

Graph 2: Distribution of exposures to trade receivables

Methodological note¹

This note describes the calculations underpinning Graph 2. It details the different approximations and assumptions made, as well as the data sources used. The numbers highlighted in green are intermediate calculations, and the red numbers are those reported in the diagram (after rounding). Throughout the exercise, our perspective is that of suppliers that sell goods on credit. We use 2016 as cut-off year due data availability (unless otherwise indicated). A companion Excel spreadsheet includes the calculation described in this note.

Graph 2 illustrates how exposures to trade receivables migrate over time from suppliers (the original risk bearers) to banks, insurers, and institutional investors. It distinguishes three stages, represented by the three columns:

- In the first stage (first column), exposures are spread among domestic and foreign suppliers – depending on whether transactions are domestic or cross-border;
- In the second stage (middle column), suppliers hedge against their customers' default, eg by insuring their trade receivables, selling their receivables outright to banks or factors, or requesting their customers to obtain bank guarantees or outright loans.
- In the third stage (last column), banks and factors in turn hedge against the credit risks, eg by insuring their exposures, or repackaging them into trade receivable asset backed securities (ABSs).

Stage I: Initial exposure to trade receivables

- Share of international receivables in global domestic and international receivables: $I/(D+I)=20\%^2$

For the purpose of the exercise, we assume that trade receivables are distributed uniformly across trades. Under this assumption we approximate the share of international receivables in global domestic and international receivables by the share of international trade in global trade. We measure the latter by the share of global exports in global gross *intermediate* output. We find that the share of international trade receivables in total (domestic + international) receivables ranges between 15% and 24%. We settle for 20%.³

Stage II: Intermediate exposure to trade receivables

INTERMEDIARIES

- Share of trade finance in total cross-border receivables: $INTERM_I/I=81.2\%$
Auboin (2009) reports that "Some 80% to 90% of world trade relies on [intermediated] trade finance" (p. 1). We use 85%; this number includes cash-in-advance transactions, which account for about 20% (see IMF (2009), Box 1.1). Discounting these cash-in-advance payments, one obtains $INTERM_I/I=(0.85-0.2)/(1-0.2)=81.2\%$.
- Share of trade finance in total trade receivables: $INTERM_I/(D+I)=16.2\%$.
This follows from $INTERM_I/(D+I)=(INTERM_I/I)*(I/(D+I))=0.812*0.20=16.2\%$. Note that this figure includes recourse factoring (see below).
- Share of trade finance in total intermediated trade credit: $INTERM_I/(INTERM_I+INTERM_D)=53.4\%$
Although intermediated finance includes loans and guarantees, factoring (outright sales, invoice discounting, documentary collections) and insurance, only data on factoring and insurance are publicly available. Given this, we approximate the share of trade finance in total intermediated trade credit as the weighted average of the shares of international factoring and international insurance in total factoring and trade credit insurance.
 - According to FCI, the share of international factoring in total factoring is $FACT_I/FACT=21.3\%$.

¹ Important caveat: as mentioned in Graph 2, the figures reported here are backed out from multiple sources (IMF, Eurostat, FCI, Collaborative Market Data, ICISA, and CGFS (2014)) using several approximations. They are therefore indicative of orders of magnitude, rather than precise estimates.

² The notations used in this annex are summarized in Table 1.

³ We use gross intermediate (as opposed to total gross) output in the denominator since the difference between the two, which is final consumption, is usually not sold on credit. For the numerator, we can use either total or just intermediate exports, leading to the two estimates of 15% and 24%. For each of these calculations, we use the ABD-MRIO (Asian Development Bank multi region input output) database which comprises of 35 sectors each in 46 countries, plus a remainder "rest of the world" region. Due to the use of intermediate inputs in production, gross output is greater than gross value added (world GDP). We ignore advance cash payments, in effect assuming that they are uniformly distributed across domestic and international trade.

- The share of international trade credit insurance in total trade credit insurance is derived from CGFS (2014) and ICISA.⁴
 - On the one hand, CGFS (2014) notes that “both inter-firm and bank credit providers also benefit from trade credit insurance, which covered nearly USD1.7 trillion of global exports in 2011 and 2012” (p. 8): $INS_I=USD1.7tr$. On the other hand, ICISA reports that trade credit insurance exposures amount to USD1.92 trillion in 2012: $INS=USD1.92tr$.
 - We obtain $INS_I/INS=88.5\%$.

To calculate the weighted average, we derive the respective weights of factoring and insurance in total trade receivables.

- According to Eurostat⁵, the share of accounts receivable in GDP is $(D+I)/GDP=21.8\%$
- According to FCI, the share of total factoring in GDP is $FACT/GDP=3.3\%$, which implies that the share of total factoring in total trade receivables is $FACT/(D+I)=15.1\%$.
- According to ICISA, the share of trade credit insurance in GDP is $INS/GDP=3\%$, which implies that the share of trade credit insurance in total trade receivables: $INS/(D+I)=13.8\%$

One can approximate the share of international intermediated trade finance in total intermediated trade finance by the weighted average of that of factoring and insurance. One thus obtains $INTERM_I/(INTERM_D+INTERM_I)=((15.1/28.9)*0.213+(13.8/28.9)*0.885)=53.4\%$.

