

FX Liquidity and Market Metrics: Online Appendix 1
Additional Tables and Figures

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Expanded Tables

Table 3, expanded. CLS spot settlements, contra currencies, by year.

The sample is all CLS spot settlements in the Aprils of 2010, 2013 and 2016. A row summarizes all settlements in which the row-currency is involved in the exchange. Percentage entries in the row reflect the total USD equivalent value of the settlement, broken out by the other currency in the exchange. For example, of the total dollar value of all settlements involving the AUD, 1.4% occurred in the AUD/CAD pair. Only 2016 values are reported in the paper; these panels include 2010 and 2013. Source: aprilAllCLS.sas → aprilAllCLS_Tables 3 & 4.rtf.

<i>APR2010</i>																	
	<i>AUD</i>	<i>CAD</i>	<i>CHF</i>	<i>DKK</i>	<i>EUR</i>	<i>GBP</i>	<i>HKD</i>	<i>ILS</i>	<i>JPY</i>	<i>KRW</i>	<i>MXN</i>	<i>NOK</i>	<i>NZD</i>	<i>SEK</i>	<i>SGD</i>	<i>USD</i>	<i>ZAR</i>
<i>AUD</i>		1.3%	0.3%		2.6%	1.6%			5.1%			0.0%	3.2%	0.0%	0.0%	86.0%	
<i>CAD</i>	1.5%		0.2%		2.3%	0.6%	0.0%		1.3%				0.6%			93.6%	
<i>CHF</i>	0.4%	0.2%		0.0%	37.6%	1.8%			1.5%			0.0%	0.0%	0.0%		58.4%	
<i>DKK</i>			0.2%		73.0%	0.3%								0.0%		26.5%	
<i>EUR</i>	0.5%	0.4%	5.3%	1.3%		7.2%	0.0%	0.0%	8.8%		0.0%	1.1%	0.2%	1.6%	0.0%	73.5%	0.0%
<i>GBP</i>	1.0%	0.3%	0.8%	0.0%	23.2%		0.0%		5.0%			0.0%	0.5%	0.1%	0.0%	69.0%	0.0%
<i>HKD</i>		0.0%			0.8%	0.1%			0.1%							98.9%	
<i>ILS</i>					0.6%											99.4%	
<i>JPY</i>	2.5%	0.5%	0.5%		21.0%	3.7%	0.0%				0.0%	0.0%	0.2%	0.0%	0.1%	71.4%	0.0%
<i>KRW</i>																100.0%	
<i>MXN</i>					1.9%				0.1%							98.1%	
<i>NOK</i>	0.0%		0.2%		42.8%	0.3%			0.5%					3.7%		52.5%	
<i>NZD</i>	13.7%	2.0%	0.1%		3.3%	3.3%			1.8%					0.0%	0.0%	75.7%	
<i>SEK</i>	0.0%		0.1%	0.0%	47.5%	0.5%			0.0%			2.9%	0.0%			49.0%	
<i>SGD</i>	0.2%				0.4%	0.1%			0.8%				0.0%			98.5%	
<i>USD</i>	9.3%	8.4%	4.4%	0.3%	39.5%	11.6%	1.6%	0.2%	16.1%	1.6%	1.2%	0.7%	1.9%	0.9%	1.6%		0.7%
<i>ZAR</i>					2.1%	0.7%			0.8%							96.4%	

Table 3, expanded. CLS spot settlements, contra currencies, by year (continued)

APR2013

	<i>AUD</i>	<i>CAD</i>	<i>CHF</i>	<i>DKK</i>	<i>EUR</i>	<i>GBP</i>	<i>HKD</i>	<i>ILS</i>	<i>JPY</i>	<i>KRW</i>	<i>MXN</i>	<i>NOK</i>	<i>NZD</i>	<i>SEK</i>	<i>SGD</i>	<i>USD</i>	<i>ZAR</i>
<i>AUD</i>		1.1%	0.4%		5.9%	1.7%	0.0%		9.3%		0.0%	0.0%	3.7%	0.0%	0.2%	77.7%	0.0%
<i>CAD</i>	1.5%		0.3%		2.9%	1.4%			1.1%		0.1%	0.0%	0.2%	0.0%		92.4%	
<i>CHF</i>	0.9%	0.6%		0.0%	42.7%	2.8%	0.0%		1.7%			0.1%	0.2%	0.1%		50.9%	0.0%
<i>DKK</i>			0.0%		82.8%	0.9%			0.5%							15.8%	
<i>EUR</i>	1.7%	0.6%	5.1%	0.9%		6.2%	0.0%	0.0%	14.0%		0.1%	2.1%	0.2%	2.6%	0.0%	66.5%	0.1%
<i>GBP</i>	1.5%	1.0%	1.1%	0.0%	20.1%		0.0%		5.4%		0.0%	0.1%	0.3%	0.2%	0.0%	70.3%	0.0%
<i>HKD</i>	0.2%		0.0%		1.4%	0.4%			0.1%							97.8%	
<i>ILS</i>					1.1%											98.9%	
<i>JPY</i>	3.4%	0.3%	0.3%	0.0%	18.2%	2.2%	0.0%				0.0%	0.0%	0.3%	0.0%	0.0%	75.2%	0.0%
<i>KRW</i>																100.0%	
<i>MXN</i>	0.1%	0.3%			1.0%	0.1%			0.1%							98.5%	
<i>NOK</i>	0.2%	0.1%	0.3%		64.6%	1.0%			0.3%					13.1%		20.3%	
<i>NZD</i>	18.0%	0.9%	0.5%		2.8%	1.4%			4.1%						0.0%	72.3%	
<i>SEK</i>	0.1%	0.1%	0.2%		64.1%	1.4%			0.4%			10.7%				22.9%	
<i>SGD</i>	2.3%				1.1%	0.2%			0.9%				0.0%			95.5%	
<i>USD</i>	10.2%	9.2%	2.8%	0.1%	30.5%	10.0%	1.0%	0.2%	26.6%	1.4%	2.8%	0.3%	1.9%	0.4%	1.2%		1.3%
<i>ZAR</i>	0.0%		0.1%		1.8%	0.2%			1.1%							96.8%	

Table 3, expanded. CLS spot settlements, contra currencies, by year (continued)

<i>APR2016</i>																	
	<i>AUD</i>	<i>CAD</i>	<i>CHF</i>	<i>DKK</i>	<i>EUR</i>	<i>GBP</i>	<i>HKD</i>	<i>ILS</i>	<i>JPY</i>	<i>KRW</i>	<i>MXN</i>	<i>NOK</i>	<i>NZD</i>	<i>SEK</i>	<i>SGD</i>	<i>USD</i>	<i>ZAR</i>
<i>AUD</i>		1.4%	0.2%		6.2%	1.9%			11.4%			0.0%	6.4%	0.0%	0.2%	72.2%	
<i>CAD</i>	1.4%		0.2%		4.0%	1.3%	0.0%		1.9%		0.1%	0.0%	0.3%	0.0%		90.7%	
<i>CHF</i>	0.4%	0.5%			30.8%	2.8%			1.5%			0.1%	0.1%	0.3%		63.4%	
<i>DKK</i>					76.0%	0.7%								0.0%		23.3%	
<i>EUR</i>	1.7%	1.1%	3.5%	1.1%		7.5%	0.0%	0.0%	6.4%		0.1%	3.8%	0.2%	4.7%	0.1%	69.7%	0.1%
<i>GBP</i>	1.3%	0.9%	0.8%	0.0%	18.3%		0.0%		7.8%		0.0%	0.1%	0.3%	0.1%	0.0%	70.2%	0.0%
<i>HKD</i>		0.1%			0.8%	0.5%			0.2%							98.4%	
<i>ILS</i>					3.0%											97.0%	
<i>JPY</i>	4.3%	0.7%	0.2%		8.7%	4.4%	0.0%					0.0%	0.5%	0.0%	0.0%	81.1%	0.0%
<i>KRW</i>																100.0%	
<i>MXN</i>		0.3%			1.5%	0.0%										98.2%	
<i>NOK</i>	0.0%	0.2%	0.2%		66.9%	0.9%			0.1%				0.0%	4.4%		27.3%	
<i>NZD</i>	20.3%	0.9%	0.1%		2.4%	1.6%			4.1%			0.0%		0.0%	0.1%	70.3%	
<i>SEK</i>	0.0%	0.0%	0.4%	0.0%	67.0%	0.8%			0.0%			3.5%	0.0%			28.2%	
<i>SGD</i>	1.0%				1.2%	0.3%			0.5%				0.2%			96.9%	
<i>USD</i>	8.2%	10.1%	2.9%	0.1%	28.5%	11.8%	1.3%	0.2%	24.3%	1.8%	2.8%	0.6%	2.5%	0.8%	2.5%		1.4%
<i>ZAR</i>					1.7%	0.1%			0.6%							97.5%	

Table 7, expanded. Distribution of accept times (NM: not matched)

Distribution of accept times by acceptance criteria (variable and factor), as in paper.

		<i>CLS/Olsen reconciliation lag (sec)</i>								
			<i>[0,5s)</i>	<i>[5s-10s)</i>	<i>[10s,20s)</i>	<i>[20s,30s)</i>	<i>[30s,1m)</i>	<i>[1m,10m)</i>	<i>NM</i>	
<i>accept Var</i>	<i>accept Factor</i>									
<i>median Spread</i>	0	2010APR	6,739,965	20.1%	18.0%	13.6%	8.0%	12.4%	21.2%	6.6%
		2013APR	11,154,150	20.6%	19.4%	15.7%	8.6%	12.9%	16.7%	6.2%
		2016APR	8,359,264	9.6%	9.7%	14.2%	11.2%	21.9%	25.2%	8.2%
	1	2010APR	6,739,965	36.4%	31.8%	7.3%	3.1%	5.0%	11.7%	4.8%
		2013APR	11,154,150	36.0%	35.1%	7.7%	3.6%	5.6%	8.5%	3.5%
		2016APR	8,359,264	22.0%	21.8%	11.3%	8.1%	14.1%	16.8%	6.0%
	5	2010APR	6,739,965	48.4%	42.1%	3.5%	0.4%	0.7%	2.7%	2.1%
		2013APR	11,154,150	46.3%	45.3%	3.0%	0.7%	1.1%	2.2%	1.4%
		2016APR	8,359,264	40.5%	39.2%	4.3%	2.1%	3.5%	6.7%	3.7%
<i>PIP</i>	1	2010APR	6,739,965	29.3%	25.8%	10.1%	5.1%	8.0%	16.0%	5.6%
		2013APR	11,154,150	32.4%	31.4%	9.5%	4.8%	7.3%	10.6%	4.1%
		2016APR	8,359,264	24.7%	24.4%	10.5%	7.2%	12.3%	15.2%	5.6%
	2	2010APR	6,739,965	34.9%	30.5%	7.9%	3.5%	5.6%	12.6%	5.0%
		2013APR	11,154,150	37.8%	37.0%	6.7%	3.0%	4.7%	7.6%	3.2%
		2016APR	8,359,264	33.0%	32.3%	7.4%	4.4%	7.4%	10.7%	4.7%
	10	2010APR	6,739,965	47.5%	41.3%	3.7%	0.6%	1.0%	3.4%	2.5%
		2013APR	11,154,150	46.8%	45.8%	2.8%	0.5%	0.9%	1.8%	1.3%
		2016APR	8,359,264	46.7%	44.9%	2.2%	0.6%	1.1%	2.4%	2.0%

Distribution of accept times by acceptance criteria (variable and factor), by year and size of settlement

		CLS/Olsen reconciliation lag (sec)									
			[0,5s)	[5s-10s)	[10s,20s)	[20s,30s)	[30s,1m)	[1m,10m)	NM		
accept Var	accept Factor										
median 0 Spread	2010APR	All	6,739,965	20.1%	18.0%	13.6%	8.0%	12.4%	21.2%	6.6%	
		<100K	584,378	18.4%	16.6%	13.6%	8.0%	12.2%	22.0%	9.3%	
		[100K,1M)	2,103,357	18.4%	16.6%	13.6%	8.1%	12.8%	22.6%	8.0%	
		1M	3,077,278	21.7%	19.3%	13.8%	8.0%	12.3%	20.0%	4.9%	
		(1M,10M]	929,956	20.3%	18.1%	13.5%	7.9%	12.1%	21.2%	6.9%	
		(10M,100M]	38,000	12.3%	10.9%	8.8%	5.4%	9.3%	30.2%	23.1%	
		>100M	6,996	13.9%	12.0%	9.4%	5.3%	9.6%	35.1%	14.6%	
	2013APR	All	11,154,150	20.6%	19.4%	15.7%	8.6%	12.9%	16.7%	6.2%	
		<100K	1,641,200	18.7%	18.0%	14.3%	7.7%	11.8%	18.7%	10.8%	
		[100K,1M)	4,228,525	20.6%	19.7%	15.9%	8.3%	12.5%	17.3%	5.6%	
		1M	4,245,113	22.1%	20.2%	16.3%	9.3%	13.5%	14.7%	3.8%	
		(1M,10M]	988,831	17.6%	16.9%	14.6%	9.0%	13.4%	18.8%	9.6%	
		(10M,100M]	46,368	8.2%	8.4%	7.8%	5.2%	9.6%	31.6%	29.2%	
		>100M	4,113	11.3%	10.8%	9.1%	5.0%	9.1%	33.4%	21.4%	
	2016APR	All	8,359,264	9.6%	9.7%	14.2%	11.2%	21.9%	25.2%	8.2%	
		<100K	1,179,604	8.3%	8.6%	12.5%	10.3%	19.6%	26.9%	13.9%	
		[100K,1M)	3,073,054	9.4%	9.6%	13.9%	11.4%	21.5%	26.4%	7.8%	
		1M	3,356,606	10.9%	10.6%	15.6%	12.0%	23.8%	22.6%	4.4%	
		(1M,10M]	706,623	7.4%	7.3%	11.4%	9.1%	18.8%	29.3%	16.6%	
		(10M,100M]	40,142	3.9%	3.6%	5.7%	4.5%	10.5%	35.4%	36.5%	
		>100M	3,235	4.8%	3.8%	5.8%	3.4%	9.9%	45.2%	27.1%	
1	2010APR	All	6,739,965	36.4%	31.8%	7.3%	3.1%	5.0%	11.7%	4.8%	
		<100K	584,378	35.3%	30.9%	7.1%	3.0%	4.9%	12.1%	6.7%	
		[100K,1M)	2,103,357	35.4%	30.9%	7.2%	3.1%	5.1%	12.5%	5.9%	
		1M	3,077,278	37.5%	32.7%	7.3%	3.1%	5.0%	10.9%	3.5%	
		(1M,10M]	929,956	36.3%	31.6%	7.3%	3.1%	5.0%	11.7%	5.0%	
		(10M,100M]	38,000	25.7%	22.3%	6.4%	3.1%	5.2%	19.2%	18.1%	
		>100M	6,996	29.4%	24.4%	7.6%	3.0%	5.1%	20.1%	10.5%	
	2013APR	All	11,154,150	36.0%	35.1%	7.7%	3.6%	5.6%	8.5%	3.5%	
		<100K	1,641,200	33.5%	32.9%	7.2%	3.4%	5.4%	10.6%	7.0%	
		[100K,1M)	4,228,525	35.8%	35.0%	7.6%	3.6%	5.7%	9.0%	3.2%	
		1M	4,245,113	38.3%	36.9%	7.8%	3.7%	5.4%	6.6%	1.4%	
		(1M,10M]	988,831	32.6%	32.1%	8.1%	4.0%	6.1%	10.5%	6.6%	

