential sanction evasion focuses on trade flow patterns related to intermediary countries (see Figure 3) – sanctioned products are exported to one of the intermediary countries and then re-exported to Russia. In order to

¹⁸ The reason for this deviation from FISMAN and WEI (2004) is that, consistent with the implementation of any trade bans, one may expect no trade at all for some products but would still in those cases be very interested in absolute and relative changes between the export and import data.

¹⁹ Due to the large amount of fixed effects, the regressions are conducted using the *reg2hdfe* package in Stata by GUIMARAES and PORTUGAL (2010).

evade the Russian sanctions, the products would have to be relabeled with respect to their country of origin. In the case of the Western sanctions, they would have to be exported out of the Western economy destined for an intermediary country and then rerouted to Russia. While such re-exports are illegal under the sanctioning countries' legislation, evaded trade flows may have occurred undetected.²⁰

The study of this channel largely follows the methodology of EVENETT ET AL. (2017) and it would see increases in trade flows at both stages, that is, one would expect visible re-exports only if a sanction coefficient is positive in regressions based on Equation 1 for the first and the second stages:

Hypothesis 4: Following the sanction imposition, trade in sanctioned goods increases in the first and second stages relative to non-sanctioned goods.

A similar method has been also applied by ROTUNNO ET AL. (2013), who find that Chinese apparel exports were shipped through African countries after the United States imposed quotas on certain Chinese textiles. The authors' definition of a "quota-hopping export platform" may thus be compared with the intermediary countries in this paper. However, they find visible re-exports mostly for American imports facing no rules of origin when shipped from Africa; the observed trans-shipments were therefore legal – unlike potential visible re-exports in the current study.

Indirect smuggling

The third mechanism combines the previously described direct smuggling and visible re-exports channels, as it relates to goods being smuggled indirectly through an intermediary country. In the case of Russian sanctioned products, the goods would be smuggled into Russia, whereas for Western sanctioned products they would be smuggled out of the Western country. Hence, regressions for both the first and second stage are needed, as indicated in Figure 3. For products sanctioned by Russia, the Western economies would (visibly) export more Russian sanctioned goods to intermediary countries relative to non-sanctioned goods as relates to the first stage. In the second stage, the *tradegap* between import and export data would change in the same direction as analyzed in the direct channel for direct smuggling (see Equation 3). Meanwhile, for goods sanctioned by the

²⁰ In the case of Switzerland, for instance, a 2017 report for the Swiss parliament (PARLAMENTARISCHE VERWALTUNGSKONTROLLE, 2017) found no evidence of non-compliance in aggregate statistics. However, sanctions-related measures were insufficiently enforced. For example, only very few on-site inspections of sanctions compliance were carried out, and all of them were announced to the firm in advance. Furthermore, Swiss Customs reported that export restrictions – such as those enforced here by the Western economies – are particularly difficult to monitor due to time constraints and insufficient information about downstream activities.

Western countries, one would anticipate an increase in the *tradegap* in the first stage and a trade increase in the second stage:

Hypothesis 5: Goods facing Russian sanctions are exported to intermediary countries and then smuggled into Russia; Western sanctioned goods are smuggled into the intermediary countries and, in a second stage, shipped to Russia.

Using the example of Figure 2 described in Section 2, there are indications of indirect smuggling in the apple trade example for the years 2015 and 2016 in particular, when Belarusian exports to Russia significantly increased compared to pre-sanction levels according to Belarusian but not Russian data. This discrepancy would lead to a strong decrease in the *tradegap* for apples in the regressions related to the second stage trade flows.

Any findings related to the channel of indirect smuggling (as well as visible re-exports) rest on the smuggling entities registering their trade flows in the intermediary country. For example, should indirect smuggling of Russian sanctioned goods have occurred, the trade gap in the second stage flows will only be visible if the exports from the intermediary country were reported (and imports into Russia not reported). At the same time, even if the exports from the intermediary country were registered, the country might have decided to suppress these figures for political motives such as not wanting to anger the sanctioning jurisdictions, which may be crucial trading partners (see the example of Russia's reaction to Belarusian anecdotal evidence in Section 2). My analysis does not distinguish between the two mechanisms, but indications of indirect smuggling - even without export numbers rising - may be found in the data.

In Figure 2, this hypothesis would arise particularly for the year 2017, when Belarus officially imported nearly half a million tonnes of apples while exporting less than a sixth of that amount. This led to net imports being seven times higher than the figures registered before any sanctions were imposed. Whether this was a widespread phenomenon is analyzed by regressing on net imports of the intermediary countries. Should the hypothesis be supported, one would expect positive coefficients for the sanction variables in these regressions:

Hypothesis 6: Intermediary countries suppressed data on trade with the sanctioning economy for sanctioned goods.

For these regressions, the function differs slightly, as the subscript i refers to the intermediary country:

$$\text{Netimports}_{ipst} = \sum_c \beta_c \text{sanctions}_{ipst}^c \xi_t + \gamma X_{ipst} + \phi_{ist} + \kappa_p + \epsilon_{ipst} \quad (4)$$

for $c = \text{Russia, West}$

Lastly, one may argue that the increase in net imports can instead be explained by supply chain processing – firms in intermediary countries imported the sanctioned products, processed them, and exported them (also legally to Russia). Since the Russian sanctions were far more focused on raw materials and intermediate products, this mechanism can be tested for the sanctioned agricultural goods in particular:²¹

Hypothesis 7: Intermediary countries increased imports of sanctioned products in order to process them and (legally) re-export the processed goods.

To test this hypothesis, all goods are classified into intermediary and final goods using the Broad Economic Classification (BEC). Should the increase of net imports be related to supply chain processing, that effect would be more pronounced for intermediary goods. This hypothesis can therefore be tested by interacting the sanction coefficient in Equation 4 with an intermediate goods dummy. Evidence for supply chain processing would require a positive coefficient of the interaction term.

Misclassification

A further channel often explored in the context of illicit trade is the misclassification of products to avoid trade barriers. As indicated in the example related to the US-Chinese trade war in Section 1, misclassifications increased for products facing higher tariffs. Similar findings were recorded by FISMAN and WEI (2004), with imports of resembling products increasing following the imposition of higher Chinese tariffs.

The current paper follows the methodology of these authors and assumes goods classified in the same four-digit HS category to be similar. Hence, misclassifications are analyzed by looking at the trade patterns of products which

²¹ An alternative analysis would involve investigating the exports of intermediary countries for downstream products processed from the sanctioned products. However, as available input-output tables are relatively coarse, it is not possible to distinguish downstream products made from sanctioned versus non-sanctioned products.

were not sanctioned but were located in the same four-digit HS code as at least one sanctioned good:

Hypothesis 8: Trade in products adjacent to the sanctioned ones increases.

In this case, the analysis is restricted to Western sanctions as nearly all Russian sanctions were relatively broad (covering each time a 4-digit HS code group). Applying the same methodology for similar products on the 2-digit HS code level to accommodate for the Russian sanction structure would be overly coarse.

Black market

Unlike the previous channels, the notion behind the fifth channel is that any sanction evasion is undetectable, as the sanctioned goods are shipped via the black market instead. Unlike the case of direct smuggling, they do not appear in exports from the Western economies. Furthermore, should goods be smuggled undetected through the black market, this would reduce the total potential amount of sanction evasion estimated in this analysis. The identified amounts may thus be seen as likely lower bounds on the aggregate extent of sanction evasion.

3.2 Methodology-related issues

Trade diversion

Two of the five sanction evasion channels – indirect smuggling and visible re-exports – explicitly involve trade with intermediary countries. However, the observed trade patterns may not necessarily be related to illegal activities but instead to trade diversion (e.g., HAIDAR, 2017). Rather than trade being routed through intermediary countries, market forces may lead to Western suppliers diverting their goods from the barred Russian market to the markets of the intermediary countries (BOWN and CROWLEY, 2007). At the same time, firms from intermediary countries may exploit the new Russian market conditions and increase their exports to Russia, where they no longer face competition from Western firms (for the sanctioned goods).

Unlike the studied sanction evasion channels, this would fully comply with the legal frameworks of all affected countries. However, the following discussion provides evidence that potential trade diversion may be of limited concern.

First of all, while trade diversion does not weaken the direct enforceability of sanctions, it weakens their effectiveness. The more firms are able to divert their sales, the less of an economic impact the sanctions will have on the target economy. Therefore, should any of the sanction evasion channels through intermediary countries be substantiated, this would provide at the very least evidence of a reduced effectiveness of the sanctions – even if not necessarily due to sanction evasion. In addition, shifting economic ties away from the sanctioning jurisdictions (to intermediary countries) weakens the ability of the sanctioning country to introduce sanctions in the future, as the target economy reduces its dependence on the sanctioning market.