- Share of intermediated trade credit in total trade receivables: $(INTERM_I+INTERM_D)/(D+I)=30.3\%$.
This follows directly from $(INTERM_D+INTERM_I)/(D+I)= (INTERM_I/(D+I))/((INTERM_D+INTERM_I)/INTERM_I) = 0.162/0.534=30.3\%$. Note that this figure includes trade credit insurance directly contracted by foreign and domestic suppliers, as well as recourse factoring (see below).
- Share of intermediated domestic trade receivables in total domestic receivables: $INTERM_D/D=17.6\%$.
This follows from $INTERM_D/D=(INTERM_D/(INTERM_D+INTERM_I))*((INTERM_D+INTERM_I)/(D+I))/(1-I/(D+I))= (1-0.534)*0.303/(1-0.20)=17.6\%$.
- Share of intermediated domestic receivables in total trade receivables: $INTERM_D/(D+I)=14.1\%$.
This follows from $INTERM_D/(D+I)=(INTERM_I+INTERM_D)/(D+I)-INTERM_I/(D+I)=0.303-0.162=14.1\%$. Note that this figure includes recourse factoring (see below).

DOMESTIC AND INTERNATIONAL FACTORING

- Share of domestic recourse factoring in total domestic factoring: $REC_FACT_D/FACT_D=21.5\%$.
This figure is obtained directly from FCI
- Share of international recourse factoring in total international factoring: $REC_FACT_I/FACT_I=21.5\%$.
This share is assumed to be the same as the domestic share.
- Share of recourse factoring in total factoring: $REC_FACT/FACT=21.5\%$.
This share is assumed to be the same as the domestic share.
- Share of recourse factoring in total trade receivables: $REC_FACT/(D+I)=3.2\%$
This follows from $REC_FACT/(D+I)=(REC_FACT/FACT)*(FACT/(D+I))=0.215*0.151=3.2\%$

DOMESTIC AND FOREIGN SUPPLIERS' INSURANCE AND RECOURSE FACTORING

- Share of international recourse factoring in total trade receivables: $REC_FACT_I/(D+I)<1\%$
This follows from $REC_FACT_I/(D+I)=(REC_FACT_I/FACT_I)*(FACT_I/FACT)*(FACT/(D+I))=0.215*0.213*0.151=0.69\%$.
- Share of domestic recourse factoring in total trade receivables: $REC_FACT_D/(D+I)=2.5\%$
This follows from $REC_FACT_D/(D+I)=REC_FACT/(D+I)-REC_FACT_I/(D+I)=0.032-0.0069=2.5\%$.
- Share of non-recourse factoring in total trade receivables: $NONREC_FACT/(D+I)=11.9\%$
This follows from $NONREC_FACT/(D+I)=FACT/(D+I)-REC_FACT/(D+I)=0.151-0.032=11.9\%$.
- Share of insured international trade receivables in total trade receivables: $INS_I/(D+I)=12.2\%$
This follows from $INS_I/(D+I)=(INS_I/INS)*(INS/(D+I))=0.885*0.138=12.2\%$.
- Share of international trade receivables directly insured by suppliers in total trade receivables: $SUP_INS_I/(D+I)=2.4\%$
We allocate international trade credit insurance to banks and suppliers pro-rata their respective ex ante exposure to international trade credit. As a result, $SUP_INS_I/(D+I)=(INS_I/(D+I))*(1-INTERM_I/I)=0.122*(1-0.812)=2.3\%$
- Share of domestic trade receivables directly insured by suppliers in total trade receivables: $SUP_INS_D/(D+I)=1.3\%$

⁴ These figures show that the share of international intermediated trade finance in domestic intermediated trade finance varies widely, depending on the instrument. While factoring is uniformly used in domestic and cross-border transactions, trade credit insurance is mostly used in international transactions.

⁵ Eurostat trade receivables data are only available for a subset of countries (AT, BE, DE, ES, FI, FR, GB, GR, IE, IT, NL, NO, PL, PT, TR, and US).

We allocate domestic trade credit insurance to banks and suppliers pro-rata their respective ex ante exposure to domestic trade credit. As a result, $SUP_INS_D/(D+I)=(INS/(D+I)-INS_I/(D+I))*(1-INTERM_D/D)=(0.138-0.122)*(1-0.176)=1.3\%$

SUPPLIERS EXPOSURES (INCL. RECOURSE FACTORING, AFTER INSURANCE)

- Share of domestic suppliers' exposures to domestic receivables in total trade receivables: $SUP_D/(D+I)=68.4\%$.
This follows from $SUP_D/(D+I)=D/(D+I)-INTERM_D/(D+I)+REC_FACT_D/(D+I)=0.8-0.141+0.025=68.4\%$.
- Share of foreign suppliers' exposures to international receivables in total trade receivables: $SUP_I/(D+I)=4.5\%$.
This follows from $SUP_I/(D+I)=I/(D+I)-INTERM_I/(D+I)+REC_FACT_I/(D+I)=0.20-0.162+0.0069=4.5\%$.