		CLS/Olsen reconciliation lag (sec)							
		[0,5s)	[5s-10s)	[10s,20s)	[20s,30s)	[30s,1m)	[1m,10m)	NM	
	(10M,100M]	46,368	19.3%	18.8%	6.1%	3.3%	6.0%	22.2%	24.3%
	>100M	4,113	25.7%	24.1%	6.2%	2.5%	4.9%	19.6%	17.1%
2016APR	All	8,359,264	22.0%	21.8%	11.3%	8.1%	14.1%	16.8%	6.0%
	<100K	1,179,604	19.1%	19.2%	10.3%	7.5%	13.4%	19.3%	11.1%
	[100K,1M)	3,073,054	21.6%	21.6%	11.2%	8.0%	13.9%	17.7%	5.9%
	1M	3,356,606	24.3%	23.9%	12.1%	8.6%	14.9%	14.0%	2.2%
	(1M,10M]	706,623	17.6%	17.3%	9.6%	7.1%	13.2%	21.6%	13.7%
	(10M,100M]	40,142	10.0%	9.3%	5.6%	4.1%	9.1%	29.1%	32.8%
	>100M	3,235	11.9%	10.7%	5.5%	3.4%	8.6%	35.8%	24.1%
5	2010APR All	6,739,965	48.4%	42.1%	3.5%	0.4%	0.7%	2.7%	2.1%
	<100K	584,378	47.8%	41.7%	3.6%	0.4%	0.7%	2.8%	3.0%
	[100K,1M)	2,103,357	47.9%	41.7%	3.5%	0.5%	0.8%	3.0%	2.6%
	1M	3,077,278	49.0%	42.5%	3.5%	0.4%	0.7%	2.4%	1.4%
	(1M,10M]	929,956	48.4%	42.0%	3.6%	0.5%	0.7%	2.6%	2.2%
	(10M,100M]	38,000	42.5%	36.8%	4.0%	0.7%	1.2%	5.4%	9.4%
	>100M	6,996	46.0%	39.5%	4.8%	0.6%	0.9%	4.3%	3.9%
	2013APR All	11,154,150	46.3%	45.3%	3.0%	0.7%	1.1%	2.2%	1.4%
	<100K	1,641,200	45.1%	44.4%	3.0%	0.6%	1.0%	3.1%	2.8%
	[100K,1M)	4,228,525	46.4%	45.5%	2.9%	0.6%	1.0%	2.3%	1.3%
	1M	4,245,113	47.3%	46.1%	3.1%	0.7%	1.1%	1.4%	0.4%
	(1M,10M]	988,831	44.2%	43.6%	3.5%	0.8%	1.4%	3.2%	3.2%
	(10M,100M]	46,368	34.9%	33.8%	4.0%	1.2%	2.2%	9.0%	14.8%
	>100M	4,113	39.5%	38.4%	4.1%	0.4%	1.0%	5.8%	10.9%
	2016APR All	8,359,264	40.5%	39.2%	4.3%	2.1%	3.5%	6.7%	3.7%
	<100K	1,179,604	37.4%	36.5%	4.4%	2.2%	3.9%	8.8%	6.8%
	[100K,1M)	3,073,054	40.3%	39.1%	4.2%	2.0%	3.5%	7.0%	3.8%
	1M	3,356,606	43.1%	41.5%	4.4%	2.1%	3.3%	4.7%	1.0%
	(1M,10M]	706,623	35.4%	34.0%	4.4%	2.2%	4.0%	10.5%	9.4%
	(10M,100M]	40,142	24.6%	23.7%	3.7%	2.0%	4.0%	17.0%	25.0%
	>100M	3,235	29.2%	27.4%	3.2%	1.7%	4.0%	16.4%	18.1%

CLS/Olsen reconciliation lag (sec)

				[0,5s)	[5s-10s)	[10s,20s)	[20s,30s)	[30s,1m)	[1m,10m)	NM		
PIP	1	2010APR	All	6,739,965	29.3%	25.8%	10.1%	5.1%	8.0%	16.0%	5.6%	
			<100K	584,378	27.6%	24.4%	10.2%	5.1%	8.1%	16.7%	7.8%	
			[100K,1M)	2,103,357	27.9%	24.7%	10.1%	5.1%	8.2%	17.1%	6.9%	
			1M	3,077,278	30.7%	27.0%	10.2%	5.1%	7.9%	14.9%	4.1%	
			(1M,10M]	929,956	29.5%	26.0%	10.0%	5.0%	7.8%	16.0%	5.8%	
			(10M,100M]	38,000	18.8%	16.6%	7.9%	4.1%	7.3%	24.7%	20.6%	
			>100M	6,996	21.3%	17.6%	8.7%	4.7%	7.8%	27.2%	12.7%	
		2013APR	All	11,154,150	32.4%	31.4%	9.5%	4.8%	7.3%	10.6%	4.1%	
			<100K	1,641,200	29.6%	28.9%	9.0%	4.5%	7.1%	12.9%	8.1%	
			[100K,1M)	4,228,525	32.1%	31.3%	9.6%	4.7%	7.3%	11.2%	3.8%	
			1M	4,245,113	34.7%	33.2%	9.7%	5.0%	7.2%	8.5%	1.8%	
			(1M,10M]	988,831	28.8%	28.4%	9.7%	5.1%	7.8%	12.7%	7.4%	
			(10M,100M]	46,368	15.9%	15.5%	6.7%	3.9%	7.1%	25.2%	25.8%	
			>100M	4,113	20.6%	19.9%	7.1%	3.3%	6.4%	24.2%	18.5%	
		2016APR	All	8,359,264	24.7%	24.4%	10.5%	7.2%	12.3%	15.2%	5.6%	
			<100K	1,179,604	21.7%	21.7%	9.7%	6.7%	11.8%	17.7%	10.6%	
			[100K,1M)	3,073,054	24.1%	24.0%	10.5%	7.2%	12.3%	16.1%	5.7%	
			1M	3,356,606	27.4%	26.8%	11.2%	7.6%	12.8%	12.3%	1.9%	
			(1M,10M]	706,623	20.3%	20.0%	9.0%	6.3%	11.5%	19.7%	13.1%	
			(10M,100M]	40,142	11.8%	11.0%	5.3%	4.1%	8.3%	27.9%	31.7%	
			>100M	3,235	13.2%	12.1%	4.9%	3.2%	9.2%	34.1%	23.3%	
	2	2010APR	All	6,739,965	34.9%	30.5%	7.9%	3.5%	5.6%	12.6%	5.0%	
			<100K	584,378	33.4%	29.3%	7.9%	3.5%	5.7%	13.3%	7.0%	
			[100K,1M)	2,103,357	33.7%	29.6%	7.9%	3.5%	5.7%	13.5%	6.2%	
			1M	3,077,278	36.1%	31.6%	7.9%	3.5%	5.5%	11.7%	3.7%	
			(1M,10M]	929,956	35.0%	30.6%	7.8%	3.4%	5.5%	12.6%	5.2%	
			(10M,100M]	38,000	23.9%	20.9%	6.6%	3.4%	5.7%	20.5%	18.9%	
			>100M	6,996	27.2%	22.6%	7.9%	3.3%	6.1%	21.9%	11.1%	
			2013APR	All	11,154,150	37.8%	37.0%	6.7%	3.0%	4.7%	7.6%	3.2%
			<100K	1,641,200	35.0%	34.5%	6.5%	2.9%	4.7%	9.8%	6.7%	
			[100K,1M)	4,228,525	37.6%	36.8%	6.7%	3.0%	4.8%	8.1%	3.0%	
			1M	4,245,113	40.1%	38.9%	6.7%	3.0%	4.4%	5.8%	1.2%	
			(1M,10M]	988,831	34.5%	34.2%	7.1%	3.3%	5.1%	9.6%	6.3%	
			(10M,100M]	46,368	21.1%	20.5%	6.0%	3.0%	5.3%	20.7%	23.4%	
			>100M	4,113	27.2%	25.3%	6.2%	2.1%	4.3%	18.4%	16.6%	

		CLS/Olsen reconciliation lag (sec)								
			[0,5s)	[5s-10s)	[10s,20s)	[20s,30s)	[30s,1m)	[1m,10m)	NM	
	2016APR	All	8,359,264	33.0%	32.3%	7.4%	4.4%	7.4%	10.7%	4.7%
		<100K	1,179,604	29.6%	29.3%	7.2%	4.3%	7.4%	13.2%	9.1%
		[100K,1M)	3,073,054	32.5%	31.8%	7.4%	4.5%	7.5%	11.4%	4.8%
		1M	3,356,606	36.0%	34.9%	7.7%	4.6%	7.3%	8.1%	1.4%
		(1M,10M]	706,623	28.1%	27.3%	6.7%	4.1%	7.3%	14.9%	11.5%
		(10M,100M]	40,142	17.6%	16.8%	4.6%	3.0%	6.4%	22.8%	28.8%
		>100M	3,235	19.6%	18.3%	5.4%	2.8%	7.0%	26.0%	20.8%
10	2010APR	All	6,739,965	47.5%	41.3%	3.7%	0.6%	1.0%	3.4%	2.5%
		<100K	584,378	46.6%	40.6%	3.8%	0.6%	1.0%	3.8%	3.6%
		[100K,1M)	2,103,357	46.9%	40.9%	3.7%	0.6%	1.0%	3.8%	3.1%
		1M	3,077,278	48.2%	41.9%	3.6%	0.6%	1.0%	3.1%	1.7%
		(1M,10M]	929,956	47.6%	41.2%	3.7%	0.6%	1.0%	3.3%	2.6%
		(10M,100M]	38,000	40.7%	35.0%	4.2%	0.9%	1.5%	6.9%	10.7%
		>100M	6,996	44.6%	38.6%	4.9%	0.6%	1.3%	5.4%	4.7%
	2013APR	All	11,154,150	46.8%	45.8%	2.8%	0.5%	0.9%	1.8%	1.3%
		<100K	1,641,200	45.6%	44.9%	2.8%	0.5%	0.9%	2.7%	2.6%
		[100K,1M)	4,228,525	46.9%	46.0%	2.7%	0.5%	0.8%	1.9%	1.2%
		1M	4,245,113	47.7%	46.4%	2.8%	0.5%	0.8%	1.2%	0.4%
		(1M,10M]	988,831	45.0%	44.4%	3.3%	0.6%	1.1%	2.7%	2.9%
		(10M,100M]	46,368	37.0%	36.0%	3.7%	0.9%	1.8%	7.4%	13.1%
		>100M	4,113	41.2%	39.4%	3.7%	0.3%	0.9%	4.7%	9.8%
	2016APR	All	8,359,264	46.7%	44.9%	2.2%	0.6%	1.1%	2.4%	2.0%
		<100K	1,179,604	44.9%	43.5%	2.2%	0.6%	1.2%	3.7%	3.8%
		[100K,1M)	3,073,054	46.5%	44.8%	2.2%	0.6%	1.1%	2.6%	2.1%
		1M	3,356,606	48.3%	46.2%	2.2%	0.6%	0.9%	1.4%	0.4%
		(1M,10M]	706,623	44.0%	42.1%	2.4%	0.7%	1.3%	4.3%	5.4%
		(10M,100M]	40,142	36.3%	34.9%	2.4%	0.8%	1.8%	8.1%	15.7%
		>100M	3,235	40.7%	37.6%	2.4%	0.4%	1.4%	6.2%	11.4%

Distribution of accept times by acceptance criteria (variable and factor), by year and currency pair

		CLS/Olsen reconciliation lag (sec)									
			[0,5s)	[5s-10s)	[10s,20s)	[20s,30s)	[30s,1m)	[1m,10m)	NM		
accept Var	accept Factor										
median	0	2010APR All	6,739,965	20.1%	18.0%	13.6%	8.0%	12.4%	21.2%	6.6%	
Spread		AUD/JPY	101,893	24.0%	21.0%	13.7%	7.0%	9.9%	17.2%	7.2%	
		AUD/USD	599,810	24.6%	21.6%	14.1%	7.0%	10.0%	16.8%	5.9%	
		EUR/CHF	167,994	30.6%	26.9%	12.4%	5.9%	7.9%	13.2%	3.1%	
		EUR/GBP	230,132	20.4%	18.6%	14.6%	8.4%	12.8%	20.1%	5.0%	
		EUR/JPY	439,772	17.1%	15.6%	12.8%	8.2%	13.9%	24.8%	7.6%	
		EUR/USD	2,159,652	16.7%	15.2%	13.7%	8.7%	13.9%	24.4%	7.4%	
		GBP/JPY	133,944	22.5%	20.4%	13.8%	8.0%	10.7%	17.5%	7.0%	
		GBP/USD	716,409	16.7%	15.2%	13.5%	9.2%	15.4%	23.6%	6.4%	
		NZD/USD	155,075	30.1%	25.7%	14.4%	5.6%	7.5%	11.3%	5.4%	
		USD/CAD	456,899	24.9%	21.7%	12.8%	6.3%	9.3%	18.6%	6.5%	
		USD/CHF	378,284	22.0%	19.8%	13.5%	7.6%	10.9%	19.0%	7.2%	
		USD/JPY	1,122,776	21.0%	18.8%	13.9%	7.8%	12.2%	20.2%	6.2%	
		USD/MXN	77,325	25.6%	21.7%	14.5%	7.6%	8.7%	15.7%	6.2%	
		2013APR All	11,154,150	20.6%	19.4%	15.7%	8.6%	12.9%	16.7%	6.2%	
		AUD/JPY	266,051	18.8%	18.4%	13.9%	7.8%	13.1%	18.9%	9.2%	
		AUD/USD	998,667	25.7%	24.1%	15.1%	7.5%	10.4%	12.5%	4.6%	
		EUR/CHF	218,070	29.2%	29.0%	13.3%	6.0%	7.7%	10.4%	4.4%	
		EUR/GBP	281,460	25.0%	24.1%	14.7%	7.4%	9.7%	13.5%	5.6%	
		EUR/JPY	925,315	15.5%	14.9%	15.4%	9.3%	15.2%	22.4%	7.2%	
		EUR/USD	2,860,268	19.2%	17.8%	16.4%	9.4%	14.0%	17.4%	5.8%	
		GBP/JPY	161,893	17.5%	17.1%	13.5%	7.3%	12.2%	18.6%	13.9%	
		GBP/USD	892,404	23.1%	22.5%	14.8%	7.7%	10.6%	14.7%	6.6%	
		NZD/USD	276,383	28.3%	27.1%	13.7%	6.1%	8.2%	10.7%	5.8%	
		USD/CAD	542,166	28.9%	27.1%	15.3%	6.7%	8.4%	9.8%	3.8%	
		USD/CHF	346,210	25.6%	24.2%	14.1%	6.9%	9.6%	13.3%	6.3%	
		USD/JPY	3,116,331	17.8%	16.5%	16.4%	9.3%	14.6%	18.7%	6.6%	
		USD/MXN	268,932	17.9%	16.3%	17.3%	9.9%	15.1%	18.1%	5.4%	
		2016APR All	8,359,264	9.6%	9.7%	14.2%	11.2%	21.9%	25.2%	8.2%	
		AUD/JPY	180,025	7.8%	7.8%	11.5%	8.9%	19.1%	30.9%	14.1%	
		AUD/USD	915,996	10.3%	10.3%	14.6%	11.4%	22.0%	23.5%	7.9%	
		EUR/CHF	125,367	19.0%	18.8%	13.9%	9.4%	15.9%	18.1%	4.9%	
		EUR/GBP	276,634	10.9%	11.1%	14.6%	11.6%	21.5%	22.9%	7.3%	