Furthermore, entering a new market is associated with MELITZ (2003)-like fixed costs, resulting in exporters entering markets only gradually (RUHL and WILLIS, 2017). It is thus questionable whether such vast amounts of goods can be shifted to a new market in such a short space of time (ASKARI ET AL., 2009). If the observed trade shifts are indeed linked to trade diversion, one would expect them to occur gradually over the space of several years, as investigated in estimations based on Equation 2.

The current paper also takes into account that the sanctions may have increased trade with intermediary countries (and thereby led to trade diversion) in the context of global supply chains, as described in the section on indirect smuggling. For instance, it would be within the legal bounds of the sanctions for a Belarusian company to import milk from the European Union, produce dairy products from that milk, and export them to Russia, even though shipping both product categories from the European Union into Russia was banned under the agricultural counter-sanctions. Such supply chain adjustments are, however, likely to occur only over time, not immediately after the imposition of sanctions. The role of the sanction evasion and trade diversion mechanisms could also be investigated in regressions on particular subsamples of countries or sectors. For sanction evasion to hold, the effects need to align for the first and second stages for particular countries and sectors, when only those subsets are regressed. Should there be a lack of alignment, this would point to trade diversion.

Lastly, the intermediary markets are usually much smaller than the Russian market (with the notable exceptions of China and Turkey). Trade related to the first stage would face demand size constraints, whereas trade diversion related to the second stage would be limited by relatively small supplies in the intermediary countries. Hence, if, for instance, trade diversion linked to the second stage did take place, one would expect it to be concentrated in those goods for which the

intermediary country possessed a comparative advantage and exported in large amounts beforehand.²²

Identification

A key concern related to the identification strategy is that the sanctioned products were not chosen at random but instead have been strategically selected by the implementing jurisdictions. This could become particularly concerning should trade in sanctioned products follow a different trend, and thus conflict with the parallel trends assumption needed for the difference-in-difference setting.

One method of investigating whether this concern is substantiated relies on checking the pre-treatment trends (e.g., FREYALDENHOVEN ET AL., 2019). Should there be no significant differences in trade flows for sanctioned and non-sanctioned products prior to their implementation in August 2014, this would provide evidence that the parallel trends assumption indeed holds. For this purpose, the coefficients on the treatment and time dummies interaction prior to treatment are checked based on Equation 2.

Furthermore, one should point out that roughly at the same time as the imposition of the goods sanctions, the Russian economy faced a recession following a rapid fall in the price of oil (see Figure B.1) (DREGER ET AL., 2016). Hence, a rich fixed effects setting has been chosen which should capture sector-specific time trends. For endogeneity to be a concern, for example, the oil price collapse would have to impact sanctioned products (e.g., pork) and non-sanctioned products (e.g., lamb) within the same sector differently.

4 Data

The main data were obtained from the ITC Trade Map, as it contains the most comprehensive compilation of monthly trade statistics. These data are supplemented with trade figures for Belarus, Hong Kong, and North Macedonia from the UN Comtrade monthly trade database. Neither of the two data sources provides sufficient data for Azerbaijan, Mongolia, and Ukraine (as indicated in Figure 1). Furthermore, data for Hong Kong for October 2013 and for the Netherlands for December 2016 are missing. Otherwise, the obtained dataset consists of a balanced panel for direct, first stage, and second stage trade flows

²² Therefore, should large-scale sanction evasion through intermediary countries be identified, the sanction effect could be interacted in the second-stage regressions with the country's pre-sanction export strength of a given product. For the potential evasion discovered to be linked to trade diversion, the estimation should show a positive coefficient for the interaction term.

covering a total of 142 country pairs (see Figure 3) for 60 continuous months from January 2012 until December 2016. The timeframe is capped at the period 2012 until 2016, as Russian monthly trade statistics are available only starting from 2012 and several jurisdictions report only scarcely from 2017 onwards.

Coincidentally, the selected period matches the five-year cycle of the HS product classification system, allowing one to forgo the reclassification of HS codes for consistency. Furthermore, data from the ITC Trade Map are aggregated to the 6-digit HS code level, despite more granular data being available. This is done because lower-level HS structures are not coordinated between countries, which would impede in particular the comparison of importer and exporter data (see Equation 3). Residual product codes such as 999999 covering 4.1% of total trade have been excluded as they cannot be assigned to any standard HS code and usually relate to confidential transactions.²³

In the context of indirect smuggling (Equation 4), annual trade data from UN Comtrade were used, as this required total import and export data for each intermediary country.

The monthly trade statistics are unavailable for Belarus, Hong Kong, and North Macedonia. Therefore, this part of the analysis is conducted using annual data instead. The sanction variables receive a value of 1 where appropriate for the years 2015 and 2016, and a value of $\frac{1}{2}$ for 2014, since the sanctions came into force in August.

With regards to the main monthly trade dataset, the summary statistics show that mean trade flows are between \$110,000 and \$150,000. Furthermore, trade figures provided by exporters are on average smaller in first stage flows (in line with usual trade data), but this is reversed for exports to Russia, as indicated by the average negative trade gap for direct and second stage flows.

Information on the relevant sanctions was obtained from the legal documents of the implementing jurisdictions. As indicated in Table 2, 14–15% of observations have been affected by Western sanctions, with the vast majority of these (13–14% of total observations) focused on dual-use goods and only roughly 1% on goods in the oil industry. Products facing Russian countersanctions account for around 7% of the trade flows.

²³ Russian imports in these confidential trade categories increased significantly in the months of May to July 2014, especially from the United States. However, the numbers quickly declined thereafter and there is no statistically significant change to confidential trade following the imposition of goods sanctions.

Table 2: Summary statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
Direct flows					
<i>trade^{importer}</i>	139,006	1,702,253	0	541,484,000	3,725,280
<i>trade^{exporter}</i>	149,029	1,904,472	0	502,990,941	3,725,280
<i>tradegap</i>	-0.365	4.043	-19.859	18.722	3,725,280
sanctions Russia	0.074	0.261	0	1	3,725,280
sanctions West	0.136	0.343	0	1	3,725,280
protectionist policy	0.08	0.271	0	1	3,725,280
liberalising policy	0.01	0.098	0	1	3,725,280
First stage flows					
<i>trade^{importer}</i>	130,270	6,027,175	0	11,210,574,000	36,644,424
<i>trade^{exporter}</i>	114,104	4,805,734	0	7,430,435,483	36,654,620
<i>tradegap</i>	0.029	3.149	-22.425	22.514	36,593,444
sanctions Russia	0.065	0.246	0	1	36,705,600
sanctions West	0.138	0.345	0	1	36,705,600
protectionist policy	0.016	0.127	0	1	36,705,600
liberalising policy	0.01	0.098	0	1	36,705,600
Second stage flows					
<i>trade^{importer}</i>	110,749	2,228,885	0	1,022,441,000	3,058,800
<i>trade^{exporter}</i>	113,872	1,798,663	0	398,394,000	3,053,702
<i>tradegap</i>	-0.058	2.787	-19.296	20.042	3,053,702
sanctions Russia	0.065	0.246	0	1	3,058,800
sanctions West	0.151	0.358	0	1	3,058,800
protectionist policy	0.069	0.253	0	1	3,058,800
liberalising policy	0.005	0.072	0	1	3,058,800

Meanwhile, the policy covariates were largely constructed based on information from the Global Trade Alert (GTA), which summarizes economic policy interventions taken unilaterally by governments since November 2008 that affect foreign commercial interests (EVENETT, 2019). The database contains detailed information on the affected products at the 6-digit HS code level, the affected jurisdictions, the type of intervention, as well as the inception and removal dates of each policy intervention. The protectionist and liberalizing trade barrier covariates are constructed as dummy variables that take on unity when at least one at-the-border trade policy was in force for a given product-country pair-month combination. These at-the-border policies include import tariffs, licensing regimes, contingent trade-protective measures, and quotas.

The GTA information is supplemented by SPS and TBT notifications obtained from the WTO notification databases. As the affected HS codes are not reported for roughly half of the notifications, relevant policy measures are identified

using corresponding ICS codes and word associations from the notification descriptions. Table 2 indicates that between 1.6% and 8% of the observations face a protectionist trade barrier depending on whether one looks at direct, first stage, or second stage trade flows. However, it is noticeable that exports to Russia face on average more protectionist policies. Liberalizing policies affect only 0.5–1% of the observations.

5 Results

This section first assesses how much trade has been lost due to the sanctions, before turning to the posited hypotheses with respect to the various sanction evasion channels in the second subsection. For those channels where evasion is detected, it will be quantified and benchmarked against the aggregate amount of (lost) trade.

5.1 Impact of the sanctions

Prior to analyzing the channels of sanction evasion, the effectiveness of the sanctions ought to be assessed first. If there were no trade reduction caused by the measures, no efforts would be necessary to study their evasion.

