Money creation and consequences of an exit in the Eurozone

There has been a lot of discussion on what would happen in case that Greece would choose to exit the Eurozone, and as a consequence of that the Hellenic Central Bank ("HCB") left the Eurosystem. The main discussion is around the ELA, but this is a red herring: the key question to ask is what happens to the Euros that have been created by the HCB. In particular we will see the key question with respect to this are those Euros that have been created by the HCB but that are no longer held with it eg either because Greek residents have transferred deposits abroad, or because they have used the money to pay for foreign assets)

The European Central Bank ("ECB") is the central central bank of the Eurozone ("EZ"). The consolidated group of all NCBs plus the ECB is known as the Eurosystem ("ES"). As a reminder, the ECB is jointly owned by all NCB, ie the ECB is not a group holding company. In fact, there is no such thing as a group holding company, as every NCB is owned by the respective sovereign, and that NCB in turn holds a share of the ECB.

So let's start with money creation (and we ignore cash here, as the rules for that are slightly different; note that in the context of this note we define money as "central bank money" or reserves, ie money that is held in account with on of the central banks of the ES. Money in the EZ is created by the NCBs but with recourse to the ECB. Another way of describing this is to say that money can only be created at (or by) the ECB, but that it will generally do so if an NCB requests it. The accounting entries for creating €100mn on behalf of the HCB are as follows:

1. ECB creates €100mn on behalf of the HCB	ECB		ECB		HCB		HCB	
	Money created by HCB (A)		*Deposits by HCB (L)*		*Money created by HCB (L)*		*Deposits at ECB (A)*	
	100			100		100	100	

Let's discuss those accounting entries in detail. As we have alluded to above, what we call money are Euros deposited at the ECB, and we see that indeed we have created money: at the ECB there is a deposit account (which, from the point of view of the ECB, is a liability account) for each of the NCBs, and this account has increased by 100mn (all number in the accounts in €mn unless otherwise stated; we will not use the terms debited and credited in this note, because they tend to lead to confusion amongst non-accountants). The corresponding account at the HCB is an asset account has increased by €100mn as well, as it should be. If we'd only consider those accounts, we would actually have a value transfer from the ECB to the HCB: the former's liabilities increased by €100m, and the latter's assets have increased by €100m, the balancing item (balance sheets must balance!) being equity. In a currency union this of course would not be acceptable, unless all other NCBs would also create Euros at the same time (and even in this case the proportion is unclear).

So what happens instead is that the ECB is running a "Money created by HCB" account (and one for each of the other NCBs) and whenever a NCB creates money, the balancing entry goes into this account (which of course is an asset account). Again, this account is mirrored at the HCB where it of course is a liability account. So what we are seeing above is that both at the HCB and the ECB the "Money created by HCB" accounts increase by €100mn. This is what makes the respective balance sheets balance, and this is what makes money creation zero value (and therefore acceptable without compensation of the other NCBs even in a currency union).

We will see this in more detail below, but the "Money created by HCB" accounts are crucial when we consider an exit scenario because then those intra-system assets and liabilities crystallise across the boundaries of the Eurosystem, and become "real" so to say.

So let's now assume that - since the inception of the Euro - the HCB as created €100bn, and that none of this money has been transferred abroad. In this case the aggregate balance sheet figures are just like the difference figures above, just the the number is €100bn instead of €100mn (number in bold below the line are aggregates, those not in bold above the line if present are changes)

2. Balance sheets after HCB has created €100bn (with no cross border transfers)	ECB		ECB		HCB		HCB	
	Money created by HCB (A)		*Deposits by HCB (L)*		*Money created by HCB (L)*		*Deposits at ECB (A)*	
	100,000			**100,000**		**100,000**	**100,000**	

What would happen in case of a Greek exit from the Eurozone now? This situation would be easy: The intra-system assets an liabilities would become external liabilities, but otherwise nothing would really change in the first step: the entiry accounts would still look exactly like before. What would change though would be the consolidate ES accounts, because suddenly the HCB would be no longer consolidated. Let's look at the consolidated acounts pre-grexit:

3. Eurosystem accounts pre exit of Greece	Eurosystem		Eurosystem	
	Money created by non-consolidated NCBs (A)		*Deposits made by non-consolidated NCBs (L)*	
	0			**0**

Here evidently there has been no money created by non-consolidated NCBs, and neither are there deposits by non-consolidated NCBs because all NCBs with money creation privilege are consolidated. However, this changes after a grexit:

4. Eurosystem accounts post exit of Greece (gross; with no cross border transfers)	Eurosystem		Eurosystem		HCB		HCB	
	Money created by non-consolidated NCBs (A)		*Deposits made by non-consolidated NCBs (L)*		*Money created by HCB (L)*		*Deposits at Eurosystem (A)*	
	100,000			**100,000**		**100,000**	**100,000**	

Suddenly the relationship between Eurosystem and the HCB crosses the group boundary, so the respective assets and liabilities do no longer disappear in consolidation. However, it is easy to see that assets and liabilities in this case are symmetric: both the Eurosystem and the HCB have each both €100bn in assets and liabilities against each other, so those can simply be netted out:

5. Eurosystem accounts post exit of Greece net with no cross border transfers)	Eurosystem		Eurosystem		HCB		HCB	
	Money created by non-consolidated NCBs (A)		*Deposits made by non-consolidated NCBs (L)*		*Money created by HCB (L)*		*Deposits at Eurosystem (A)*	
	0			**0**		**0**	**0**	

What we find that assets and liabilities cancel, and the separation is possible without any remaining net claims of any of the parties.

But what if Greek nationals had acutally transferred money to say France, without a corresponding transfer back (this can be either in order to pay for goods, or it can be Greek residents holding accounts with banks in France; this does not make a difference here)? Say pre-transfer the respective balance sheets are as follows (we have not shown the money-created accounts here; we assume they simply mirror the NCBs deposit accounts initially; "FCB" is the French central bank, Banque de France)

	ECB		ECB		HCB		FCB	
6. Balance sheets after creation of €100bn each at HCB and FCB, and before cross border transfers	*Deposits by HCB (L)*		*Deposits by FCB (L)*		*Deposits at ECB (A)*		*Deposits at ECB (A)*	
		100,000		**100,000**	**100,000**		**100,000**	

Lets have a look first what happens when a Greek corporate transfers deposits from its Greek account to its French account. This is rather complex because corporates do not have account at the NCB so they have to go via a commercial bank (here "Greek Bank" is a Greek commercial bank, and "French Bank" a French commercial bank). So, if the corporate moves €10mn what happens is as follows:

	Greek Bank		French Bank		Greek Corporate		Greek Corporate	
7. Balance sheet impact of a Greek resident moving €10mn from a Greek to a French account	*Deposits by corp (L)*		*Deposits by corp (L)*		*Deposits at GB (A)*		*Deposits at FB (A)*	
	10			10		10	10	
	HCB		FCB		Greek Bank		French Bank	
	Deposits by GB (L)		*Deposits by FB (L)*		*Deposits at HCB (A)*		*Deposits at FCB (A)*	
	10			10		10	10	
	ECB		ECB		HCB		FCB	
	Deposits by HCB (L)		*Deposits by FCB (L)*		*Deposits at ECB (A)*		*Deposits at ECB (A)*	
	10			10		10	10	

That looks complicated, but it is really just tedious accounting. In the first row we see what happens to the corporate and its deposit account: the one at the French bank gets increased by €10mn, and the one at the Greek bank decreased by the same amount. At the corporate that show on the asset side, and at the banks on the liability side. In the second row we see that this is balanced by transactions with the respective central banks, so the Greek bank reduces and the French bank increases its deposits at their respective NCB by €10mn, and hence their balance sheets balance. In the third row finally we see that the central banks pass on the transfer to their accounts at the ECB: the deposits of the HCB at the ECB decrease by €10mn, and those by the FCB increase by the same amount. This makes the respective NCBs balance sheet balance, and the ECB balance sheet balances as well because one liability account is increased by €10mn, and another one is decreased by the same amount.