BANKS' EXPOSURES (EXCL. RECOURSE FACTORING, BEFORE INSURANCE)

- Share of banks' exposures to domestic receivables in total trade receivables: $BANK_D/(D+I)=10.6\%$.
This follows from $BANK_D/(D+I)=INTERM_D/(D+I)-SUP_INS_D-REC_FACT_D/(D+I)=0.141-0.013-0.025=10.6\%$.
- Share of banks' exposures to international receivables in total trade receivables: $BANK_I/(D+I)=13.1\%$.
This follows from $BANK_I/(D+I)=INTERM_I/(D+I)-SUP_INS_I-REC_FACT_I/(D+I)=0.162-0.024-0.0069=13.1\%$.
- Share of banks' exposures to receivables in total trade receivables: $(BANK_D+BANK_I)/(D+I)=23.7\%$.

Stage III: Ultimate exposure to trade receivables

- Share of banks' insured international trade receivables in total trade receivables: $BANK_INS_I/(D+I)=9.9\%$
We arbitrarily allocate international trade credit insurance to banks and suppliers pro-rata their respective ex ante exposure to international trade credit. As a result, $BANK_INS_I/(D+I)=(INS_I/(D+I))*(INTERM_I/I)=0.122*0.812=9.9\%$
- Share of banks' insured domestic trade receivables in total trade receivables: $BANK_INS_D/(D+I)<1\%$
We arbitrarily allocate domestic trade credit insurance to banks and suppliers pro-rata their respective ex ante exposure to domestic trade credit. As a result, $BANK_INS_D/(D+I)=(INS/(D+I)-INS_I/(D+I))*(INTERM_D/D)=(0.138-0.122)*0.176=0.28\%$
- Share of trade receivable ABS in total trade receivables: $ABS/(D+I)<0.1\%$
According to CMD, the share of trade receivable ABS in world GDP is $ABS/GDP=0.02\%$. As a result, $ABS/(D+I)=(ABS/GDP)/((D+I)/GDP)=0.0002/0.218=0.09\%<0.1\%$.

BANKS' EXPOSURES (EXCL. RECOURSE FACTORING, AFTER INSURANCE AND SECURITIZATION)

- Share of banks' net exposures to trade receivables in total trade receivables after insurance and securitization: $(BANKNET_D+BANKNET_I)/(D+I)=13.7\%$
Since banks off-load $(BANK_INS_I+BANK_INS_D)/(D+I)=10\%$ of their exposures onto insurers and $ABS/(D+I)<1\%$ onto institutional investors, their net exposure ultimately amounts to $(BANKNET_D+BANKNET_I)/(D+I)=(BANK_D+BANK_I)/(D+I)-(BANK_INS_I+BANK_INS_D)/(D+I)-ABS/(D+I)=0.237-0.10-0.0009=13.7\%$

TRADE CREDIT INSURER'S EXPOSURES TO DOMESTIC AND FOREIGN TRADE RECEIVABLES

- Share of trade credit insurers' exposures to international total trade receivables: $INS_I/(D+I)=12.2\%$
See above
- Share of trade credit insurers' exposures to domestic total trade receivables: $INS_D/(D+I)=1.6\%$
This follows from $INS_D/(D+I)=INS/(D+I)-INS_I/(D+I)=0.138-0.122=1.6\%$

Table 1: Notations

Variable name	Description
ABS	Trade receivables assets backed securities
BANK_D	Banks' exposures to domestic trade receivables
BANK_I	Banks' exposures to international trade receivables
BANK_INS_D	Banks' insured domestic trade receivables
BANK_INS_I	Banks' insured international trade receivables
BANKNET_D	Banks' net exposures to domestic trade receivables (after insurance and securitization)
BANKNET_I	Banks' net exposures to international trade receivables (after insurance and securitization)
D	Domestic trade receivables
FACT	Total factoring (includes outright purchases or receivables, invoice discounting, documentary collections)
FACT_D	Domestic factoring
FACT_I	International factoring
I	International trade receivables
INS	Insurance of trade receivables
INS_D	Insurance of domestic trade receivables
INS_I	Insurance of international trade receivables
INTERM_D	Intermediated domestic trade receivables (includes loans, factoring, guarantees, insurance)
INTERM_I	Intermediated international trade receivables, or "trade finance" (includes loans, factoring, guarantees, insurance)
NONREC_FACT	Total non-recourse factoring
REC_FACT	Total recourse factoring
REC_FACT_D	Domestic recourse factoring
REC_FACT_I	International recourse factoring
SUP_D	Domestic suppliers' ultimate exposures to trade receivables,
SUP_I	Foreign suppliers' ultimate exposures to trade receivables,
SUP_INS_D	Domestic suppliers' direct insurance of trade receivables
SUP_INS_I	Foreign suppliers' direct insurance of trade receivables

References

Auboin M (2009): "Boosting the availability of trade finance in the current crisis: background analysis for a substantial G20 package" CEPR Policy Insights No 35, June.

CGFS (2014): "Trade finance: developments and issues", CGFS Paper No 50.

IMF (2009): "Sustaining the Recovery", World Economic Outlook, October 2009