		CLS/Olsen reconciliation lag (sec)							
		[0,5s)	[5s-10s)	[10s,20s)	[20s,30s)	[30s,1m)	[1m,10m)	NM	
	EUR/JPY	255,422	8.7%	8.6%	13.0%	10.3%	21.3%	25.7%	12.4%
	EUR/USD	2,118,544	8.4%	8.5%	14.8%	11.9%	23.3%	25.9%	7.3%
	GBP/JPY	141,694	8.0%	8.2%	11.3%	9.2%	18.1%	26.7%	18.5%
	GBP/USD	874,550	8.7%	8.8%	13.9%	11.7%	22.7%	25.6%	8.6%
	NZD/USD	341,514	14.9%	14.6%	14.3%	10.1%	17.9%	20.2%	7.9%
	USD/CAD	743,888	9.9%	10.0%	14.1%	11.3%	22.1%	24.8%	7.8%
	USD/CHF	278,449	13.6%	13.3%	14.6%	11.1%	19.1%	21.4%	7.0%
	USD/JPY	1,847,349	7.9%	7.9%	13.6%	11.2%	22.7%	28.3%	8.4%
	USD/MXN	259,832	18.3%	18.1%	15.5%	10.4%	16.6%	15.9%	5.3%
1	2010APR All	6,739,965	36.4%	31.8%	7.3%	3.1%	5.0%	11.7%	4.8%
	AUD/JPY	101,893	40.3%	34.4%	5.8%	2.1%	3.3%	8.9%	5.3%
	AUD/USD	599,810	40.2%	34.1%	7.5%	2.2%	3.5%	8.3%	4.2%
	EUR/CHF	167,994	45.5%	39.4%	4.7%	1.3%	2.2%	5.5%	1.5%
	EUR/GBP	230,132	40.2%	35.5%	5.9%	2.4%	3.9%	8.8%	3.3%
	EUR/JPY	439,772	34.8%	31.2%	6.3%	3.1%	5.4%	13.5%	5.8%
	EUR/USD	2,159,652	32.8%	28.9%	7.9%	3.9%	6.3%	14.5%	5.7%
	GBP/JPY	133,944	39.3%	34.8%	5.9%	2.3%	3.5%	9.3%	4.9%
	GBP/USD	716,409	33.4%	29.8%	8.0%	4.2%	6.8%	13.3%	4.5%
	NZD/USD	155,075	44.4%	36.9%	8.1%	1.2%	1.5%	4.5%	3.5%
	USD/CAD	456,899	40.5%	34.4%	6.5%	1.8%	3.1%	9.2%	4.5%
	USD/CHF	378,284	38.6%	33.8%	5.9%	2.4%	3.7%	10.3%	5.2%
	USD/JPY	1,122,776	37.3%	32.6%	7.1%	2.9%	4.7%	11.0%	4.4%
	USD/MXN	77,325	37.9%	31.4%	11.1%	4.3%	3.6%	7.5%	4.3%
	2013APR All	11,154,150	36.0%	35.1%	7.7%	3.6%	5.6%	8.5%	3.5%
	AUD/JPY	266,051	33.4%	34.5%	6.6%	3.4%	5.7%	10.2%	6.3%
	AUD/USD	998,667	41.4%	38.9%	6.8%	2.0%	3.0%	5.1%	2.8%
	EUR/CHF	218,070	44.4%	44.0%	3.6%	1.0%	1.4%	3.3%	2.4%
	EUR/GBP	281,460	41.2%	40.2%	5.2%	1.8%	2.7%	5.4%	3.3%
	EUR/JPY	925,315	31.3%	31.4%	8.6%	4.6%	7.6%	12.2%	4.2%
	EUR/USD	2,860,268	35.5%	34.2%	8.2%	4.0%	6.0%	9.1%	2.9%
	GBP/JPY	161,893	32.5%	33.1%	5.9%	3.1%	5.2%	10.3%	9.8%
	GBP/USD	892,404	39.2%	38.7%	5.4%	2.5%	3.7%	6.9%	3.8%
	NZD/USD	276,383	43.1%	41.1%	5.2%	1.3%	1.9%	4.0%	3.4%
	USD/CAD	542,166	43.8%	41.4%	5.4%	1.4%	2.0%	3.8%	2.2%
	USD/CHF	346,210	41.2%	39.9%	4.8%	1.8%	2.7%	5.9%	3.7%
	USD/JPY	3,116,331	32.8%	32.5%	8.8%	4.7%	7.2%	10.4%	3.6%

		CLS/Olsen reconciliation lag (sec)							
		[0,5s)	[5s-10s)	[10s,20s)	[20s,30s)	[30s,1m)	[1m,10m)	NM	
	USD/MXN	268,932	28.7%	25.4%	15.5%	8.2%	12.3%	7.6%	2.3%
2016APR	All	8,359,264	22.0%	21.8%	11.3%	8.1%	14.1%	16.8%	6.0%
	AUD/JPY	180,025	19.6%	19.4%	9.6%	6.5%	12.6%	20.7%	11.6%
	AUD/USD	915,996	23.4%	23.1%	11.4%	7.9%	13.4%	15.1%	5.7%
	EUR/CHF	125,367	38.4%	37.2%	6.1%	3.2%	5.0%	7.3%	2.7%
	EUR/GBP	276,634	26.2%	26.1%	10.5%	7.2%	11.4%	13.6%	5.0%
	EUR/JPY	255,422	20.4%	20.2%	10.7%	7.6%	13.7%	17.5%	9.8%
	EUR/USD	2,118,544	18.5%	18.5%	12.8%	9.5%	16.9%	18.6%	5.2%
	GBP/JPY	141,694	19.9%	19.8%	9.1%	6.3%	11.3%	18.1%	15.5%
	GBP/USD	874,550	21.2%	21.1%	11.5%	8.6%	14.5%	17.0%	6.1%
	NZD/USD	341,514	30.0%	29.3%	9.2%	5.5%	8.8%	11.5%	5.7%
	USD/CAD	743,888	23.8%	23.7%	11.0%	7.8%	13.3%	15.2%	5.3%
	USD/CHF	278,449	30.1%	29.3%	9.3%	5.6%	8.9%	11.9%	4.8%
	USD/JPY	1,847,349	18.4%	18.2%	11.9%	8.8%	16.2%	20.1%	6.3%
	USD/MXN	259,832	40.1%	39.0%	5.5%	2.7%	3.9%	5.5%	3.3%
5	2010APR All	6,739,965	48.4%	42.1%	3.5%	0.4%	0.7%	2.7%	2.1%
	AUD/JPY	101,893	49.7%	42.3%	3.1%	0.3%	0.4%	1.9%	2.3%
	AUD/USD	599,810	49.7%	42.1%	4.8%	0.2%	0.4%	1.4%	1.4%
	EUR/CHF	167,994	50.4%	43.4%	3.2%	0.2%	0.5%	1.9%	0.5%
	EUR/GBP	230,132	50.7%	44.4%	2.3%	0.2%	0.3%	1.1%	1.1%
	EUR/JPY	439,772	47.9%	42.6%	2.3%	0.4%	0.8%	3.2%	2.8%
	EUR/USD	2,159,652	47.1%	41.2%	3.3%	0.6%	1.1%	3.9%	2.9%
	GBP/JPY	133,944	49.5%	43.5%	2.6%	0.3%	0.4%	1.7%	2.0%
	GBP/USD	716,409	48.5%	42.8%	2.9%	0.4%	0.8%	2.6%	1.9%
	NZD/USD	155,075	49.7%	41.3%	7.0%	0.3%	0.2%	0.6%	0.9%
	USD/CAD	456,899	49.8%	42.2%	4.3%	0.3%	0.4%	1.7%	1.3%
	USD/CHF	378,284	49.4%	43.1%	2.8%	0.3%	0.5%	2.2%	1.8%
	USD/JPY	1,122,776	48.7%	42.6%	3.6%	0.4%	0.7%	2.4%	1.7%
	USD/MXN	77,325	44.3%	36.7%	10.5%	3.4%	1.8%	2.0%	1.3%
	2013APR All	11,154,150	46.3%	45.3%	3.0%	0.7%	1.1%	2.2%	1.4%
	AUD/JPY	266,051	44.9%	46.1%	2.0%	0.4%	0.9%	2.8%	3.0%
	AUD/USD	998,667	48.2%	45.0%	4.3%	0.2%	0.3%	0.9%	1.1%
	EUR/CHF	218,070	48.7%	48.3%	2.1%	0.1%	0.1%	0.3%	0.3%
	EUR/GBP	281,460	48.1%	46.6%	2.7%	0.2%	0.3%	1.0%	1.2%
	EUR/JPY	925,315	45.2%	45.5%	2.6%	0.6%	1.1%	2.9%	2.0%
	EUR/USD	2,860,268	46.9%	45.4%	2.9%	0.5%	0.9%	2.3%	1.1%

CLS/Olsen reconciliation lag (sec)

		[0,5s)	[5s-10s)	[10s,20s)	[20s,30s)	[30s,1m)	[1m,10m)	NM	
	<i>GBP/JPY</i>	161,893	44.3%	44.8%	1.8%	0.5%	0.8%	3.2%	4.7%
	<i>GBP/USD</i>	892,404	47.6%	46.8%	1.8%	0.2%	0.5%	1.7%	1.3%
	<i>NZD/USD</i>	276,383	48.3%	46.1%	3.5%	0.2%	0.2%	0.6%	1.0%
	<i>USD/CAD</i>	542,166	48.6%	45.9%	3.5%	0.2%	0.3%	0.7%	0.7%
	<i>USD/CHF</i>	346,210	48.0%	46.4%	2.2%	0.2%	0.4%	1.3%	1.4%
	<i>USD/JPY</i>	3,116,331	45.6%	45.8%	2.3%	0.7%	1.2%	2.7%	1.6%
	<i>USD/MXN</i>	268,932	30.1%	26.6%	15.7%	8.3%	12.6%	6.0%	0.6%
2016APR	<i>All</i>	8,359,264	40.5%	39.2%	4.3%	2.1%	3.5%	6.7%	3.7%
	<i>AUD/JPY</i>	180,025	39.2%	37.5%	3.4%	1.5%	2.8%	7.6%	7.9%
	<i>AUD/USD</i>	915,996	42.5%	40.6%	3.8%	1.6%	2.6%	5.4%	3.5%
	<i>EUR/CHF</i>	125,367	48.9%	46.8%	1.8%	0.2%	0.3%	1.1%	0.9%
	<i>EUR/GBP</i>	276,634	44.4%	43.0%	2.7%	1.1%	1.7%	4.2%	2.9%
	<i>EUR/JPY</i>	255,422	39.8%	38.0%	3.5%	1.8%	3.1%	7.3%	6.4%
	<i>EUR/USD</i>	2,118,544	37.8%	36.9%	5.7%	3.1%	5.1%	8.3%	3.1%
	<i>GBP/JPY</i>	141,694	38.1%	37.1%	2.9%	1.3%	2.4%	7.8%	10.4%
	<i>GBP/USD</i>	874,550	40.9%	39.8%	4.0%	2.0%	3.1%	6.5%	3.7%
	<i>NZD/USD</i>	341,514	45.3%	43.2%	2.8%	0.7%	1.3%	3.6%	3.1%
	<i>USD/CAD</i>	743,888	42.9%	41.4%	3.4%	1.5%	2.5%	5.2%	3.1%
	<i>USD/CHF</i>	278,449	45.7%	43.8%	2.6%	0.6%	1.3%	3.4%	2.6%
	<i>USD/JPY</i>	1,847,349	38.0%	36.8%	5.2%	2.7%	4.6%	8.5%	4.1%
	<i>USD/MXN</i>	259,832	48.8%	47.0%	1.5%	0.1%	0.2%	0.8%	1.6%

			CLS/Olsen reconciliation lag (sec)								
			[0,5s)	[5s-10s)	[10s,20s)	[20s,30s)	[30s,1m)	[1m,10m)	NM		
PIP	1	2010APR	All	6,739,965	29.3%	25.8%	10.1%	5.1%	8.0%	16.0%	5.6%
			AUD/JPY	101,893	32.1%	27.5%	9.8%	4.4%	6.5%	13.4%	6.4%
			AUD/USD	599,810	33.3%	28.6%	10.4%	4.1%	6.1%	12.3%	5.1%
			EUR/CHF	167,994	39.2%	34.1%	7.7%	2.9%	4.5%	9.2%	2.3%
			EUR/GBP	230,132	33.5%	29.9%	9.0%	4.3%	6.6%	12.8%	3.9%
			EUR/JPY	439,772	25.2%	22.7%	10.1%	5.9%	9.8%	19.7%	6.7%
			EUR/USD	2,159,652	26.5%	23.5%	10.4%	5.7%	9.2%	18.5%	6.3%
			GBP/JPY	133,944	28.4%	25.6%	11.2%	5.8%	7.9%	14.8%	6.2%
			GBP/USD	716,409	25.3%	22.9%	11.0%	6.6%	10.7%	18.2%	5.3%
			NZD/USD	155,075	36.4%	30.8%	11.6%	3.4%	4.6%	8.4%	4.8%
			USD/CAD	456,899	32.1%	27.6%	9.7%	4.1%	6.1%	14.6%	5.8%
			USD/CHF	378,284	31.1%	27.5%	9.3%	4.5%	6.8%	14.6%	6.2%
			USD/JPY	1,122,776	31.9%	28.1%	9.4%	4.4%	7.0%	14.3%	5.0%
			USD/MXN	77,325	26.1%	22.1%	14.3%	7.5%	8.5%	15.4%	6.1%
		2013APR	All	11,154,150	32.4%	31.4%	9.5%	4.8%	7.3%	10.6%	4.1%
			AUD/JPY	266,051	28.2%	28.5%	9.1%	5.1%	8.4%	13.4%	7.3%
			AUD/USD	998,667	37.7%	35.4%	8.8%	3.2%	4.7%	6.9%	3.3%
			EUR/CHF	218,070	40.3%	39.9%	5.8%	2.2%	3.1%	5.4%	3.3%
			EUR/GBP	281,460	38.0%	37.1%	7.0%	2.9%	4.1%	7.2%	3.8%
			EUR/JPY	925,315	24.6%	24.3%	11.6%	6.7%	11.0%	16.5%	5.3%
			EUR/USD	2,860,268	32.5%	31.2%	9.8%	5.0%	7.5%	10.6%	3.4%
			GBP/JPY	161,893	24.0%	24.1%	10.2%	5.5%	9.1%	15.1%	12.1%
			GBP/USD	892,404	34.0%	33.4%	8.4%	4.1%	5.9%	9.5%	4.7%
			NZD/USD	276,383	38.2%	36.5%	7.8%	2.8%	3.9%	6.5%	4.3%
			USD/CAD	542,166	39.9%	37.7%	7.7%	2.7%	3.7%	5.6%	2.7%
			USD/CHF	346,210	37.4%	36.1%	6.9%	3.0%	4.3%	7.8%	4.4%
			USD/JPY	3,116,331	30.9%	30.4%	9.8%	5.3%	8.2%	11.4%	4.0%
			USD/MXN	268,932	18.6%	16.9%	17.2%	9.7%	14.8%	17.5%	5.3%
		2016APR	All	8,359,264	24.7%	24.4%	10.5%	7.2%	12.3%	15.2%	5.6%
			AUD/JPY	180,025	19.6%	19.4%	9.6%	6.5%	12.6%	20.7%	11.6%
			AUD/USD	915,996	27.3%	26.8%	10.1%	6.6%	10.8%	13.0%	5.3%
			EUR/CHF	125,367	36.9%	35.8%	6.8%	3.7%	5.8%	8.1%	2.9%
			EUR/GBP	276,634	30.4%	30.1%	8.8%	5.7%	8.8%	11.6%	4.6%
			EUR/JPY	255,422	21.5%	21.2%	10.3%	7.3%	13.1%	16.9%	9.7%
			EUR/USD	2,118,544	25.7%	25.5%	10.5%	7.2%	12.2%	14.6%	4.3%