The first analysis is based on the difference-in-difference setting specified in Equation 1. As indicated in Table 3, the Russian sanctions have significantly reduced imports from the Western economies. The effect is stable to different choices of covariates, although it is less pronounced when using export data instead of import data (columns 5–7 and 2–4, respectively).²⁴ Figure 4 shows that this trade reduction caused by the Russian sanctions remains persistent over the two and half years following their imposition.

²⁴ As a robustness check, the regressions were also run with a more conservative definition of sectors at the 2-digit HS code level. The results are very similar, with only the Russian sanction coefficient being ca. a third lower. This is expected, as most Russian sanctions target entire 2-digit HS codes (see Table A.1).

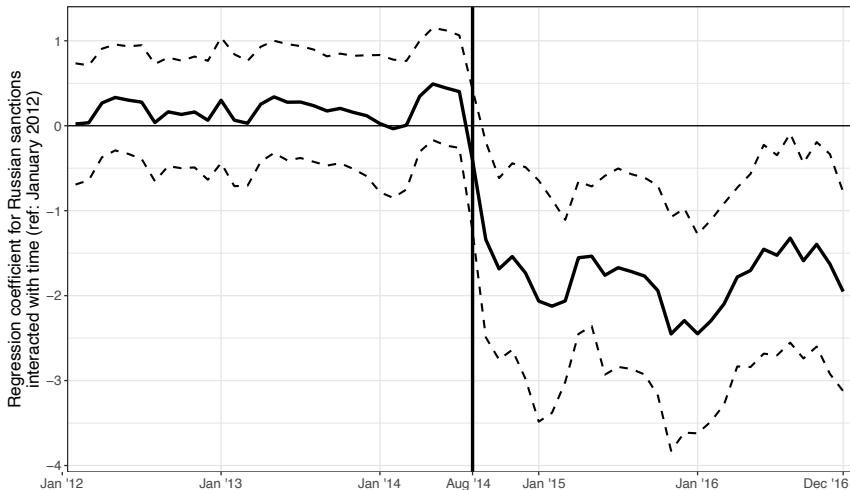
Table 3: Regression results for direct trade flows

	(1) Import data	(2) Import data	(3) Import data	(4) Import data	(5) Export data	(6) Export data	(7) Export data
Regression	linear	PPML	PPML	PPML	PPML	PPML	PPML
sanctions	-0.430***	-1.852***	-1.852***	-1.852***	-1.513***	-1.513***	-1.513***
Russia	(0.071)	(0.113)	(0.113)	(0.113)	(0.096)	(0.096)	(0.096)
sanctions	-0.049***	0.086***	0.071***		0.112***	0.136***	
West	(0.013)	(0.023)	(0.025)		(0.035)	(0.040)	
sanctions West				0.073***			0.132***
dual-use				(0.026)			(0.040)
sanctions West				0.073			0.033
oil technology				(0.064)			(0.100)
misclass. West			-0.040		0.065**		
			(0.028)		(0.027)		
misclass. West				-0.018			0.058**
dual-use				(0.030)			(0.027)
misclass. West				-0.100*			0.045
oil technology				(0.057)			(0.058)
Covariates	Yes						
FEs	Yes						
<i>R</i> ²	0.526	0.734	0.734	0.734	0.735	0.735	0.735
N	1,020,551	3,132,029	3,132,029	3,132,029	3,274,785	3,274,785	3,274,785

Notes:

The regressions are based on Equation 1. Standard errors clustered at the sector-country pair-time level in parentheses. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. For the PPML regressions a Pseudo R^2 is displayed. The dependent variable in the linear regression is logarithmised, i.e., it only includes positive trade flows.

Figure 4: Russian sanction coefficient in direct trade flows over time



Notes:

This figure illustrates the effect of Russian sanctions on direct trade flows over time. The coefficient is based on Equation 2 and the standard errors are clustered at the sector-country pair-time level. The dotted lines represent the 95% confidence interval for each month's estimated coefficient. January 2012 serves as the reference time point.

According to the figure, there was also no statistically significant effect of the sanctions prior to their announcement, which may address the selection issues raised in Section 3.

There is a slight positive increase in the months prior to August 2014 (relative to the referenced January 2012); however, the rise is not statistically significant based on the 95% confidence interval. This result supports Hypothesis 2 that there are no anticipation effects of the sanctions, as they were implemented rapidly.

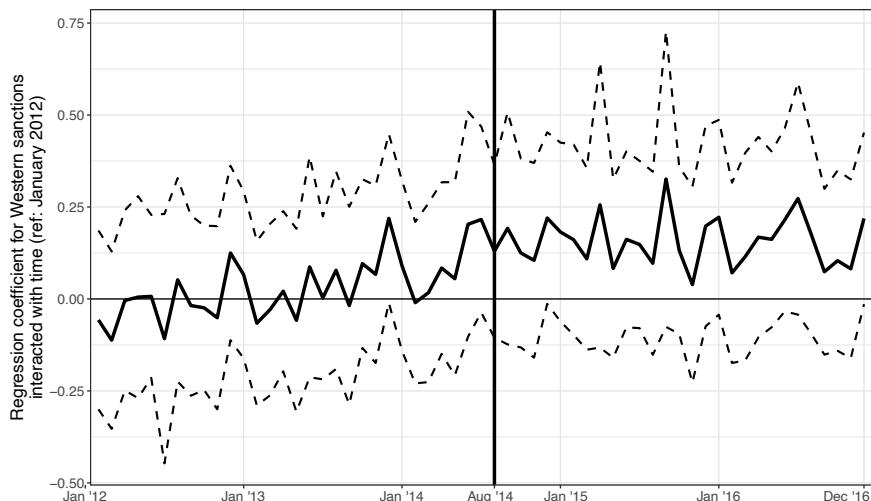
The negative impact of the Russian sanctions also holds separately for all eleven studied Western economies facing sanctions (see Table B.5 in Appendix B). The strongest declines occurred for Belgium, Poland, and Spain. Meanwhile, the placebo regressions conducted for Japan and depicted in Table B.3 show no significant changes to trade patterns for goods sanctioned by Russia compared to other goods within those sectors.²⁵ In terms of sectors, the animal and vegetable industries were more severely impacted in relative terms than food processing (see Table B.6).

²⁵ The export data-based regressions show a small positive coefficient; however, it is statistically significant only at the 10% level.

Hypothesis 1 is also supported by the empirical results, as the negative impact is significantly greater for Russian sanctions than for Western sanctions. In fact, the effect of the Western measures is even positive, though significantly smaller in absolute terms than the counterpart's negative effect. Based on columns 4 and 7 in Table 3, this positive effect is driven by the sanctions on dual-use goods. Given that the list of dual-use items was constructed in 2005 (with only minor annual amendments since), it is hard to argue that the positive coefficient may be explained by endogeneity concerns. Rather, these results point to a potentially ineffective use of the Western sanctions. Another explanation could be that, as explained in Section 2, the dual-use measures affected only parts of the studied 6-digit HS codes and were banned solely for military purposes. The available trade data thus do not allow for a conclusive statement on the impact of the Western sanctions related to dual-use goods.

A similar conclusion can be drawn based on the Western sanction coefficient for individual month-year combinations. As shown in Figure 5, there is a rise in the coefficient around the time the sanctions were introduced – notably already prior to their imposition. However, all of the time-specific coefficients are indistinguishable from zero based at the 95% confidence interval.

Figure 5: Western sanction coefficient in direct trade flows over time



Notes:

This figure illustrates the effect of Western sanctions on direct trade flows over time. The coefficient is based on Equation 2 and the standard errors are clustered at the sector-country pair-time level. The dotted lines represent the 95% confidence interval for each month's estimated coefficient. January 2012 serves as the reference time point.

In terms of country variation, the significant increase was observable for seven of the eleven countries²⁶ (see Table B.5). Furthermore, the increase is concentrated in the construction, textile, and machinery industries (Table B.6), as only six of the thirteen sectors concerned saw significant increases. Two sectors (chemicals and wood) even recorded significant negative impacts from the Western sanctions.

Overall, these results suggest that Russian sanctions were more effective (in terms of trade flows aggregated to 6-digit HS codes) and I am more likely to observe evasion for sanctioned agricultural products. The following evasion analysis therefore puts a strong emphasis on the Russian as opposed to the Western sanctions. Also, the size of any detected evasion is benchmarked against the estimated direct loss from the goods sanctions. Keeping everything else constant, the goods sanctions alone reduced imports of agricultural produce into Russia from the (studied) eleven sanctioned countries by \$5.633 billion between August 2014 and December 2016, according to the regression specification 3 in Table 3. This is equivalent to 59.73% of the total agricultural imports in 2013 affected by the sanctions.²⁷ While this loss over nearly two and half years may appear surprisingly low given that roughly half of all agricultural imports were banned, one should take into consideration that these goods also faced numerous other sanctions such as new restrictions on trade finance. Furthermore, the finding is in line with Crozet and Hinz (2020), who show that the majority of the goods trade decline was caused by non-goods sanctions.