Now this looks complicated, so let's simplify this a bit and only extract the accounts we are interested in (this is exactly the same as above, but with some noise removed):

	ECB		ECB		HCB		FCB	
7b. Same (last row only)	*Deposits by HCB (L)*		*Deposits by FCB (L)*		*Deposits at ECB (A)*		*Deposits at ECB (A)*	
	10			10		10	10	

What we see here is that - as far as the central banks are concerned - a deposit by the HCB becomes a deposit by the FCB. If one thinks as the ECB as a bank and the NCBs as customers then what happened is simply that the HCB transferred €10mn to the FCB. Now let's look at the same transaction aggregated across a large number of Greek corporates who - on a net basis - say transfer €10bn to France. If we start with the accounts as presented in row 6. we get

	ECB		ECB		HCB		FCB	
8. Central bank accounts after aggregate net transfers of €10bn	*Deposits by HCB (L)*		*Deposits by FCB (L)*		*Deposits at ECB (A)*		*Deposits at ECB (A)*	
	10,000			10,000		10,000	10,000	
		90,000		**110,000**	**90,000**		**110,000**	

We now want to see again what happens in case of a Greek exit, so we are looking at the equivalent accounts of row 2, but now after transfers took place:

	ECB		ECB		HCB		HCB	
9. Balance sheets after HCB has created €100bn (with €10bn of net cross border transfers)	*Money created by HCB (A)*		*Deposits by HCB (L)*		*Money created by HCB (L)*		*Deposits at ECB (A)*	
			10,000					10,000
	100,000			**90,000**		**100,000**	**90,000**	

We have just removed the FCB accounts from the picture, and we are showing the "Money created" accounts from row 2 that are not impacted by the cross border transfers. Now we are looking at Grexit again. Pre-exit, the consolidated accounts do not change, they are the same as row 3:

	Eurosystem		Eurosystem	
10. Eurosystem accounts pre exit of Greece (with €10bn of net cross border transfers)	*Money created by non-consolidated NCBs (A)*		*Deposits made by non-consolidated NCBs (A)*	
	0			**0**

Post grexit we get the same as in row 4, with the (important!) difference that the numbers have changed:

	Eurosystem		Eurosystem		HCB		HCB	
11. Eurosystem accounts post exit of Greece (gross; with €10bn of net cross border transfers)	*Money created by non-consolidated NCBs (A)*		*Deposits made by non-consolidated NCBs (L)*		*Money created by HCB (L)*		*Deposits at Eurosystem (A)*	
			10,000					10,000
	100,000			**90,000**		**100,000**	**90,000**	

Now if we are netting as we did in row 5 the numbers do not net to zero, but a net liability from HCB to the Eurosystem remains:

	Eurosystem		Eurosystem		HCB		HCB	
5. Eurosystem accounts post exit of Greece net (with €10bn of net cross border transfers)	*Money created by non-consolidated NCBs (A)*		*Deposits made by non-consolidated NCBs (L)*		*Money created by HCB (L)*		*Deposits at Eurosystem (A)*	
	10,000			**0**		**10,000**	**0**	

So after grexit and netting we have a net liability of €10bn by the HCB to the Eurosystem, which corresponds to the money that had been created by the HCB (or rather, by the ECB on behalf of the HCB and transferred to the HCB) and that has subsequently been transferred abroad.

A final word here: we have done the whole analysis in a corporate accounting framework. The situation here is slighty different in that many of the actors are sovereigns (or close to sovereigns) and who might therefore be able to make their own law (or not, because they might be bound by EC law, treaties etc) so liabilities that are there from an accounting point of view might not be legally enforceable. Moreover, ultimately this is a political process, and how much the HCB would owe to the ECB / Eurosystem after a grexit is a decision that ultimately will be taken at the political level.