		CLS/Olsen reconciliation lag (sec)								
		[0,5s)	[5s-10s)	[10s,20s)	[20s,30s)	[30s,1m)	[1m,10m)	NM		
		GBP/JPY	141,694	15.4%	15.5%	10.2%	7.6%	13.9%	21.0%	16.4%
		GBP/USD	874,550	21.2%	21.1%	11.5%	8.6%	14.5%	17.0%	6.1%
		NZD/USD	341,514	30.0%	29.3%	9.2%	5.5%	8.8%	11.5%	5.7%
		USD/CAD	743,888	22.7%	22.7%	11.3%	8.2%	13.9%	15.7%	5.4%
		USD/CHF	278,449	30.1%	29.3%	9.3%	5.6%	8.9%	11.9%	4.8%
		USD/JPY	1,847,349	23.7%	23.3%	10.5%	7.2%	12.9%	16.8%	5.7%
		USD/MXN	259,832	19.0%	18.8%	15.2%	10.2%	16.2%	15.4%	5.1%
2	2010APR	All	6,739,965	34.9%	30.5%	7.9%	3.5%	5.6%	12.6%	5.0%
		AUD/JPY	101,893	36.9%	31.6%	7.5%	2.9%	4.6%	10.8%	5.7%
		AUD/USD	599,810	38.5%	32.8%	8.2%	2.6%	4.1%	9.4%	4.5%
		EUR/CHF	167,994	43.2%	37.5%	5.7%	1.9%	3.0%	7.0%	1.8%
		EUR/GBP	230,132	40.2%	35.5%	5.9%	2.4%	3.9%	8.8%	3.3%
		EUR/JPY	439,772	30.2%	27.2%	8.1%	4.3%	7.3%	16.6%	6.2%
		EUR/USD	2,159,652	32.8%	28.9%	7.9%	3.9%	6.3%	14.5%	5.7%
		GBP/JPY	133,944	33.4%	29.8%	8.7%	4.2%	5.7%	12.6%	5.7%
		GBP/USD	716,409	31.4%	28.1%	8.9%	4.8%	7.7%	14.5%	4.7%
		NZD/USD	155,075	40.2%	33.8%	9.8%	2.3%	3.0%	6.5%	4.3%
		USD/CAD	456,899	36.7%	31.3%	7.8%	2.8%	4.4%	11.9%	5.2%
		USD/CHF	378,284	36.5%	32.0%	6.9%	2.9%	4.5%	11.6%	5.5%
		USD/JPY	1,122,776	37.3%	32.6%	7.1%	2.9%	4.7%	11.0%	4.4%
		USD/MXN	77,325	26.5%	22.5%	14.2%	7.3%	8.3%	15.1%	6.1%
	2013APR	All	11,154,150	37.8%	37.0%	6.7%	3.0%	4.7%	7.6%	3.2%
		AUD/JPY	266,051	33.2%	34.3%	6.6%	3.5%	5.8%	10.3%	6.3%
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		EUR/CHF	218,070	44.0%	43.6%	3.8%	1.1%	1.5%	3.5%	2.5%
		EUR/GBP	281,460	42.8%	41.7%	4.5%	1.3%	2.1%	4.5%	3.0%
		EUR/JPY	925,315	30.5%	30.6%	9.0%	4.9%	8.0%	12.7%	4.3%
		EUR/USD	2,860,268	38.7%	37.4%	6.6%	2.9%	4.5%	7.4%	2.5%
		GBP/JPY	161,893	28.8%	29.1%	7.7%	4.2%	6.8%	12.5%	10.8%
		GBP/USD	892,404	39.0%	38.5%	5.5%	2.5%	3.7%	7.0%	3.8%
		NZD/USD	276,383	42.3%	40.4%	5.6%	1.6%	2.2%	4.5%	3.5%
		USD/CAD	542,166	43.8%	41.4%	5.4%	1.4%	2.0%	3.8%	2.2%
		USD/CHF	346,210	41.9%	40.6%	4.4%	1.6%	2.4%	5.5%	3.6%
		USD/JPY	3,116,331	37.0%	37.0%	6.5%	3.3%	5.1%	8.1%	3.0%
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		CLS/Olsen reconciliation lag (sec)							
		[0,5s)	[5s-10s)	[10s,20s)	[20s,30s)	[30s,1m)	[1m,10m)	NM	
2016APR	All	8,359,264	33.0%	32.3%	7.4%	4.4%	7.4%	10.7%	4.7%
	AUD/JPY	180,025	27.6%	26.9%	7.1%	4.5%	8.2%	15.3%	10.4%
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	EUR/USD	2,118,544	34.9%	34.2%	6.9%	4.0%	6.7%	9.8%	3.4%
	GBP/JPY	141,694	21.6%	21.5%	8.6%	5.8%	10.3%	17.1%	15.1%
	GBP/USD	874,550	29.3%	28.9%	8.8%	5.8%	9.3%	12.7%	5.2%
	NZD/USD	341,514	37.6%	36.3%	5.9%	3.0%	4.7%	7.8%	4.8%
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	AUD/JPY	101,893	48.0%	40.8%	3.4%	0.5%	0.8%	3.3%	3.1%
	AUD/USD	599,810	48.9%	41.3%	4.9%	0.4%	0.5%	2.1%	1.9%
	EUR/CHF	167,994	49.8%	42.9%	3.4%	0.3%	0.6%	2.3%	0.6%
	EUR/GBP	230,132	50.7%	44.4%	2.3%	0.2%	0.3%	1.1%	1.1%
	EUR/JPY	439,772	45.5%	40.4%	2.8%	0.8%	1.5%	5.3%	3.7%
	EUR/USD	2,159,652	47.1%	41.2%	3.3%	0.6%	1.1%	3.9%	2.9%
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	GBP/USD	716,409	47.2%	41.7%	3.2%	0.7%	1.2%	3.7%	2.3%
	NZD/USD	155,075	48.3%	40.1%	7.1%	0.4%	0.5%	1.7%	2.0%
	USD/CAD	456,899	47.5%	40.3%	4.6%	0.6%	1.0%	3.6%	2.5%
	USD/CHF	378,284	47.9%	41.8%	3.1%	0.4%	0.9%	3.4%	2.5%
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	USD/MXN	77,325	29.9%	25.0%	13.1%	6.3%	6.8%	13.1%	5.8%
	2013APR All	11,154,150	46.8%	45.8%	2.8%	0.5%	0.9%	1.8%	1.3%
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	EUR/CHF	218,070	48.6%	48.2%	2.1%	0.1%	0.1%	0.4%	0.4%
	EUR/GBP	281,460	48.5%	47.0%	2.6%	0.1%	0.2%	0.7%	0.9%
	EUR/JPY	925,315	44.7%	45.0%	2.8%	0.8%	1.4%	3.3%	2.1%
	EUR/USD	2,860,268	48.0%	46.4%	2.6%	0.3%	0.5%	1.4%	0.8%

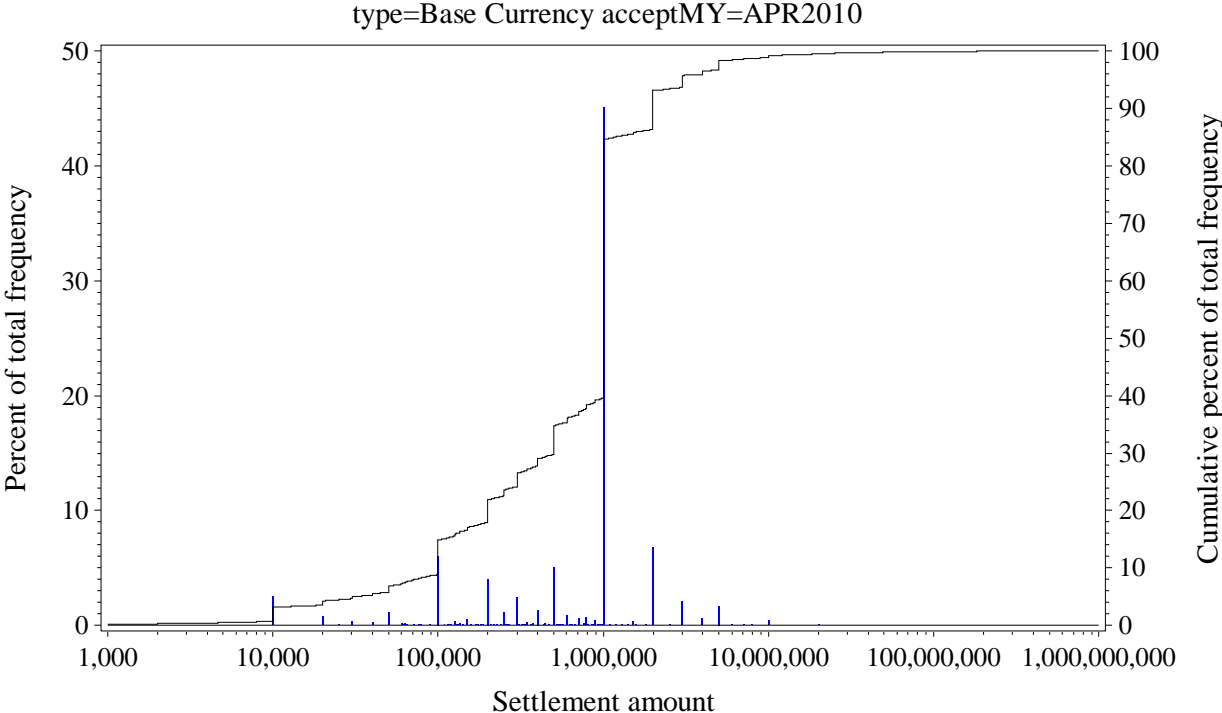
CLS/Olsen reconciliation lag (sec)

		[0,5s)	[5s-10s)	[10s,20s)	[20s,30s)	[30s,1m)	[1m,10m)	NM	
	<i>GBP/JPY</i>	161,893	41.5%	42.1%	2.5%	0.9%	1.6%	4.9%	6.4%
	<i>GBP/USD</i>	892,404	47.4%	46.7%	1.8%	0.3%	0.5%	1.8%	1.4%
	<i>NZD/USD</i>	276,383	48.1%	45.9%	3.5%	0.2%	0.2%	0.7%	1.2%
	<i>USD/CAD</i>	542,166	48.6%	45.9%	3.5%	0.2%	0.3%	0.7%	0.7%
	<i>USD/CHF</i>	346,210	48.2%	46.6%	2.2%	0.2%	0.3%	1.1%	1.3%
	<i>USD/JPY</i>	3,116,331	47.2%	47.4%	1.8%	0.3%	0.6%	1.6%	1.2%
	<i>USD/MXN</i>	268,932	23.7%	21.1%	16.0%	8.6%	13.1%	13.2%	4.2%
2016APR	<i>All</i>	8,359,264	46.7%	44.9%	2.2%	0.6%	1.1%	2.4%	2.0%
	<i>AUD/JPY</i>	180,025	44.9%	42.8%	2.0%	0.5%	1.0%	3.7%	5.1%
	<i>AUD/USD</i>	915,996	48.3%	46.0%	1.9%	0.2%	0.4%	1.4%	1.6%
	<i>EUR/CHF</i>	125,367	49.8%	47.6%	1.6%	0.1%	0.1%	0.4%	0.4%
	<i>EUR/GBP</i>	276,634	49.0%	47.3%	1.3%	0.1%	0.2%	0.9%	1.1%
	<i>EUR/JPY</i>	255,422	46.0%	43.7%	1.7%	0.5%	1.0%	3.4%	3.9%
	<i>EUR/USD</i>	2,118,544	48.1%	46.4%	1.8%	0.3%	0.6%	1.7%	1.1%
	<i>GBP/JPY</i>	141,694	39.6%	38.5%	2.4%	1.0%	2.0%	6.8%	9.6%
	<i>GBP/USD</i>	874,550	46.2%	44.7%	2.1%	0.6%	1.0%	2.9%	2.4%
	<i>NZD/USD</i>	341,514	48.2%	45.9%	2.1%	0.2%	0.4%	1.4%	1.7%
	<i>USD/CAD</i>	743,888	46.9%	45.1%	1.9%	0.5%	0.9%	2.6%	2.1%
	<i>USD/CHF</i>	278,449	48.4%	46.3%	2.0%	0.2%	0.4%	1.5%	1.3%
	<i>USD/JPY</i>	1,847,349	47.3%	45.3%	2.0%	0.4%	0.7%	2.2%	2.1%
	<i>USD/MXN</i>	259,832	25.2%	24.8%	12.9%	8.2%	12.6%	12.0%	4.4%

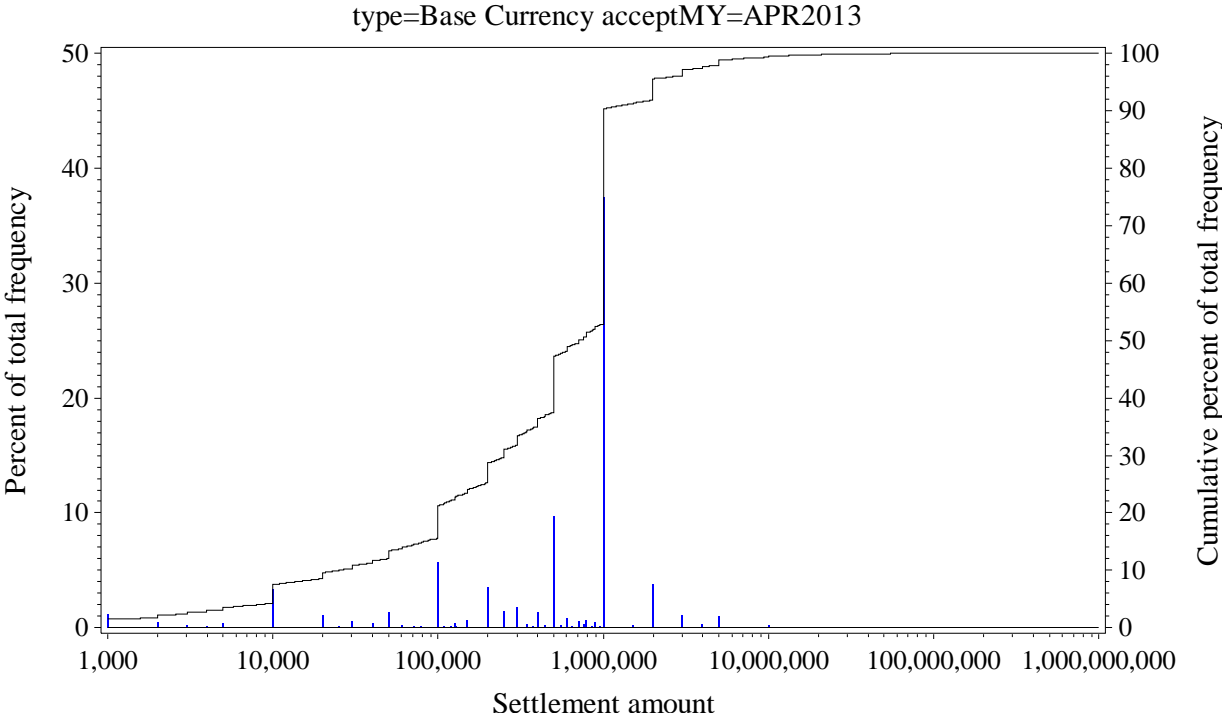
Expanded Figures

Expanded Figure 1: Distribution of settlement sizes, by year.
Size is measured in units of base currency (and, in alternate plots, quote currency).