5.2 Testing the sanction evasion channels

Direct smuggling

Evidence of direct smuggling is detected by comparing exporter- and importer-reported trade flows of the sanctioned products. In line with Hypothesis 3, the estimated decline for goods facing Russian sanctions is more pronounced in data reported by Russia than in the equivalent export data from the Western sanctioned economies (see Table 3). This difference is further explored in *tradegap* regressions based on Equation 3. As the estimated coefficients for Russian sanctioned goods in Table 4 are statistically significant at any of the usual levels, the estimation further strengthens the claim that direct smuggling occurred for products sanctioned by Russia following the imposition of the sanctions. The

26 Interestingly, there is an even stronger increase in sanctioned dual-use products from Japan (see Table B.3) than for any of the countries that imposed sanctions on dual-use goods.

27 According to export data-based estimates in specification 6 in Table 3, the decline was lower at \$4.227 billion, or to 44.82% of the 2013 agricultural imports affected by the sanctions. This difference is discussed in the context of direct smuggling in the following subsection.

obtained coefficient remains stable when the regression is repeated only for those observations that saw positive trade of at least \$50,000 in both the export and import data.²⁸

Table 4: Regression results for direct smuggling

	(1) <i>Tradegap</i>	(2) <i>Tradegap</i>	(3) <i>Tradegap</i>	(4) <i>Tradegap</i>
sanctions	-0.165*** (0.039)	-0.161*** (0.039)	-0.161*** (0.039)	-0.157*** (0.039)
Russia				
sanctions	0.009 (0.018)	0.030 (0.019)		-0.010 (0.011)
West				
sanctions West			0.010 (0.019)	
dual-use				
sanctions West			0.503*** (0.073)	
oil technology				
Sample	Full	Full	Full	Int. margin
Covariates	No	Yes	Yes	Yes
FEs	Yes	Yes	Yes	Yes
<i>R</i> ²	0.154	0.155	0.155	0.271
N	3,414,840	3,414,840	3,414,840	336,144

Notes:

The regressions are based on Equation 3. Standard errors clustered at the sector-country pair-time level in parentheses. Significance levels: * p < 0.10, ** p < 0.05, *** p < 0.01.

Based on the relevant coefficient from the third specification in the table, a back-of-the-envelope calculation is conducted to estimate the approximate value of goods that may have been directly smuggled into Russia.²⁹ If the sanctions had not been imposed, the *tradegap* between the import and export data of the sanctioned products would have been around 16 percentage points higher.³⁰ In other words, the sanctions led to import data being underreported for the sanctioned products. The counterfactual amount of trade using import data without the effect of the sanctions is around \$187 million higher, providing a rough estimate of the amount smuggled directly in trade between the eleven Western economies and

28 The threshold of \$50,000 to define the extensive margin is based on the widely used definition from EVENETT and VENABLES (2002).

29 This estimation is based on the assumption that no factors other than smuggling will have impacted the bilateral asymmetry of import and export data for the sanctioned products relative to other products in the given sector.

30 Before the sanctions were imposed, the average observation for a good sanctioned by Russia was \$105,670 according to import data and \$93,020 based on export data. After August 2014, the *tradegap* turned negative as the average flow was \$8,053 and \$9,192, respectively.

Russia. This is equal to 3.31% of the total estimated decline in direct trade flows of sanctioned agricultural goods.

Interestingly, specification 3 in Table 4 provides evidence of direct smuggling of oil-sector products facing Western sanctions as well. In line with Hypothesis 3, the coefficient for Western sanctioned products is positive. The *tradegap* increased by around 50% for those goods, despite no trade decline being estimated in the direct channel (see regressions 4 and 7 in Table 3). No such effects were detected for dual-use goods.

Repeating the *tradegap* regression for Japan as a placebo test (see specification 5 in Table B.3), the bilateral asymmetry between the import and export data did not significantly change for the Western sanctioned goods relative to non-sanctioned goods. While there is a small increase in the Russian sanctions coefficient, the estimate is statistically significant only at the 10% level. These findings largely support the notion that no direct smuggling occurred for Japan, as it did not impose goods sanctions and it did not face Russian countermeasures.

Visible re-exports

Following EVENETT ET AL. (2017) and ROTUNNO ET AL. (2013), a further method of investigating sanction evasion involves analyzing trade flows through intermediary countries (see Figure 3). Should re-exports of sanctioned goods have taken place, there would be a significant increase in trade in sanctioned goods relative to non-sanctioned goods at both stages of evasion.

As indicated in Tables 5 and 6, there is no evidence that such visible re-exports occurred for goods sanctioned by Russia in the context of all the studied intermediary countries combined. Neither is there evidence of re-exports for any individual sector (see Tables B.9 and B.12). However, three intermediary countries did significantly import more products sanctioned by Russia from the Western economies (see Table B.8): Belarus, Kazakhstan, and Georgia.³¹ All three of these countries border Russia and the former two are part of the Eurasian Economic Union — a customs union led by Russia — making transportation without strict border controls more likely.

³¹ Note that a significant effect for each of three economies is detected only when regressions are based on import (and not export) data. Also, the regression relating to Turkey indicates a slight increase for Russian sanctioned goods as well; however, that effect is significant only at the 10% level.

Table 5: Regression results for first stage trade flows

	(1) Import data	(2) Import data	(3) Import data	(4) Export data	(5) Export data
Regression	linear	PPML	PPML	PPML	PPML
sanctions	0.060** (0.024)	0.046 (0.111)	0.046 (0.111)	-0.161 (0.117)	-0.161 (0.117)
Russia					
sanctions	-0.096*** (0.008)	-0.351*** (0.026)		0.216*** (0.053)	
West					
sanctions West			-0.342*** (0.027)		0.232*** (0.055)
dual-use					
sanctions West			-0.338*** (0.042)		-0.116** (0.050)
oil technology					
Covariates	Yes	Yes	Yes	Yes	Yes
FEs	Yes	Yes	Yes	Yes	Yes
<i>R</i> ²	0.484	0.809	0.809	0.788	0.788
N	6,822,405	32,850,185	32,850,185	31,731,981	31,731,981

Notes:

The regressions are based on Equation 1. Standard errors clustered at the sector- country pair-time level in parentheses. Significance levels: * p < 0.10, ** p < 0.05, *** p < 0.01. For the PPML regressions a Pseudo *R*² is displayed.

While a significant increase in trade of sanctioned goods in the first stage is a necessary condition for visible re-exports, this evasion channel requires a similar increase in the second stage as well. However, such a surge is documented only for one of the three jurisdictions, namely, Kazakhstan. The regressions therefore provide only very limited evidence for Hypothesis 4.

In a counterfactual exercise without the effect of the sanctions for Kazakh trade, exports of the sanctioned agricultural products from the eleven studied Western countries to the Central Asian economy would have been \$163.4 million lower. In the second stage, Kazakh exports to Russia for those goods would have been \$92.4 million lower. Taking the lower of the two figures as an approximation of the detected visible re-exports, this amount represents 1.64% of the estimated decline in Russian sanctioned goods.³² Meanwhile, the Western sanctions coefficients indicate statistically significant changes for Western sanctioned goods compared

³² As suggested in Section 3, the visible re-exports could have occurred due to trade diversion rather than re-exports per se. Therefore, a sector-level regression for Kazakhstan is conducted for both stages. The estimates are particularly large and significant for HS section I and are aligned for both stages, providing support for the re-export hypothesis.

to non-sanctioned goods in both stages. In the first stage, all flows of Western sanctioned goods seem to fall except for dual-use goods when using export data. The second stage sees increases across the board – with the exception of goods related to the oil industry when using (Russian) import data. Similarly to the regressions on the impact of sanctions (see the previous subsection), the results related to Western sanctions are unexpected. They not only reject Hypothesis 4 but provide statistically significant results in the opposite direction to expected. In order to test what drives these results in further detail, more fine-grained trade data on the Western sanctioned products would be required.

Table 6: Regression results for second stage trade flows

	(1) Import data	(2) Import data	(3) Import data	(4) Export data	(5) Export data
Regression	linear	PPML	PPML	PPML	PPML
sanctions	0.166** (0.065)	0.107 (0.110)	0.107 (0.110)	0.141 (0.111)	0.141 (0.111)
Russia					
sanctions	0.077*** (0.020)	0.138** (0.060)		0.182*** (0.039)	
West					
sanctions West			0.141** (0.061)		0.166*** (0.040)
dual-use					
sanctions West			0.041 (0.071)		0.537*** (0.139)
oil technology					
Covariates	Yes	Yes	Yes	Yes	Yes
FEs	Yes	Yes	Yes	Yes	Yes
<i>R</i> ²	0.520	0.794	0.794	0.801	0.801
N	519,551	2,681,985	2,681,985	2,639,659	2,639,659

Notes:

The regressions are based on Equation 1. Standard errors clustered at the sector-country pair-time level in parentheses. Significance levels: * p < 0.10, ** p < 0.05, *** p < 0.01. For the PPML regressions a Pseudo *R*² is displayed.