Base Currency, APR2010

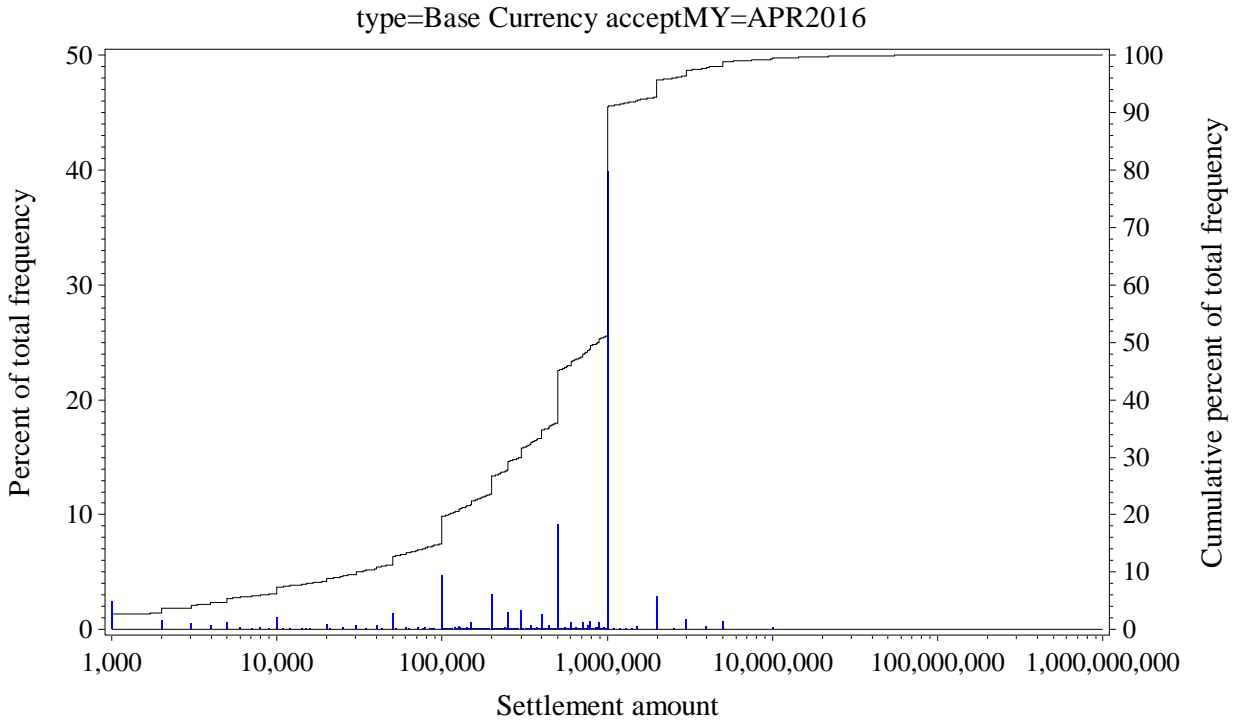


Base Currency, APR2013

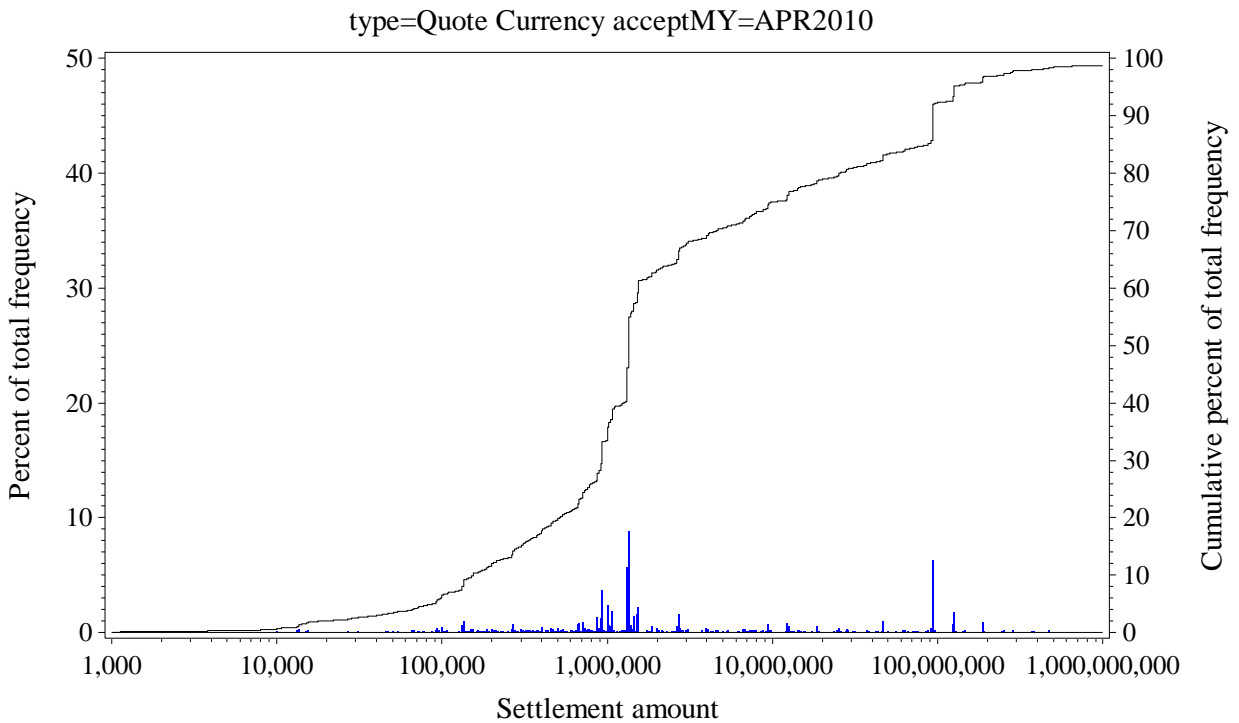


Expanded Figure 1: Distribution of settlement sizes, by year (continued).

Base Currency, APR2016

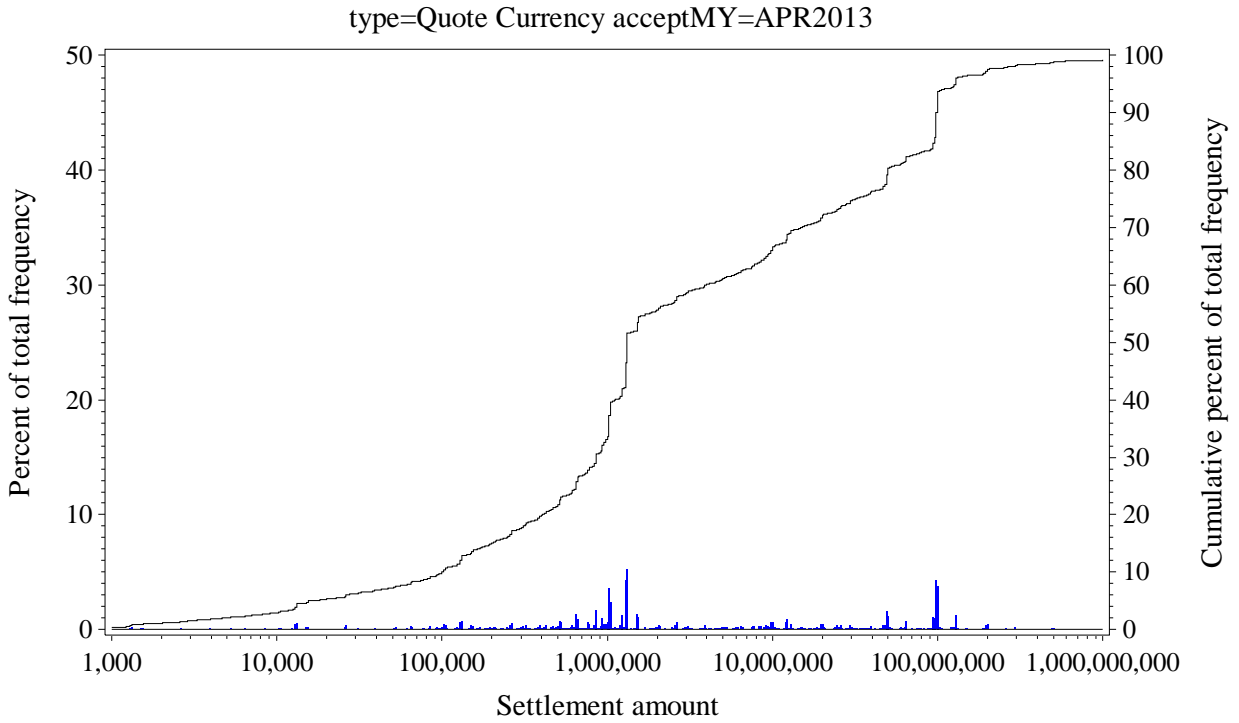


Quote Currency, APR2010

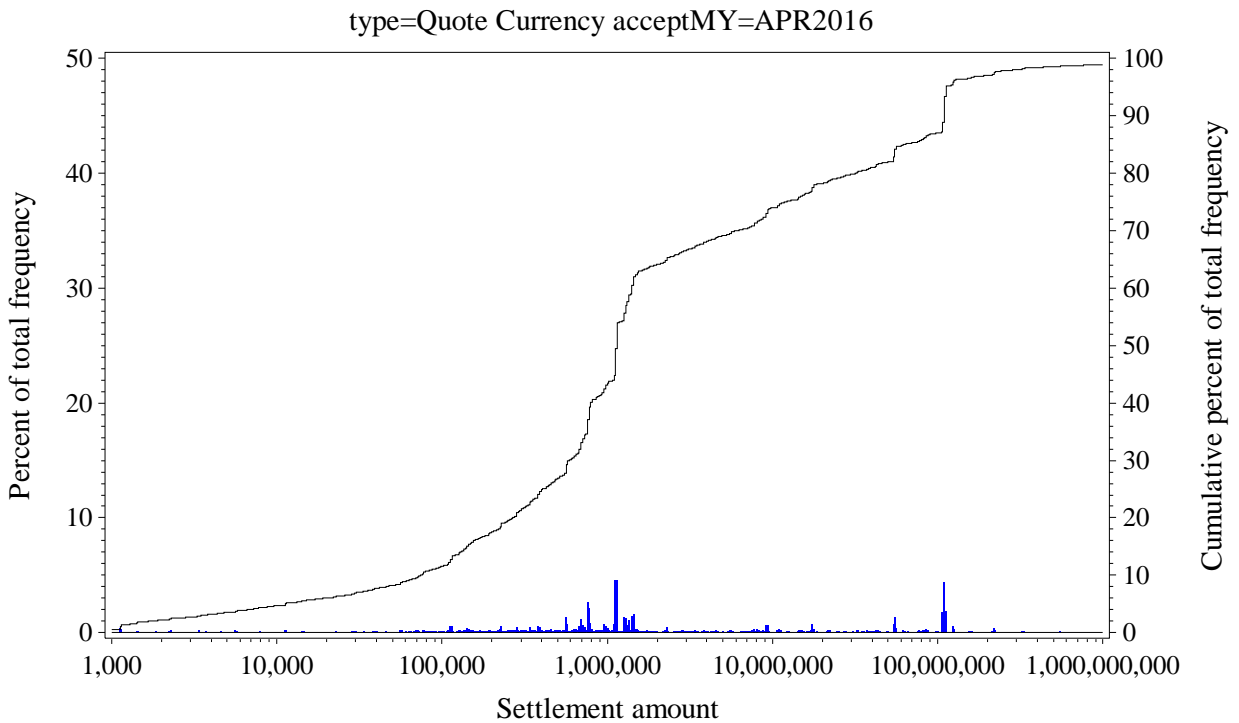


Expanded Figure 1: Distribution of settlement sizes, by year (continued).

Quote Currency, APR2013



Quote Currency, APR2016



Supplemental Tables

Supplemental Table S1. Settlement size distributions.

The sample is all CLS settlements in the Aprils of 2010, 2013, and 2016. Settlement sizes are stated in USD equivalent. Very small settlements, below one unit of the base currency, are excluded.

Settlement size distributions by year and instrument type.

		<i>amtUSD</i>												
		<i>N</i>	<i>Mean</i>	<i>Min</i>	<i>P1</i>	<i>P5</i>	<i>P10</i>	<i>P25</i>	<i>P50</i>	<i>P75</i>	<i>P90</i>	<i>P95</i>	<i>P99</i>	<i>Max</i>
<i>All</i>	<i>APR2010</i>	7,917,446	5,564K	0.585	9,166	30,723	99,226	334,435	999,322	1,347K	2,702K	6,017K	99,685K	10,685M
	<i>APR2013</i>	13,599,987	4,070K	0.690	1,294	10,066	28,968	195,340	832,811	1,296K	2,001K	4,013K	65,271K	11,668M
	<i>APR2016</i>	10,900,484	4,735K	0.685	996.32	5,208	30,580	199,955	761,424	1,131K	1,988K	4,530K	87,127K	13,686M
<i>Spot</i>	<i>APR2010</i>	7,265,321	1,868K	0.711	9,954	39,230	99,856	337,159	998,973	1,344K	2,665K	3,996K	11,973K	10,482M
	<i>APR2013</i>	12,489,634	1,137K	0.823	1,300	10,080	29,909	196,763	797,073	1,290K	1,531K	2,608K	7,589K	3,084M
	<i>APR2016</i>	9,936,800	1,045K	0.685	1,000	5,064	31,575	200,381	758,073	1,124K	1,428K	2,265K	6,936K	5,688M
<i>Outright Forward</i>	<i>APR2010</i>	258,555	10,848K	0.711	479.64	4,803	13,930	92,284	627,030	2,646K	11,078K	26,831K	232,311K	8,092M
	<i>APR2013</i>	475,453	4,126K	0.839	801.25	3,193	11,716	70,040	301,178	1,300K	5,384K	12,974K	61,249K	3,085M
	<i>APR2016</i>	327,577	4,977K	0.690	764.39	7,614	20,938	88,953	388,921	2,132K	8,823K	17,155K	77,753K	5,689M
<i>Near Leg FX Swap</i>	<i>APR2010</i>	135,898	79,893K	0.711	5,541	45,663	130,597	767,055	4,054K	53,166K	204,744K	384,088K	1,034M	10,685M
	<i>APR2013</i>	236,045	71,235K	0.844	1,529	27,156	109,475	706,610	4,254K	50,006K	198,463K	347,819K	905,467K	11,668M
	<i>APR2016</i>	245,199	72,706K	1.07	1,150	28,872	104,004	666,332	5,101K	49,866K	191,610K	359,924K	992,237K	13,680M
<i>Far Leg FX Swap</i>	<i>APR2010</i>	135,495	79,840K	0.711	5,459	45,160	128,938	764,175	4,022K	52,354K	204,600K	384,382K	1,034M	10,685M
	<i>APR2013</i>	238,483	70,479K	0.844	1,522	26,085	104,222	675,108	4,023K	49,960K	196,225K	344,614K	900,836K	11,668M
	<i>APR2016</i>	242,954	73,081K	1.07	1,143	28,537	103,013	663,019	5,066K	49,895K	193,088K	362,124K	994,313K	13,686M
<i>Other</i>	<i>APR2010</i>	84,385	67,023K	0.992	315.60	9,900	41,436	482,349	1,559K	40,449K	180,168K	344,221K	767,963K	10,482M
	<i>APR2013</i>	138,191	36,838K	0.849	968.59	6,514	17,697	198,644	1,004K	9,628K	100,117K	205,165K	641,248K	4,706M
	<i>APR2016</i>	110,914	32,626K	0.991	49.79	276.74	851.51	22,761	473,763	13,045K	86,943K	171,434K	527,866K	5,677M
<i>Option</i>	<i>APR2010</i>	37,792	9,164K	0.585	461.89	15,216	50,322	273,838	1,006K	4,988K	22,836K	40,393K	106,903K	1,854M
	<i>APR2013</i>	22,181	21,497K	0.690	190.47	30,157	97,809	504,058	5,127K	22,744K	49,594K	92,550K	200,957K	3,218M
	<i>APR2016</i>	37,040	10,498K	0.763	143.37	1,441	7,361	84,239	796,983	10,008K	29,855K	51,014K	114,358K	1,000M

Settlement size distributions by year and currency (spot settlements only).