Lastly, the regressions in Table B.11 show a significant surge in Russian sanctioned goods in the second stage from Serbia. However, this strong effect is observed only for the second stage, as the coefficient in the first stage (see column 7 in Table B.8) is both small and statistically insignificant. This result may point towards trade diversion rather than sanction evasion regarding agricultural goods originating from Serbia.

Indirect smuggling

In the context of visible re-exports, Belarus and Georgia saw increases in Russian sanctioned products in the first stage, but there were no significant surges in trade flows related to the second stage. As suggested by Hypothesis 5 on indirect smuggling, sanction evasion could have also occurred by routing Russian sanctioned goods to intermediary countries and then smuggling them indirectly from these neighboring or trade hub countries. If this channel were present, one would expect a decrease in the tradegap for the Russian sanction coefficient in the second stage regressions, since the smuggled products would appear only in the export data and not in the import data between the intermediary countries and Russia.

As indicated in Table B.11 in Appendix B, the Russian sanction coefficient is significantly negative only for Georgia (and is positive for Belarus). Across all countries, the coefficient is positive at the 5% significance level and turns negative when the sample is reduced to flows on the intensive margin (see columns 1–4 in Table B.11). There is thus limited evidence of indirect smuggling occurring in relation to the Russian sanctions. For Georgia, the estimated smuggled amount is equal to \$38.95 million for the years 2014–2016. While this amount may seem negligible, it corresponds to 57% of Georgia's 2013 imports of the (Russian) sanctioned products from the eleven Western economies and 3.36% of Georgia's total 2013 imports from those countries.

Looking at potential indirect smuggling of Western sanctioned goods, we see an increase in the tradegap in the first stage only for oil-technology goods and a slight decrease in the coefficient for dual-use goods (Table B.7). However, for indirect smuggling of the Western sanctioned oil goods to have occurred as described in Hypothesis 5, there would have to be a significant increase in trade in the second stage flows. As the results show a surge only using export data and not import data, I conclude that there is insufficient evidence to support the case for large-scale indirect smuggling of goods related to the Western sanctions. There is also no indication for such sanction evasion using country-specific regressions (see Tables B.8 and B.11).

Given the limited evidence for indirect smuggling, one may have to take into account the possibility of data suppression or unreported trade, as suggested by Hypothesis 6 in Section 3. Therefore, potential effects of sanctions on net imports are analyzed as described in Equation 4. On aggregate, there is no significant effect of the sanctions on the net imports of the intermediary countries.³³ However,

³³ Also, Figure 2 indicates that data suppression became a problem only in 2017. Hence, the regressions were also run for specific years, and no significant effects were found.

when the regressions are repeated on a country level (see the upper part of Table B.13), a strong and statistically significant (Russian) sanction coefficient stands out for Belarus. In fact, based on the estimated coefficient, counterfactual net imports of goods sanctioned by Russia *ceteris paribus* would have been less than half as large. This corresponds to roughly US\$771 million, or 32% of Belarus' net import value in 2013 (for the sanctioned products). Notably, this figure relates to total net imports and not only the eleven studied Western economies. Since the first stage regressions (see Table B.8) represent a trade increase in sanctioned goods worth \$163.7 million (42.75% of 2013 trade in the sanctioned products), this amount provides a more comparable estimate of indirect smuggling through Belarus.

As described in Section 3, the effect of net imports is also analyzed in an interaction term with an intermediate goods dummy (see Hypothesis 7). If the rise in net imports were due to supply chain adjustments rather than indirect smuggling, we would expect the interaction term of the sanction coefficient and the intermediate good dummy to be positive. However, the coefficient in the context of Belarus is not statistically significant (see the lower part of Table B.13).

Lastly, in the context of Figure 2, it was discussed that some amount of sanction evasion may have occurred by forging the certificates of origin to disguise the products' EU origin before being shipped to Russia (YELISEYEU, 2017). This was investigated using annual world product-level import and export data for the years 2012 to 2016. Indications of forgery were identified through unlikely origin-product combinations of intermediary countries' imports, defined as combinations that were not recorded in a given year in the imports of any other destinations (i.e., not intermediary countries) as well as not in the exports of those origin countries. Several hundred such combinations were found but there was no significant uptick in anomalies after August 2014. Sanctioned products were also no more likely to experience such unusual flows when the statistics were checked for individual intermediary countries. I hence conclude that there is no evidence of large-scale forging of certificates of origin in the context of the evasion of sanctioned goods.

Misclassification

The last investigated channel for sanction evasion relates to one of the most frequently used statistics to detect the evasion of trade policies. Actors may try to avoid a given policy by misspecifying their product as a similar good that does face the trade barrier. Given that Russian sanctions were defined relatively coarsely, the current analysis is restricted to the goods facing Western sanctions. For those products, I find a statistically significant increase only in relation to

dual-use goods, which on average did not face a decline in the first place (see specifications 4 and 7 in Table 3). I therefore reject Hypothesis 8.

Overall, I find only limited amounts of sanction evasion in relation to the Ukraine crisis, given that the total amount of lost trade between 2014 and 2016 due to the Russian sanctions is estimated at \$5.633 billion. For Western sanctioned dual-use goods, I even estimate a trade increase for direct flows between the Western economies and Russia. However, the evasion that was detected is observed across numerous channels. Apart from evidence of around \$187 million of trade being directly smuggled, there are indications of sanction evasion through intermediary countries. Interestingly, the countries concerned all border Russia and two of them share a customs union with Russia. Sanctioned products worth \$92 million may have been visibly re-exported through Kazakhstan, while \$39 million worth of agricultural produce may have been indirectly smuggled through Georgia. Lastly, a surge in Belarusian net imports of sanctioned products may indicate indirect smuggling of products worth \$164 million. The combined total of \$482 million represents 8.56% of the total estimated decline in direct trade flows resulting from the Russian sanctions on agriculture. While these estimates should be treated as back-of-the-envelope calculations, they amount to a non-negligible share of total trade – especially considering the exclusion of undocumented trade between Western economies and Russia (see the black market channel in Table 1).

Furthermore, one should note that the above analysis was conducted to investigate large-scale sanction evasion across numerous channels for two dozen countries. The results abstract from firm- or product-specific cases of evasion evidence as presented anecdotally in Figure 2. Further analysis of individual cases of sanction evasion would require transaction-level data ideally from all countries concerned. This, however, would require a level of cooperation between the jurisdictions that imposed sanctions on each other.

6 Conclusion

In this paper, I investigate whether sanctions imposed in the wake of the Ukraine crisis by Western countries and Russia have been evaded by analyzing monthly product-level trade patterns. Consolidating different methods from the literature related to the detection of illicit trade, I find that goods sanctions imposed by the Russian government in particular have most likely been evaded. While the detected amounts do not call into doubt the general effectiveness of the sanctions, they are non-negligible. Roughly \$482 million, or 8.56% of the total estimated trade loss of \$5.633 billion from the Russian sanctions, may have been smuggled either directly or through Russia's neighboring countries.

In terms of policy implications, as more than half of the estimated evasion involves trade flows through Belarus and Kazakhstan, the findings highlight the importance of trade policy coordination with third countries, especially if these are part of the same customs union.

This analysis shows numerous indications of how sanctions may be smuggled. In order to provide further robustness to these results, more fine-grained data would be necessary (particularly to estimate the impact of the Western sanctions). Such resources would allow an investigation of other indications of illicit trade as well, such as deviations from Benford's law (DEMIR and JAVORCIK 2020).

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Appendix A: Sanctions introduced in relation to the Ukraine crisis

Table A.1: Russia's main trading partners based on 2013 import data

Exporter	Trade Value (in m USD)	Country category	Share	Cumul. share	Rus. sanct.	West. sanct.
World	314,945	-	100.00%	-	9,431	65,982
China	53,173	Intermediary	16.88%	16.88%	980	18,752
Germany	37,905	Sanctions	12.04%	28.92%	814	9,529
USA	16,718	Sanctions	5.31%	34.23%	846	501
Ukraine	15,791	Sanctions	5.01%	39.24%	-	-
Italy	14,554	Sanctions	4.62%	43.86%	299	4,098
Belarus	13,959	Intermediary	4.43%	48.29%	2,501	3,536
Japan	13,560	Non-goods san.	4.31%	52.60%	7	2,686
France	13,021	Sanctions	4.13%	56.73%	445	2,893
South Korea	10,305	-	3.27%	60.01%	-	-
Poland	8,321	Sanctions	2.64%	62.65%	1,145	2,014
UK	8,106	Sanctions	2.57%	65.22%	66	1,624
Turkey	7,273	Intermediary	2.31%	67.53%	1,527	1,081
Netherlands	5,837	Sanctions	1.85%	69.38%	797	1,051
Kazakhstan	5,665	Intermediary	1.80%	71.18%	31	1,033
Finland	5,396	Sanctions	1.71%	72.90%	367	1,693
Czechia	5,318	Sanctions	1.69%	74.59%	19	1,738
Spain	4,915	Sanctions	1.56%	76.15%	796	647

Notes:

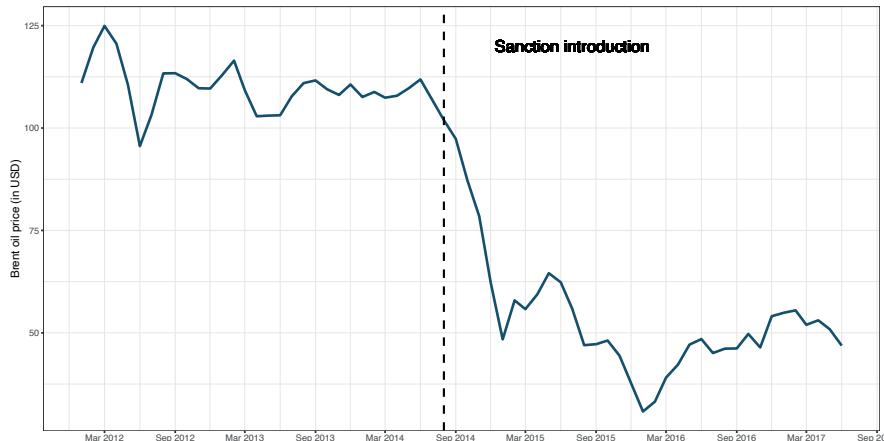
The amounts in the last two columns relate to trade affected by Russian/Western sanctions in millions of 2013 US dollars; whereas the totals in the first row of the last two columns relate to the direct trade flows (see Figure 3). The aggregate trade statistics are based on annual data, whereas the last two columns on monthly figures.

Table A.2: List of HS codes hit by sanctions during the Ukraine crisis

Implementer		EU		USA		Russia	
Type	Export licensing	Dual-use goods ban	Arms embargo	Export licensing	Import ban	Import ban	
Target	Russia	Russia	Russia	Russia	i.a. EU, USA	Turkey	
Products							
	73041100	Too long; 6197 tariff lines	93	7304110000	0201	020714	
	73041910			7304191020	0202	020727	
	73041930			7304191050	0203	060312	
	73041990			7304191080	0207	070200	
	73042200			7304195020	0210	070310	
	73042300			7304195050	0301	070410	
	73042910			7304195080	0302	070700	
	73042930			7304220000	0303	080510	
	73042990			7304233000	0304	080520	
	73051100			7304236000	0305	080610	
	73051200			7304241000	0306	080810	
	73051900			7304246000	0307	080830	
	73052000			7304291055	0308	080910	
	730611			7304293155	0401	080930	
	730619			7304295000	0402	080940	
	73062100			7304296100	0403	081010	
	73062900			7305111000	0404	250100	
	82071300			7305115000	0405		
	82071910			7305121000	0406		
	841350			7305125000	0701		
	841360			7305191000	07020000		
	84138200			7305195000	0703		
	84139200			7305203000	0704		
	84304900			7305207000	0705		
	87052000			7306110000	0706		
	89052000			7306191000	070700		
	89059010			7306195000	0708		
	84313900			7311000000	0709		
	84314300			7613000000	0710		
	843149			8207130000	0711		
				8207191030	0712		
				8207192030	0713		
				8207195030	0714		
				8413500010	0801		
				8413600050	0802		
				8413820000	0803		
				8413920000	0804		
				8421398020	0805		
				8421398030	0806		
				8421398040	0807		
				8430494000	0808		
				8430498010	0809		
				8430498020	0810		
				8431390050	0811		
				8431434000	0813		
				8431438010	160100		
				8431438090	1901901100		
				8479899850	1901909100		
				8705200000	2106909200		
				8708998175	2106909804		
				8905200000	2106909805		
				8905901000	2106909809		

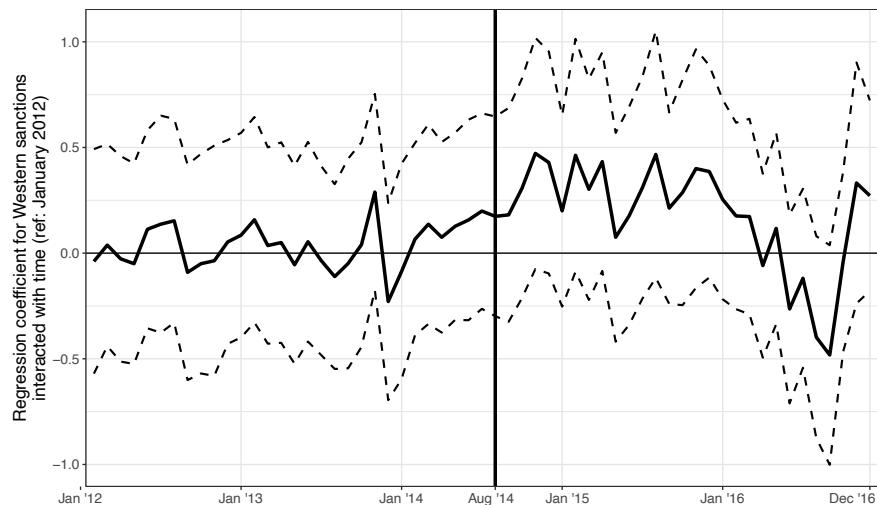
Appendix B: Additional charts and tables

Figure B.1: The Brent oil price during the Ukraine crisis.



Source: IMF Primary Commodity Data.

Figure B.2: Western sanction coefficient in 2nd stage trade flows over time.



Notes:

This figure illustrates the effect of Western sanctions on 2nd stage trade flows over time. The coefficient is based on Equation 2 and the standard errors are clustered at the sector-country pair-time level. The dotted lines represent the 95-percent confidence interval for each month's estimated coefficient.

Table B.3: Placebo regression results for direct trade flows (Japan)

	(1) Import data	(2) Import data	(3) Export data	(4) Export data	(5) Data gap
Regresion	PPML	PPML	PPML	PPML	Linear
sanctions	-0.026	-0.026	0.360*	0.360*	0.060*
Russia	(0.199)	(0.199)	(0.215)	(0.215)	(0.032)
sanctions	0.287***		0.350***		-0.038
West	(0.049)		(0.062)		(0.039)
sanctions West		0.284***		0.349***	
dual-use		(0.048)		(0.063)	
sanctions West		-0.013		0.102	
oil technology		(0.157)		(0.113)	
Covariates	Yes	Yes	Yes	Yes	Yes
FEs	Yes	Yes	Yes	Yes	Yes
<i>R</i> ²	0.943	0.943	0.952	0.952	0.386
N	167,907	167,907	138,979	138,979	310,440

Notes:

The regressions are based on Equation 1 (specifications 1-4) and Equation 3 (specification 5) Standard errors clustered at the sector-country pair-time level in parentheses. Significance levels: * p < 0.10, ** p < 0.05, *** p < 0.01. For the PPML regressions a Pseudo *R*² is displayed.

Table B.4: Regression results for direct trade flows using 2-digit HS codes as sectors

	(1) Import data	(2) Import data	(3) Import data	(4) Export data	(5) Export data	(6) Export data
Regression	PPML	PPML	PPML	PPML	PPML	PPML
sanctions	-1.169*** (0.090)	-1.169*** (0.090)	-1.169*** (0.090)	-1.110*** (0.089)	-1.110*** (0.089)	-1.110*** (0.089)
Russia						
sanctions	0.070*** (0.022)	0.049** (0.024)		0.075*** (0.021)	0.097*** (0.023)	
West						
sanctions West			0.053** (0.025)			0.094*** (0.021)
dual-use						
sanctions West			0.050 (0.065)			0.006 (0.099)
oil technology						
misclass. West		-0.050* (0.027)			0.049** (0.021)	
misclass. West			-0.022 (0.028)			0.053** (0.020)
dual-use						
misclass. West			-0.143** (0.058)			-0.022 (0.058)
oil technology						
Covariates	Yes	Yes	Yes	Yes	Yes	Yes
FEs	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2	0.766	0.766	0.766	0.773	0.773	0.773
N	2,937,381	2,937,381	2,937,381	3,129,430	3,129,430	3,129,430

Notes:

The regressions are based on Equations 1 with sectors specified as 2-digit HS codes instead of the usual HS sections. Standard errors clustered at the sector-country pair-time level in parentheses. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. For the PPML regressions a Pseudo R^2 is displayed.