APR2010

	amtUSD												
	<i>N</i>	<i>Mean</i>	<i>Min</i>	<i>P1</i>	<i>P5</i>	<i>P10</i>	<i>P25</i>	<i>P50</i>	<i>P75</i>	<i>P90</i>	<i>P95</i>	<i>P99</i>	<i>Max</i>
<i>AUD</i>	772,912	\$1,619K	\$0.231	\$9,264	\$40,705	\$92,407	\$271,076	\$923,625	\$928,121	\$1,855K	\$2,776K	\$9,002K	\$3,571M
<i>CAD</i>	512,273	\$2,036K	\$0.010	\$3,109	\$21,433	\$83,689	\$202,552	\$996,739	\$1,003K	\$1,999K	\$3,019K	\$19,235K	\$1,994M
<i>CHF</i>	582,480	\$1,508K	\$0.130	\$9,181	\$31,403	\$97,993	\$313,708	\$996,645	\$1,340K	\$2,002K	\$2,824K	\$10,278K	\$6,397M
<i>DKK</i>	10,466	\$10,695K	\$17.99	\$6,054	\$26,941	\$93,744	\$293,693	\$1,340K	\$6,697K	\$25,816K	\$37,142K	\$94,160K	\$2,885M
<i>EUR</i>	3,133,208	\$1,991K	\$0.135	\$13,348	\$55,643	\$133,518	\$493,488	\$1,336K	\$1,346K	\$2,684K	\$4,014K	\$13,456K	\$8,091M
<i>GBP</i>	1,119,010	\$1,739K	\$0.768	\$13,518	\$15,482	\$67,285	\$229,186	\$1,213K	\$1,534K	\$2,675K	\$3,091K	\$15,368K	\$8,091M
<i>HKD</i>	29,441	\$6,314K	\$6.44	\$2,449	\$18,376	\$75,154	\$788,961	\$1,000K	\$4,999K	\$10,002K	\$19,962K	\$98,655K	\$1,224M
<i>ILS</i>	4,742	\$4,098K	\$51.43	\$5,086	\$40,334	\$164,727	\$997,873	\$1,010K	\$3,051K	\$5,966K	\$12,510K	\$58,064K	\$268,365K
<i>JPY</i>	1,853,987	\$1,406K	\$0.140	\$9,284	\$15,044	\$58,559	\$200,405	\$994,498	\$1,065K	\$2,001K	\$3,009K	\$10,692K	\$10,482M
<i>KRW</i>	83,690	\$2,229K	\$1,832	\$498,244	\$580,348	\$995,152	\$998,096	\$1,001K	\$1,992K	\$3,001K	\$4,987K	\$36,680K	\$500,420K
<i>MXN</i>	78,207	\$1,848K	\$1.99	\$7,538	\$100,823	\$303,187	\$997,407	\$999,668	\$1,005K	\$2,944K	\$4,984K	\$13,744K	\$678,511K
<i>NOK</i>	52,470	\$3,112K	\$0.321	\$3,601	\$39,799	\$98,483	\$375,842	\$1,334K	\$1,347K	\$3,889K	\$6,594K	\$27,894K	\$1,408M
<i>NZD</i>	210,162	\$1,381K	\$0.711	\$7,158	\$35,272	\$71,079	\$220,457	\$711,242	\$723,522	\$1,530K	\$2,661K	\$10,687K	\$714,177K
<i>SEK</i>	75,854	\$2,771K	\$0.335	\$3,588	\$31,599	\$95,399	\$294,621	\$1,335K	\$1,346K	\$3,214K	\$6,399K	\$17,336K	\$1,795M
<i>SGD</i>	53,203	\$3,537K	\$1.45	\$8,925	\$71,871	\$149,390	\$995,396	\$1,005K	\$2,846K	\$5,006K	\$9,816K	\$43,672K	\$935,339K
<i>USD</i>	5,909,964	\$1,962K	\$0.010	\$10,023	\$50,901	\$101,077	\$400,359	\$998,927	\$1,344K	\$2,654K	\$4,001K	\$12,481K	\$10,482M
<i>ZAR</i>	49,719	\$1,798K	\$0.135	\$1,915	\$13,590	\$40,896	\$456,502	\$998,693	\$1,008K	\$2,043K	\$4,070K	\$20,849K	\$519,930K

Settlement size distributions by year and currency (spot settlements only, continued).

APR2013

	<i>amtUSD</i>												
	<i>N</i>	<i>Mean</i>	<i>Min</i>	<i>P1</i>	<i>P5</i>	<i>P10</i>	<i>P25</i>	<i>P50</i>	<i>P75</i>	<i>P90</i>	<i>P95</i>	<i>P99</i>	<i>Max</i>
<i>AUD</i>	1,512,184	\$1,034K	\$0.010	\$1,037	\$10,336	\$28,415	\$195,307	\$737,137	\$1,039K	\$1,311K	\$2,083K	\$9,822K	\$2,185M
<i>CAD</i>	689,578	\$1,714K	\$0.010	\$1,001	\$8,053	\$19,139	\$185,934	\$912,845	\$1,002K	\$1,349K	\$2,101K	\$14,404K	\$1,961M
<i>CHF</i>	648,981	\$1,003K	\$0.010	\$995.48	\$5,664	\$14,038	\$133,624	\$687,882	\$1,008K	\$1,309K	\$2,295K	\$8,493K	\$1,559M
<i>DKK</i>	21,142	\$2,772K	\$0.345	\$946.62	\$9,538	\$18,581	\$96,907	\$771,760	\$1,302K	\$6,507K	\$12,999K	\$36,907K	\$520,925K
<i>EUR</i>	4,651,561	\$1,175K	\$0.130	\$1,298	\$12,118	\$22,617	\$191,313	\$818,170	\$1,304K	\$1,323K	\$2,621K	\$9,960K	\$2,185M
<i>GBP</i>	1,432,677	\$1,181K	\$0.018	\$1,536	\$4,627	\$15,310	\$141,630	\$763,198	\$1,526K	\$1,541K	\$3,084K	\$9,426K	\$3,084M
<i>HKD</i>	50,432	\$2,372K	\$0.031	\$140.51	\$3,141	\$17,363	\$189,064	\$999,961	\$1,364K	\$4,999K	\$9,826K	\$28,873K	\$499,584K
<i>ILS</i>	14,028	\$2,112K	\$0.012	\$1,381	\$26,381	\$104,549	\$717,819	\$1,000K	\$1,077K	\$3,999K	\$4,988K	\$22,147K	\$273,687K
<i>JPY</i>	4,645,096	\$905,350	\$0.010	\$1,082	\$10,014	\$29,141	\$165,330	\$523,895	\$1,006K	\$1,314K	\$2,008K	\$7,361K	\$2,017M
<i>KRW</i>	98,400	\$1,736K	\$573.89	\$495,452	\$501,227	\$991,638	\$997,496	\$1,001K	\$1,720K	\$3,001K	\$4,961K	\$10,717K	\$199,959K
<i>MXN</i>	276,317	\$1,219K	\$0.120	\$6,073	\$74,731	\$101,371	\$501,011	\$997,897	\$1,003K	\$1,995K	\$2,846K	\$10,052K	\$302,444K
<i>NOK</i>	165,424	\$1,073K	\$0.050	\$865.75	\$14,827	\$51,968	\$172,644	\$654,364	\$1,300K	\$1,364K	\$2,616K	\$12,509K	\$642,475K
<i>NZD</i>	461,001	\$688,043	\$0.422	\$851.07	\$4,271	\$8,534	\$84,625	\$411,284	\$847,049	\$1,034K	\$1,697K	\$6,711K	\$977,994K
<i>SEK</i>	198,649	\$1,095K	\$0.153	\$1,453	\$17,311	\$63,413	\$172,752	\$669,353	\$1,300K	\$1,417K	\$2,620K	\$8,945K	\$1,151M
<i>SGD</i>	112,510	\$1,325K	\$0.514	\$942.64	\$9,808	\$65,024	\$262,074	\$999,335	\$1,001K	\$2,432K	\$4,086K	\$10,918K	\$300,461K
<i>USD</i>	9,822,273	\$1,211K	\$0.010	\$1,288	\$10,606	\$40,067	\$235,357	\$982,609	\$1,107K	\$1,546K	\$2,679K	\$11,451K	\$3,084M
<i>ZAR</i>	180,469	\$899,757	\$0.101	\$248.35	\$6,489	\$11,749	\$108,561	\$933,706	\$1,004K	\$1,666K	\$2,021K	\$7,983K	\$219,233K

Settlement size distributions by year and currency (spot settlements only, continued).

APR2016

	<i>amtUSD</i>												
	<i>N</i>	<i>Mean</i>	<i>Min</i>	<i>P1</i>	<i>P5</i>	<i>P10</i>	<i>P25</i>	<i>P50</i>	<i>P75</i>	<i>P90</i>	<i>P95</i>	<i>P99</i>	<i>Max</i>
<i>AUD</i>	1,373,868	\$735,268	\$0.091	\$760.14	\$2,417	\$9,953	\$150,344	\$629,302	\$767,664	\$1,056K	\$1,536K	\$7,532K	\$1,901M
<i>CAD</i>	907,299	\$1,089K	\$0.022	\$725.61	\$2,395	\$16,022	\$153,680	\$658,000	\$1,000K	\$1,099K	\$1,988K	\$6,686K	\$2,632M
<i>CHF</i>	460,383	\$895,088	\$0.011	\$989.91	\$3,151	\$19,513	\$137,160	\$544,488	\$1,003K	\$1,137K	\$1,516K	\$7,994K	\$2,007M
<i>DKK</i>	27,223	\$1,873K	\$0.156	\$931.92	\$7,624	\$22,855	\$110,441	\$637,382	\$1,134K	\$2,359K	\$5,633K	\$20,419K	\$456,825K
<i>EUR</i>	3,249,292	\$1,115K	\$0.011	\$1,130	\$3,306	\$19,289	\$226,408	\$1,022K	\$1,136K	\$1,143K	\$2,283K	\$12,037K	\$5,688M
<i>GBP</i>	1,423,428	\$1,045K	\$0.013	\$1,388	\$2,866	\$10,252	\$143,110	\$712,178	\$1,424K	\$1,447K	\$2,650K	\$12,276K	\$2,447M
<i>HKD</i>	79,875	\$1,421K	\$0.740	\$1,174	\$12,807	\$45,134	\$213,156	\$999,930	\$1,000K	\$2,114K	\$4,981K	\$13,622K	\$500,006K
<i>ILS</i>	18,200	\$1,225K	\$0.499	\$3,684	\$14,455	\$29,490	\$171,524	\$998,278	\$1,001K	\$1,982K	\$4,031K	\$13,561K	\$111,254K
<i>JPY</i>	2,541,681	\$1,046K	\$0.010	\$983.75	\$5,025	\$31,403	\$234,874	\$761,585	\$1,003K	\$1,435K	\$2,211K	\$9,763K	\$3,197M
<i>KRW</i>	95,998	\$1,656K	\$98.88	\$992,749	\$994,121	\$995,155	\$998,806	\$1,001K	\$1,004K	\$2,007K	\$3,997K	\$11,148K	\$199,718K
<i>MXN</i>	263,148	\$965,318	\$0.010	\$2,096	\$31,194	\$86,823	\$208,850	\$989,677	\$1,001K	\$1,011K	\$1,999K	\$6,857K	\$360,353K
<i>NOK</i>	227,263	\$903,659	\$0.056	\$2,281	\$37,873	\$98,643	\$208,262	\$745,794	\$1,130K	\$1,143K	\$1,357K	\$5,402K	\$726,881K
<i>NZD</i>	497,769	\$637,188	\$0.090	\$692.14	\$1,943	\$7,699	\$79,803	\$497,414	\$690,724	\$769,623	\$1,387K	\$6,343K	\$615,295K
<i>SEK</i>	250,616	\$1,021K	\$0.240	\$2,210	\$33,530	\$79,717	\$169,518	\$699,991	\$1,132K	\$1,139K	\$1,998K	\$9,550K	\$1,230M
<i>SGD</i>	212,198	\$1,085K	\$1.000	\$4,647	\$59,198	\$99,835	\$373,637	\$997,752	\$1,001K	\$1,730K	\$2,935K	\$7,373K	\$418,923K
<i>USD</i>	8,082,478	\$1,097K	\$0.010	\$994.28	\$7,177	\$44,288	\$229,226	\$764,197	\$1,011K	\$1,439K	\$2,283K	\$11,616K	\$5,688M
<i>ZAR</i>	164,381	\$776,320	\$0.080	\$504.81	\$10,540	\$38,318	\$124,019	\$543,639	\$997,465	\$1,018K	\$1,941K	\$4,544K	\$274,902K

Supplemental Table S2. Clustering in spot settlement rates, by location of market

The sample is CLS spot settlements for Aprils of 2010, 2013, and 2016, in currency pairs that can be classified as “EBS-dominant pairs” or “Other pairs”. A pip is the traditional tick size in a currency pair, in units of the quote currency: 0.01 for the JPY, 0.0001 for all others (the second decimal place for JPY, the fourth for all others). The micro pip digit is the third place for the JPY and the fifth place for all others. 0 and 5 are tabulated separately; the remaining eight digits are summarized in “Other”. Under the null hypothesis of equal probability of each digit, the frequencies on 0/5/Other would be 10%/10%/80%.

	All pairs				EBS-dominant pairs				Other pairs			
	N	Percent Frequency of micro pip digit			N	Percent Frequency of micro pip digit			N	Percent Frequency of micro pip digit		
0		5	Other	0		5	Other	0		5	Other	
2010	7,265,894	56.4	7.0	36.6	4,269,499	55.7	5.9	38.3	2,996,395	57.3	8.6	34.1
2013	12,490,361	33.3	11.9	54.7	7,473,588	28.0	14.4	57.6	5,016,773	41.2	8.2	50.5
2016	9,937,550	27.7	10.1	62.2	4,633,724	22.8	12.5	64.7	5,303,826	32.0	8.1	59.9

Supplemental Table S3. Clustering in Olsen bids and offers

The sample is Olsen bids and asks in April of the indicated year, for selected currency pairs. The price granularity is described by the “pip”. A pip is the traditional tick size in a currency pair, in units of the quote currency: 0.01 for the JPY, 0.0001 for all others (the second decimal place for JPY, the fourth for all others). The micro pip is the third place for the JPY and the fifth place for all others. For each bid or ask quote, the digit in the pip and micro pip decimal place is recorded.

Clustering in Olsen bids and offers, bids and offers combined, by year

	<i>N</i>	<i>Pip</i>										<i>Micro Pip</i>									
		0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
<i>APR2010</i>	4,685,830	10.2	9.5	10.1	9.7	10.3	10.0	10.4	9.9	10.3	9.6	74.9	3.0	2.6	2.7	2.7	2.8	2.8	2.6	2.9	2.9
<i>APR2013</i>	4,886,578	10.2	9.7	10.0	10.0	10.1	10.0	10.1	10.1	10.0	9.7	26.7	8.0	8.1	8.3	8.0	8.5	8.0	8.1	8.2	8.1
<i>APR2016</i>	4,724,218	9.9	9.8	10.0	10.0	10.1	10.1	10.1	10.1	10.0	9.8	19.5	9.1	9.0	8.8	8.9	8.8	8.9	8.8	9.0	9.1

Clustering in Olsen bids and offers, bids and offers reported separately, by year.

	<i>N</i>	<i>Pip</i>										<i>Micro Pip</i>									
		0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
<i>APR2010 Bid</i>	2,342,915	10.0	9.7	10.2	9.9	10.3	10.3	10.5	10.0	9.9	9.3	77.2	2.4	2.4	2.4	2.6	2.7	2.3	2.4	2.8	2.8
<i>APR2010 Ofr</i>	2,342,915	10.4	9.3	9.9	9.6	10.3	9.8	10.2	9.9	10.8	9.9	72.5	3.7	2.9	3.0	2.9	2.9	3.2	2.9	3.0	3.0
<i>APR2013 Bid</i>	2,443,289	10.1	9.9	10.1	10.1	10.1	10.1	10.2	10.1	9.8	9.5	27.6	7.9	8.0	8.4	7.9	8.8	7.8	7.8	7.8	7.9
<i>APR2013 Ofr</i>	2,443,289	10.2	9.6	9.8	10.0	10.2	10.0	10.1	10.1	10.2	9.9	25.8	8.1	8.1	8.1	8.2	8.3	8.1	8.5	8.5	8.3
<i>APR2016 Bid</i>	2,362,109	9.8	9.9	10.1	10.0	10.1	10.1	10.2	10.1	9.9	9.7	19.5	9.2	9.3	9.0	9.0	8.8	8.8	8.7	8.8	9.0
<i>APR2016 Ofr</i>	2,362,109	9.9	9.6	10.0	10.0	10.1	10.0	10.0	10.2	10.1	10.0	19.6	9.0	8.8	8.6	8.8	8.8	9.0	9.0	9.3	9.1

Clustering in Olsen bids and offers, bids and offers combined, by currency pair and year