Data source:

UN Comtrade Database.

Table B.5 Regression for direct channel by country

	(1) Belgium	(2) Czechia	(3) Finland	(4) France	(5) Germany	(6) Italy	(7) Netherlands	(8) Poland	(9) Spain	(10) UK	(11) USA
Import data regressions											
sanctions	-3.278*** (0.328)	-1.269*** (0.174)	-1.073*** (0.194)	-1.288*** (0.170)	-0.964*** (0.103)	-2.535*** (0.295)	-2.022*** (0.198)	-3.130*** (0.356)	-4.034*** (0.554)	-0.417** (0.184)	-1.351*** (0.221)
Russia											
sanctions	-0.007 (0.127)	0.246*** (0.049)	0.006 (0.070)	-0.069 (0.054)	0.144*** (0.035)	0.152*** (0.050)	0.074 (0.107)	0.127*** (0.030)	0.391*** (0.090)	0.142** (0.065)	0.176* (0.100)
West											
Covariates	Yes										
FEs	Yes										
Pseudo R^2	0.853	0.885	0.867	0.879	0.907	0.862	0.851	0.891	0.840	0.891	0.862
N	159,398	157,638	141,536	212,880	248,160	229,020	180,178	193,140	188,220	192,540	218,340
Export data regressions											
sanctions	-2.722*** (0.248)	-1.789*** (0.223)	-1.287*** (0.288)	-1.129*** (0.189)	-0.728*** (0.099)	-1.875*** (0.185)	-0.842*** (0.170)	-2.363*** (0.278)	-4.956*** (0.494)	-0.957*** (0.177)	-1.358*** (0.258)
Russia											
sanctions	0.067 (0.042)	0.213*** (0.056)	-0.019 (0.044)	0.216*** (0.078)	0.032 (0.037)	0.225*** (0.041)	-0.120** (0.049)	0.161** (0.066)	0.256*** (0.063)	0.620*** (0.151)	0.034 (0.124)
West											
Covariates	Yes										
FEs	Yes										
Pseudo R^2	0.890	0.889	0.880	0.855	0.920	0.867	0.869	0.872	0.828	0.885	0.813
N	210,780	195,780	233,820	215,340	268,800	235,440	230,880	250,740	212,280	207,180	206,589

Notes:

Standard errors clustered at the sector-country pair-time level in parentheses. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table B.6 Regression for direct channel by section

HS section	(1) I Animals	(2) II Vegetables	(3) IV Foodstuffs	(4) V Minerals	(5) VI Chemicals	(6) VII Plastic	(7) X Wood	(8) XI Textiles
sanctions	-3.284*** (0.298)	-3.766*** (0.247)	-0.250*** (0.087)					
Russia				-0.142 (0.119)	-0.168*** (0.052)	0.097*** (0.030)	-0.261* (0.156)	0.064 (0.104)
Covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2	0.768	0.586	0.619	0.817	0.803	0.659	0.676	0.625
N	169,448	186,480	141,840	87,840	513,360	151,200	99,360	541,440
HS section	(9) XII Footwear	(10) XIII Construction	(11) XIV Stones	(12) XV Metals	(13) XVI Machinery	(14) XVII Vehicles	(15) XVIII Instruments	(16) XX Misc.
sanctions	-0.075 (0.216)	0.209*** (0.064)	-0.363 (0.225)	0.018 (0.063)	0.125*** (0.032)	0.336** (0.170)	0.167*** (0.048)	0.482*** (0.126)
West								
Covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2	0.877	0.579	0.739	0.642	0.586	0.794	0.772	0.732
N	33,182	101,520	27,778	385,200	548,640	79,200	149,760	84,960

Notes:

Standard errors clustered at the sector-country pair-time level in parentheses. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table B.7: Regression results for indirect smuggling (first stage)

	(1) <i>Tradegap</i>	(2) <i>Tradegap</i>	(3) <i>Tradegap</i>	(4) <i>Tradegap</i>
sanctions Russia	0.035*** (0.012)	0.036*** (0.012)	0.036*** (0.012)	0.028 (0.020)
sanctions West	-0.043*** (0.005)	-0.025*** (0.005)		-0.032*** (0.004)
sanctions West dual-use			-0.030*** (0.005)	
sanctions West oil technology			0.088*** (0.019)	
Sample	Full	Full	Full	Int. margin
Covariates	No	Yes	Yes	Yes
FEs	Yes	Yes	Yes	Yes
<i>R</i> ²	0.061	0.061	0.061	0.145
N	34,039,746	34,039,746	34,039,746	1,623,139

Notes:

The regressions are based on Equation 3. Standard errors clustered at the sector-country pair-time level in parentheses. Significance levels: * p < 0.10, ** p < 0.05, *** p < 0.01.

Table B.8 Regression for first stage by country

	(1) Belarus	(2) China	(3) HongKong	(4) Georgia	(5) Kazakhstan	(6) N. Maced.	(7) Serbia	(8) Singapore	(9) Switzerland	(10) Turkey
Import data regressions										
sanction	0.374** (0.152)	-0.013 (0.066)	0.169 (0.109)	0.227*** (0.082)	0.343*** (0.107)	0.042 (0.070)	0.097 (0.077)	0.112 (0.132)	0.107 (0.079)	0.134* (0.075)
.Russia										
sanctions	0.084** (0.042)	-0.347*** (0.045)	-0.433*** (0.078)	0.138* (0.083)	0.109 (0.071)	0.464*** (0.056)	-0.188*** (0.033)	-0.488*** (0.044)	-0.059* (0.030)	-0.137*** (0.045)
West										
Pseudo R^2	0.641	0.855	0.867	0.599	0.666	0.818	0.728	0.855	0.912	0.749
N	2,780,219	3,146,450	2,713,688	2,323,626	2,682,163	2,734,684	2,942,417	3,096,816	3,356,818	3,064,299
Export data regressions										
sanctions	0.119 (0.192)	-0.385*** (0.094)	0.068 (0.112)	-0.215 (0.152)	0.042 (0.132)	-0.087 (0.082)	0.056 (0.070)	0.030 (0.129)	0.010 (0.078)	0.139 (0.100)
Russia										
sanctions	0.172*** (0.034)	0.129*** (0.044)	0.382** (0.175)	0.196* (0.115)	0.081 (0.083)	0.181 (0.120)	0.094* (0.053)	-0.094* (0.057)	0.638*** (0.156)	0.052 (0.039)
West										
Pseudo R^2	0.669	0.839	0.841	0.674	0.639	0.814	0.674	0.804	0.858	0.738
N	2,762,576	3,189,484	3,131,177	2,465,533	2,750,984	2,421,637	2,951,959	3,072,571	3,230,173	3,145,246
Tradegap regressions										
sanctions	0.015 (0.019)	0.009 (0.028)	-0.026 (0.019)	0.019 (0.014)	0.027 (0.022)	0.007 (0.008)	0.078*** (0.025)	0.096** (0.042)	0.089 (0.079)	0.039 (0.024)
Russia										
sanctions	-0.039** (0.015)	-0.052*** (0.017)	0.022 (0.014)	0.007 (0.010)	-0.007 (0.014)	-0.049*** (0.013)	-0.084*** (0.016)	-0.019 (0.014)	0.013 (0.013)	-0.029* (0.017)
West										
R^2	0.143	0.099	0.090	0.067	0.106	0.125	0.103	0.081	0.130	0.098
N	3,409,666	3,409,666	3,352,752	3,409,666	3,409,666	3,409,666	3,409,666	3,409,666	3,409,666	3,409,666

Notes:

Standard errors clustered at the sector-country pair-time level in parentheses. Significance levels: * p < 0.10, ** p < 0.05, *** p < 0.01. The import and export data regressions are based on Equation 1, and the tradegap regressions on Equation 3. All regressions contain policy covariates.

Table B.9 Regression for first stage by section

HS section	(1) I Animals	(2) II Vegetables	(3) IV Foodstuffs	(4) V Minerals	(5) VI Chemicals	(6) VII Plastic	(7) X Wood	(8) XI Textiles
sanctions	-0.073	0.266	0.046					
Russia	(0.051)	(0.246)	(0.056)					
sanctions				0.038	-0.332***	0.074***	0.427***	0.096
West				(0.117)	(0.045)	(0.023)	(0.084)	(0.059)
Pseudo R^2	0.720	0.871	0.679	0.788	0.779	0.766	0.744	0.678
N	1,624,912	1,827,189	1,377,180	914,836	5,132,052	1,387,536	924,960	5,190,716
HS section	(9) XII Footwear	(10) XIII Construction	(11) XIV Stones	(12) XV Metals	(13) XVI Machinery	(14) XVII Vehicles	(15) XVIII Instruments	(16) XX Misc.
sanctions	0.103	0.011	0.161	0.079***	-0.412***	-0.810***	-0.208***	-0.010
West	(0.117)	(0.045)	(0.187)	(0.030)	(0.030)	(0.099)	(0.045)	(0.035)
Covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2	0.860	0.637	0.902	0.691	0.739	0.818	0.810	0.771
N	279,697	927,970	253,817	3,700,208	5,080,119	837,081	1,383,527	771,366

Notes:

Standard errors clustered at the sector-country pair-time level in parentheses. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The regressions are based on Equation 1 and use importer-reported trade data. All regressions contain policy covariates.