		<i>Pip</i>										<i>Micro Pip</i>										
		0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	
<i>N</i>		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	
<i>AUD/JPY</i>	<i>APR2010</i>	380,548	10.1	9.8	10.2	9.8	10.2	9.7	10.2	9.9	10.3	9.9	71.4	3.0	2.9	3.1	2.8	5.0	3.0	3.0	3.1	2.9
	<i>APR2013</i>	387,858	10.3	10.0	10.1	9.9	9.8	9.7	10.0	9.9	10.2	10.1	19.0	9.0	9.0	9.0	9.0	9.0	9.0	8.9	9.0	9.1
	<i>APR2016</i>	365,822	10.1	10.1	10.2	10.2	10.0	10.0	9.8	9.8	9.9	9.9	11.8	9.9	9.8	9.6	9.9	9.7	9.9	9.7	9.8	9.9
<i>AUD/USD</i>	<i>APR2010</i>	372,168	10.4	9.3	10.2	9.5	10.9	9.9	10.5	9.9	10.6	8.9	84.7	1.8	1.7	1.7	1.6	1.9	1.6	1.7	1.6	1.8
	<i>APR2013</i>	382,268	9.4	9.6	10.3	10.8	10.7	10.3	10.1	9.9	9.8	9.2	20.9	8.4	8.5	9.0	8.9	9.3	8.4	9.7	8.5	8.5
	<i>APR2016</i>	362,920	9.6	9.7	9.8	9.9	10.3	10.4	10.3	10.1	9.8	9.9	12.8	10.5	9.9	9.4	9.1	9.1	9.3	9.4	10.1	10.4
<i>EUR/CHF</i>	<i>APR2010</i>	379,832	10.4	9.6	10.1	9.2	9.5	9.6	10.3	10.3	10.7	10.3	82.2	2.0	2.0	2.0	2.0	1.4	2.1	2.1	2.1	2.1
	<i>APR2013</i>	379,084	9.4	9.1	9.6	9.9	10.6	10.4	10.7	10.8	10.0	9.4	25.8	8.2	8.1	8.2	8.3	8.2	8.3	8.4	8.2	8.3
	<i>APR2016</i>	362,130	9.8	9.7	10.3	10.1	9.9	9.6	10.1	10.4	10.3	9.8	13.7	9.8	9.7	9.5	9.4	9.3	9.6	9.5	9.7	9.8
<i>EUR/GBP</i>	<i>APR2010</i>	380,764	9.6	9.2	10.1	10.1	10.7	10.1	10.7	10.1	10.3	9.1	35.4	8.0	6.5	7.3	7.1	6.5	7.7	6.6	7.5	7.4
	<i>APR2013</i>	384,698	10.2	10.1	10.0	9.6	9.6	9.6	10.1	10.1	10.4	10.3	20.1	8.9	8.7	8.7	8.8	9.6	8.9	8.5	8.7	8.9
	<i>APR2016</i>	363,378	10.0	10.2	10.5	10.2	9.6	9.7	9.8	10.0	10.1	10.0	12.9	9.5	9.8	9.5	9.7	10.0	9.8	9.5	9.7	9.5
<i>EUR/JPY</i>	<i>APR2010</i>	382,394	10.2	9.7	10.3	9.8	10.3	9.8	10.3	9.7	10.3	9.7	75.1	2.7	2.9	2.7	2.9	2.7	2.7	2.8	2.7	2.9
	<i>APR2013</i>	383,774	10.0	10.0	9.9	9.8	10.0	9.9	10.2	10.0	10.2	10.0	15.8	9.2	10.0	9.1	9.2	9.2	9.2	9.1	9.6	9.6
	<i>APR2016</i>	368,594	10.2	9.8	10.0	9.8	9.9	10.2	10.0	10.1	10.0	10.1	12.8	9.7	9.8	9.6	9.7	9.7	9.6	9.6	9.8	9.8
<i>EUR/USD</i>	<i>APR2010</i>	380,420	9.7	9.4	10.0	10.0	10.5	10.4	10.5	10.1	10.0	9.4	86.0	1.8	1.4	1.4	1.6	1.5	1.8	1.5	1.3	1.7
	<i>APR2013</i>	384,520	9.3	9.4	10.0	10.4	10.6	10.4	10.2	10.1	10.1	9.6	20.1	8.6	8.5	9.7	8.6	8.9	8.7	8.9	9.3	8.6
	<i>APR2016</i>	363,404	9.2	9.6	10.4	10.2	10.2	10.0	10.1	10.4	10.0	9.8	13.1	9.5	9.8	9.3	9.9	9.7	10.2	9.4	9.7	9.5

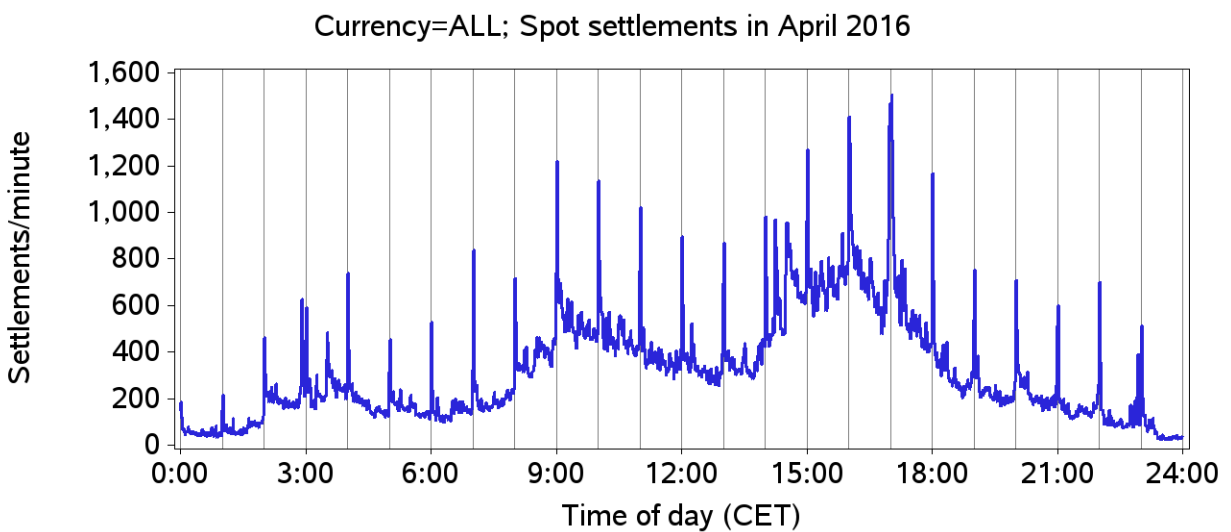
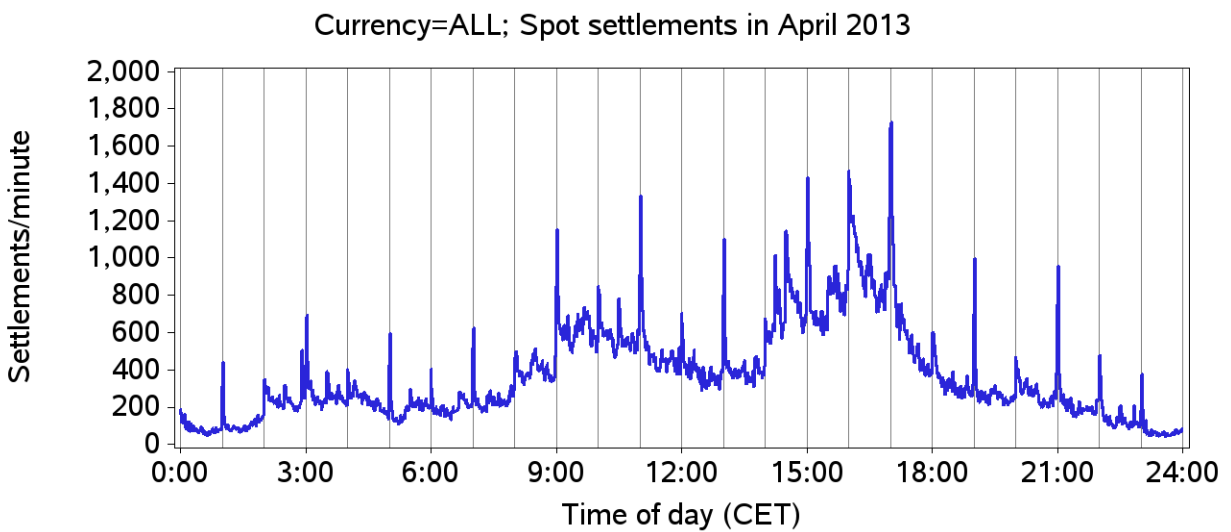
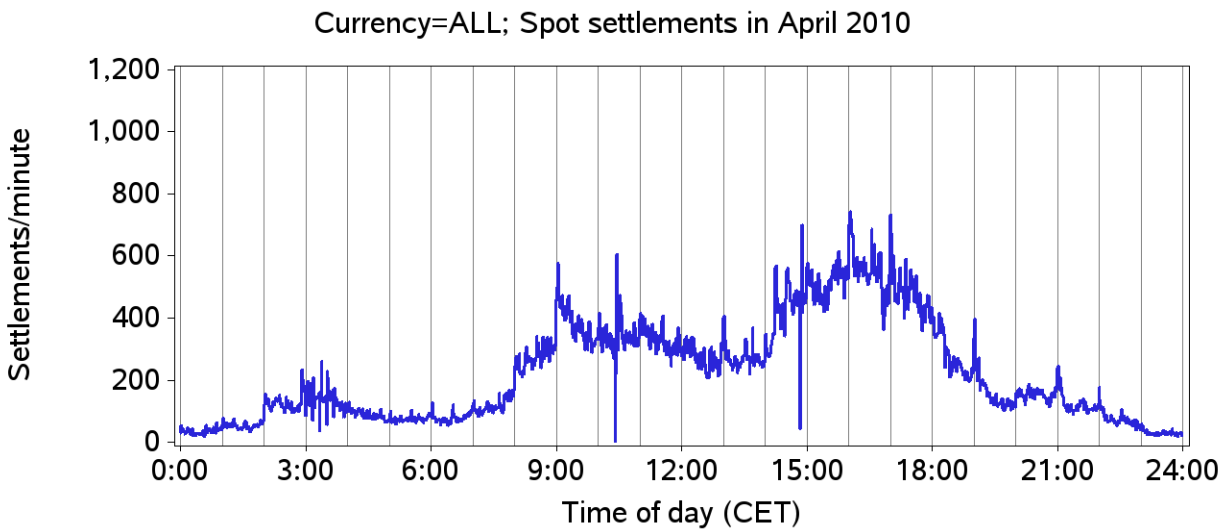
Supplemental Table S4. Alternative Liquidity Measures by Currency Pair, ranked by turnover in April 2016

The sample is all CLS spot settlements in the Aprils of 2010, 2013 and 2016 that are between 100,000 and 100,000,000 units of the base currency. Turnover is measured as value of settlements expressed in USD in trillions for the entire month. I^{Volume} is the volume based illiquidity measure and reflects the log price change over an interval that contains \$100 million US equivalent over the interval. I^{Time} is the fixed-time illiquidity measure based on a two-minute window. λ^{BVC} is the bulk-volume illiquidity measure estimated by a regression of log price changes against signed order flow imputed by the bulk-volume classification method. See Tables 7, 8 and 9 in the main paper for additional details including standard error estimates.

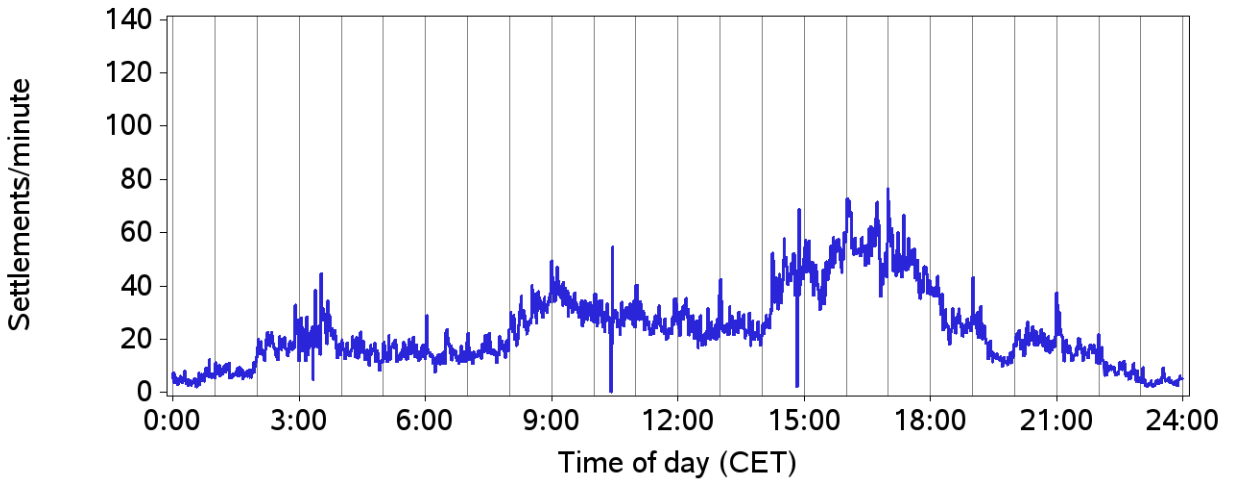
		April 2010				April 2013				April 2016			
April 2016 Turnover Rank	Pair	Turnover	I^{Volume}	I^{Time}	λ^{BVC}	Turnover	I^{Volume}	I^{Time}	λ^{BVC}	Turnover	I^{Volume}	I^{Time}	λ^{BVC}
1	EUR/USD	3.533	0.0103	0.0271	0.0288	3.449	0.0089	0.0186	0.0243	2.255	0.0117	0.0260	0.0303
2	USD/JPY	1.332	0.0181	0.0521	0.0461	2.951	0.0168	0.0256	0.0437	1.928	0.0156	0.0293	0.0456
3	GBP/USD	1.013	0.0224	0.1132	0.0563	1.029	0.0148	0.0651	0.0367	0.950	0.0227	0.0930	0.0559
4	USD/CAD	0.567	0.0285	0.2974	0.0703	0.655	0.0154	0.0990	0.0388	0.721	0.0275	0.1225	0.0686
5	AUD/USD	0.678	0.0280	0.1364	0.0667	1.074	0.0169	0.0472	0.0415	0.668	0.0350	0.1058	0.0881
6	EUR/GBP	0.384	0.0283	0.3721	0.0715	0.319	0.0269	0.3586	0.0666	0.258	0.0374	0.4756	0.0893
7	USD/MXN	0.130	0.0470	0.8396	0.1256	0.325	0.0324	0.4869	0.0851	0.241	0.0536	0.8619	0.1344
8	EUR/JPY	0.528	0.0398	0.2606	0.0967	0.756	0.0465	0.2389	0.1107	0.223	0.0503	0.4750	0.1329
9	USD/CHF	0.373	0.0352	0.3922	0.0886	0.296	0.0319	0.3006	0.0780	0.213	0.0400	0.4052	0.0933
10	NZD/USD	0.139	0.0737	1.1234	0.1671	0.202	0.0480	0.4325	0.1105	0.204	0.0639	0.4949	0.1527
11	EUR/CHF	0.294	0.0137	0.2629	0.0451	0.272	0.0165	0.2142	0.0391	0.117	0.0274	0.4830	0.0586
12	GBP/JPY	0.092	0.1097	1.8205	0.2437	0.087	0.1412	2.0576	0.3911	0.114	0.0909	1.4834	0.2470
13	AUD/JPY	0.063	0.1386	2.6932	0.3096	0.143	0.1119	1.6495	0.2566	0.113	0.1120	1.7379	0.2840

Supplemental Figures

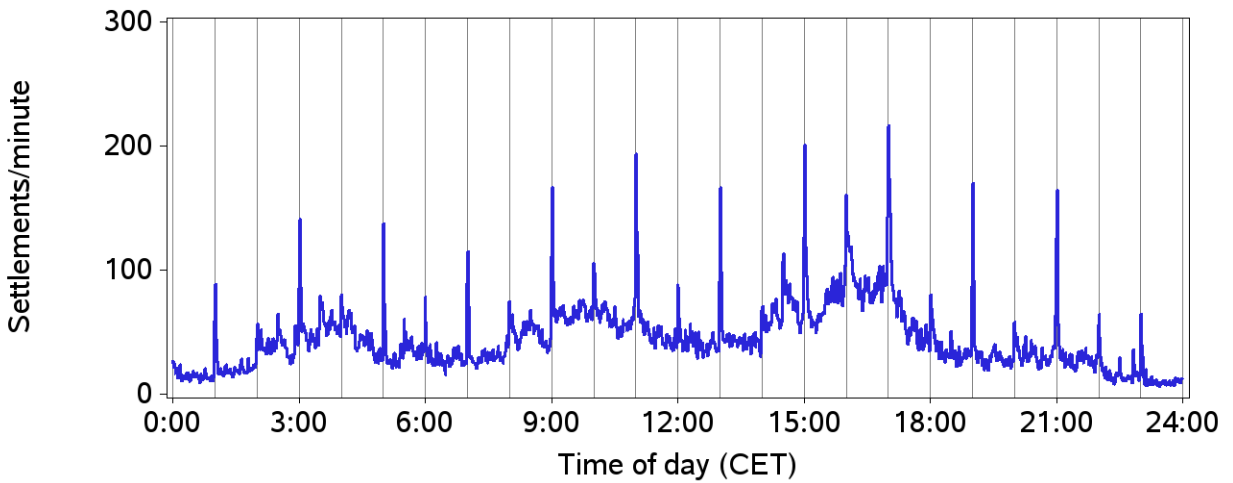
Figure SF1. Intraday patterns in spot settlement activity, by currency and year