Table B.10: Regression results for indirect smuggling (second stage)

	(1) <i>Tradegap</i>	(2) <i>Tradegap</i>	(3) <i>Tradegap</i>	(4) <i>Tradegap</i>
sanctions	0.105** (0.051)	0.106** (0.051)	0.106** (0.051)	-0.108*** (0.034)
Russia				
sanctions	-0.010 (0.015)	-0.009 (0.015)		0.044*** (0.013)
West				
sanctions West			-0.009 (0.016)	
dual-use				
sanctions West			0.001 (0.055)	
oil technology				
Sample	Full	Full	Full	Int. margin
Covariates	No	Yes	Yes	Yes
FEs	Yes	Yes	Yes	Yes
<i>R</i> ²	0.067	0.067	0.067	0.380
N	3,099,226	3,099,226	3,099,226	190,185

Notes:

The regressions are based on Equation 3. Standard errors clustered at the sector-country pair-time level in parentheses. Significance levels: * p < 0.10, ** p < 0.05, *** p < 0.01.

Table B.11 Regression for second stage by country

	(1) Belarus	(2) China	(3) Hong Kong	(4) Georgia	(5) Kazakhstan	(6) N. Maced.	(7) Serbia	(8) Singapore	(9) Switzerland	(10) Turkey
Import data regressions										
sanctions	-0.161** (0.078)	-0.005 (0.076)	-3.570*** (1.207)	-0.705 (0.505)	1.157*** (0.212)	1.417*** (0.355)	1.171*** (0.347)	-0.602 (0.780)	-0.044 (0.104)	-0.250 (0.352)
Russia										
sanctions	0.051 (0.043)	0.134* (0.077)	-0.010 (0.238)	-1.188*** (0.453)	-0.035 (0.115)	-0.534 (0.588)	0.374*** (0.075)	-0.348* (0.209)	0.206** (0.100)	0.122 (0.075)
West										
Pseudo R^2	0.861	0.909	0.671	0.931	0.864	0.783	0.861	0.780	0.847	0.852
N	240,420	252,780	93,217	24,733	158,803	20,918	77,630	60,726	146,825	176,713
Export data regressions										
sanctions	-0.231** (0.094)	0.200*** (0.064)	-0.089 (0.574)	-0.210 (0.595)	0.584*** (0.192)	-0.308 (0.701)	1.073*** (0.300)	0.830* (0.427)	-0.359*** (0.106)	-0.032 (0.251)
Russia										
sanctions	0.001 (0.045)	0.204*** (0.039)	0.310*** (0.086)	-1.984*** (0.455)	0.063 (0.115)	-0.326 (0.530)	0.406*** (0.064)	0.394 (0.260)	-0.104 (0.066)	0.128** (0.059)
West										
Pseudo R^2	0.935	0.906	0.923	0.934	0.914	0.803	0.856	0.721	0.893	0.868
N	247,140	243,720	74,263	24,250	165,960	12,177	86,335	74,109	147,485	198,118
Tradegap regressions										
sanctions	0.684** (0.295)	-0.138** (0.055)	-0.014 (0.022)	-0.061*** (0.023)	0.344*** (0.075)	0.330*** (0.065)	0.066** (0.031)	0.040** (0.018)	-0.026 (0.025)	-0.170*** (0.040)
Russia										
sanctions	-0.135*** (0.029)	0.106** (0.043)	-0.099*** (0.034)	-0.010 (0.011)	0.087** (0.039)	-0.011 (0.008)	-0.002 (0.020)	-0.228*** (0.033)	0.088** (0.036)	0.108*** (0.039)
West										
R^2	0.335	0.317	0.380	0.224	0.202	0.527	0.236	0.323	0.356	0.248
N	310,440	310,440	305,266	310,440	310,440	310,440	310,440	310,440	310,440	310,440

Notes:

Standard errors clustered at the sector-country pair-time level in parentheses. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The import and export data regressions are based on Equation 1, and the tradegap regressions on Equation 3. All regressions contain policy covariates.

Table B.12 Regression for second stage by section

HS section	(1) I Animals	(2) II Vegetables	(3) IV Foodstuffs	(4) V Minerals	(5) VI Chemicals	(6) VII Plastic	(7) X Wood	(8) XI Textiles
sanctions	-0.056	0.155	-0.184					
Russia	(0.083)	(0.165)	(0.139)					
sanctions				-0.119	-0.087	0.076	-0.425***	0.310***
West				(0.356)	(0.125)	(0.072)	(0.129)	(0.082)
Pseudo R^2	0.853	0.691	0.574	0.751	0.663	0.758	0.714	0.797
N	97,610	150,855	113,878	59,309	408,945	107,952	69,387	465,842
HS section	(9) XII Footwear	(10) XIII Construction	(11) XIV Stones	(12) XV Metals	(13) XVI Machinery	(14) XVII Vehicles	(15) XVIII Instruments	(16) XX Misc.
sanctions	-0.347**	0.473***	0.519**	0.186***	0.216**	0.005	-0.308***	0.219***
West	(0.167)	(0.062)	(0.235)	(0.068)	(0.102)	(0.107)	(0.116)	(0.049)
Covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2	0.922	0.787	0.715	0.694	0.822	0.735	0.663	0.914
N	22,889	74,166	17,094	319,992	457,800	61,258	109,917	62,946

Notes:

Standard errors clustered at the sector-country pair-time level in parentheses. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The regressions are based on Equation 1 and use importer-reported trade data. All regressions contain policy covariates.

Table B.13 Regression for net imports by intermediary country

	(1) Belarus	(2) China	(3) HongKong	(4) Georgia	(5) Kazakhstan	(6) N. Maced.	(7) Serbia	(8) Singapore	(9) Switzerland	(10) Turkey
Baseline regressions										
sanctions	0.750***	0.044	0.163	-0.005	-0.402**	0.096	0.006	-0.043	0.053	0.089
Russia	(0.248)	(0.104)	(0.100)	(0.210)	(0.165)	(0.158)	(0.081)	(0.036)	(0.082)	(0.066)
sanctions	-0.017	0.049	-0.013	0.146**	0.017	-0.047	-0.095*	-0.104**	0.033	0.127***
West	(0.058)	(0.041)	(0.087)	(0.061)	(0.039)	(0.043)	(0.050)	(0.047)	(0.032)	(0.032)
FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>R</i> ²	0.921	0.957	0.913	0.904	0.914	0.915	0.914	0.912	0.956	0.948
N	19,201	8,307	15,330	20,252	22,439	19,378	18,781	17,150	19,604	15,736
Regressions containing interaction of Russian sanction and intermediate good dummy										
sanctions	0.772***	0.086	0.138	-0.010	-0.411**	0.102	0.034	-0.042	0.056	0.088
Russia	(0.243)	(0.111)	(0.103)	(0.218)	(0.164)	(0.162)	(0.087)	(0.035)	(0.080)	(0.075)
intermediate good	6.763	0.165	-0.034	11.008	-0.507	3.721	2.248	-0.259	-0.529	0.789
	(5809)	(173)	(261)	(2503)	(1341)	(2974)	(5983)	(1341)	(675)	(1201)
interaction: sanction x intermediate good	-0.772	-0.503**	0.636***	0.113	0.202	-0.102	-0.539**	-0.072	-0.106	0.014
	(0.520)	(0.249)	(0.220)	(0.281)	(0.315)	(0.181)	(0.263)	(0.077)	(0.310)	(0.301)
sanctions	-0.017	0.049	-0.013	0.146**	0.017	-0.047	-0.095*	-0.104**	0.033	0.127***
West	(0.058)	(0.041)	(0.087)	(0.061)	(0.039)	(0.043)	(0.050)	(0.047)	(0.032)	(0.032)
FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>R</i> ²	0.921	0.957	0.913	0.904	0.914	0.915	0.914	0.912	0.956	0.948
N	19,201	8,307	15,330	20,252	22,439	19,378	18,781	17,150	19,604	15,736

Notes:

All regressions include sector-year fixed effects. Standard errors clustered at the sector-year level in parentheses. Significance levels: * p < 0.10, ** p < 0.05, *** p < 0.01. The regressions are based on Equation 4.

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