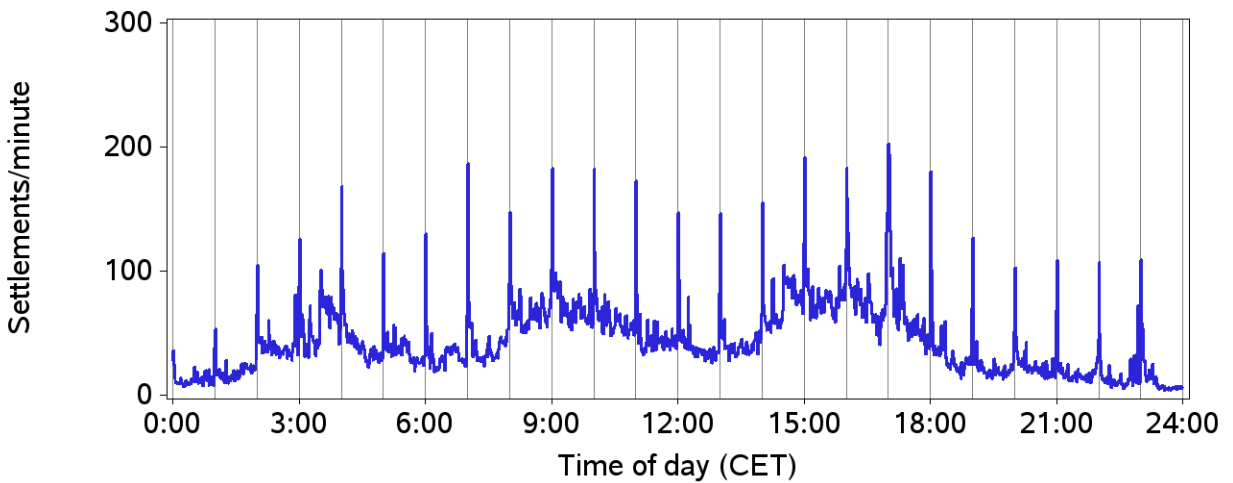
Currency=AUD; Spot settlements in April 2010



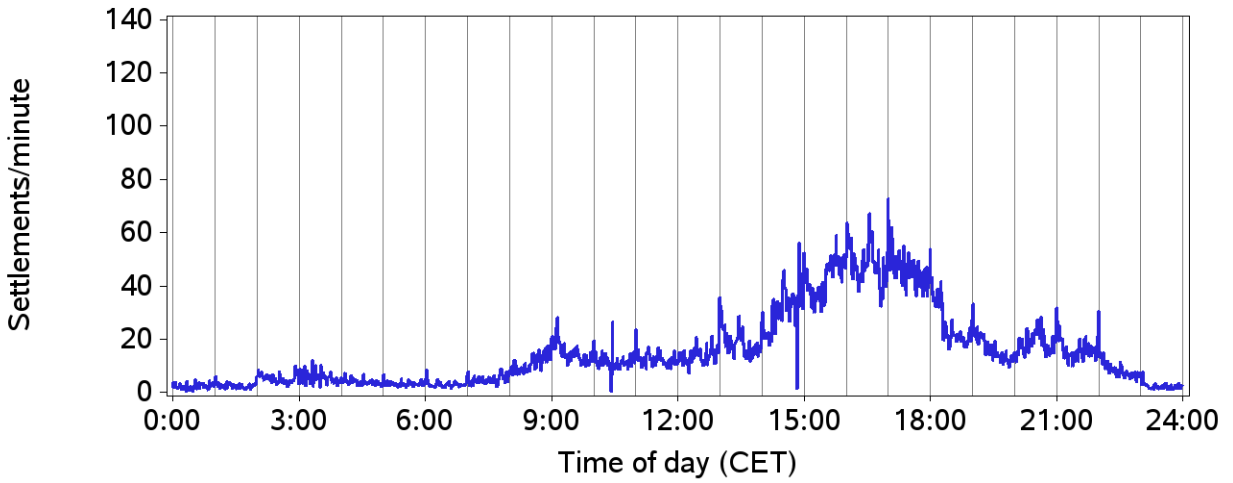
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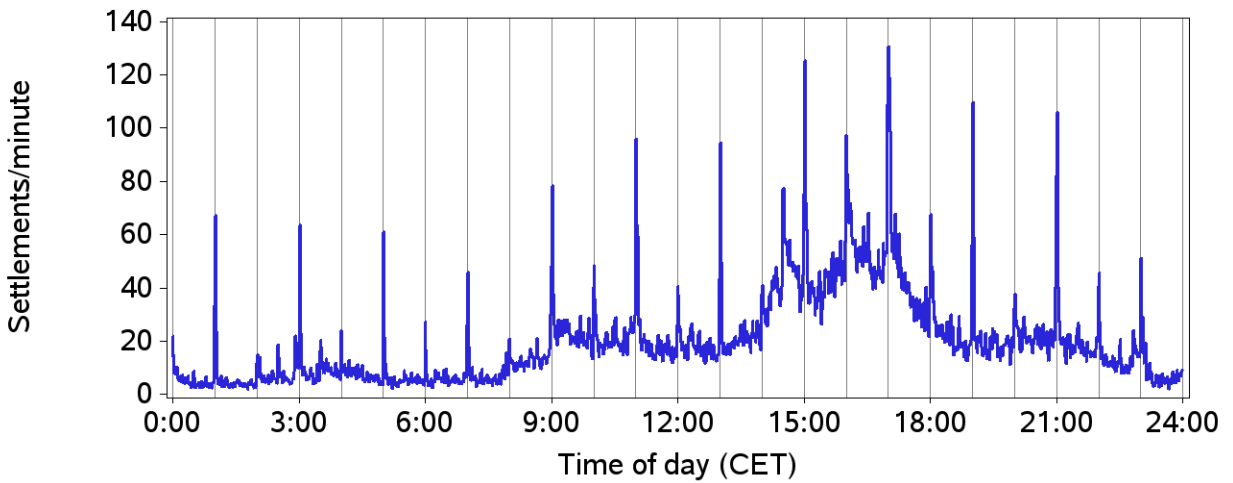
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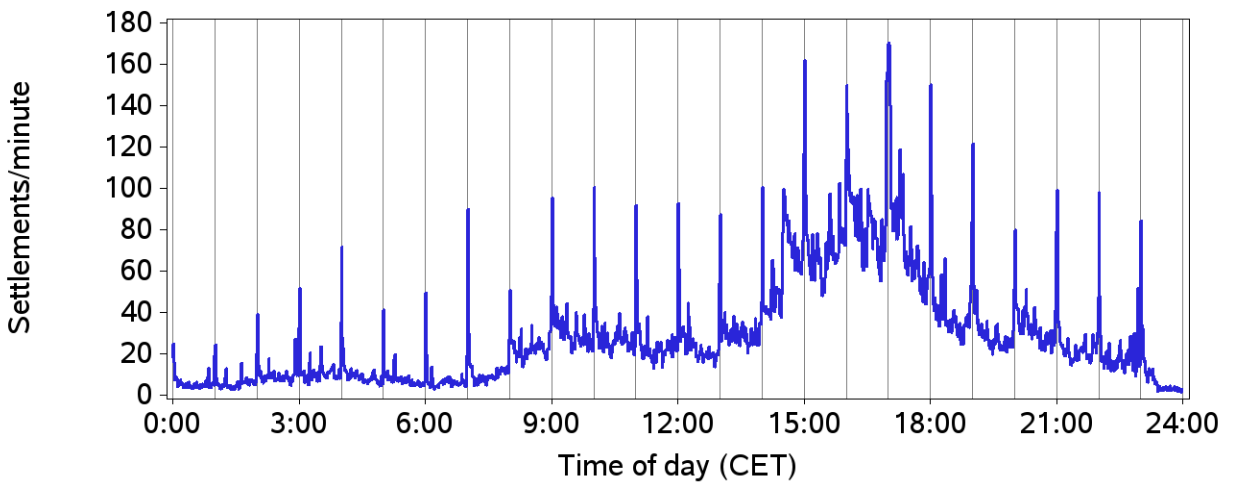
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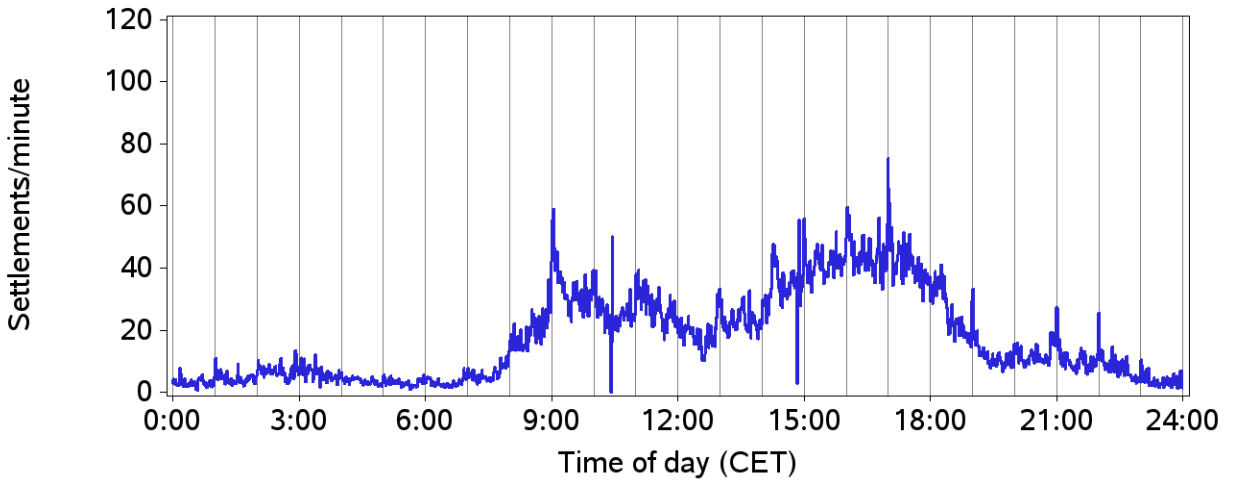
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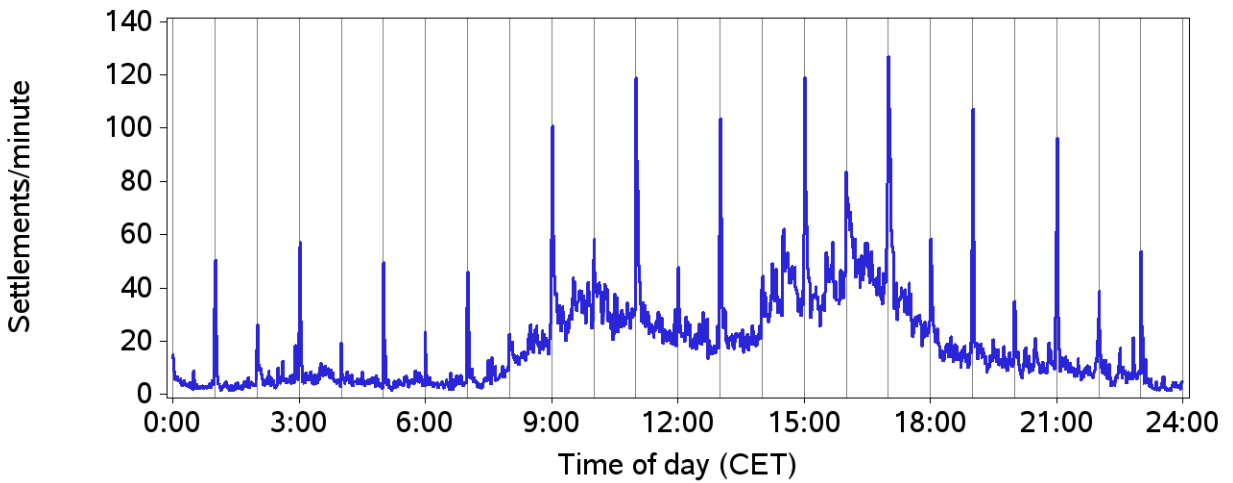
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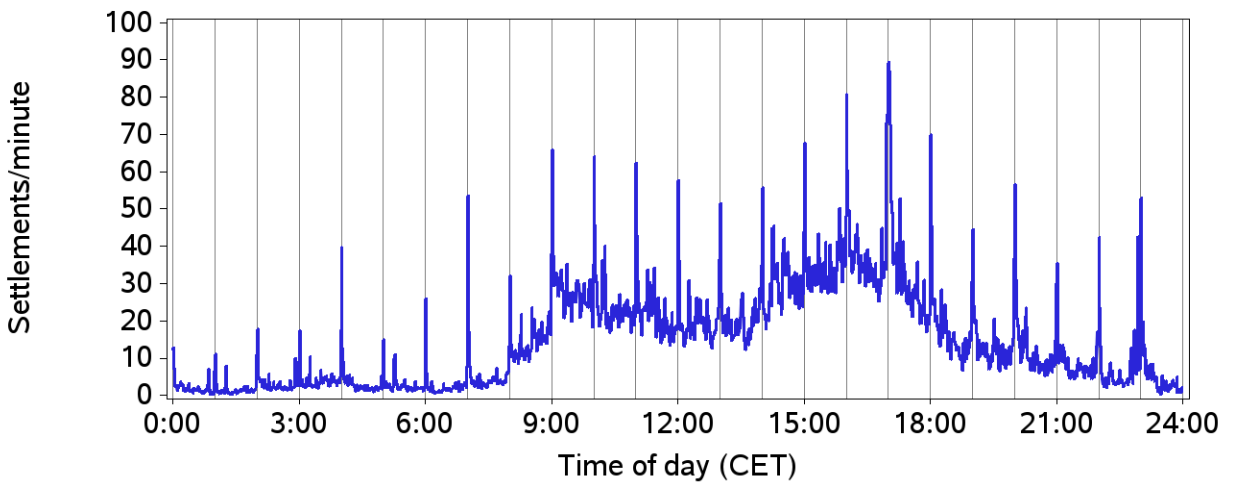
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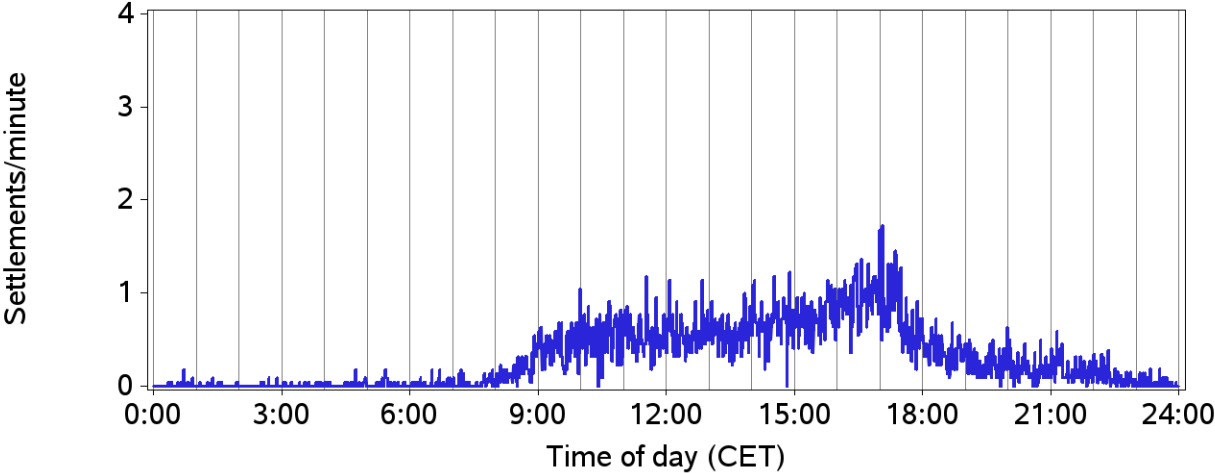
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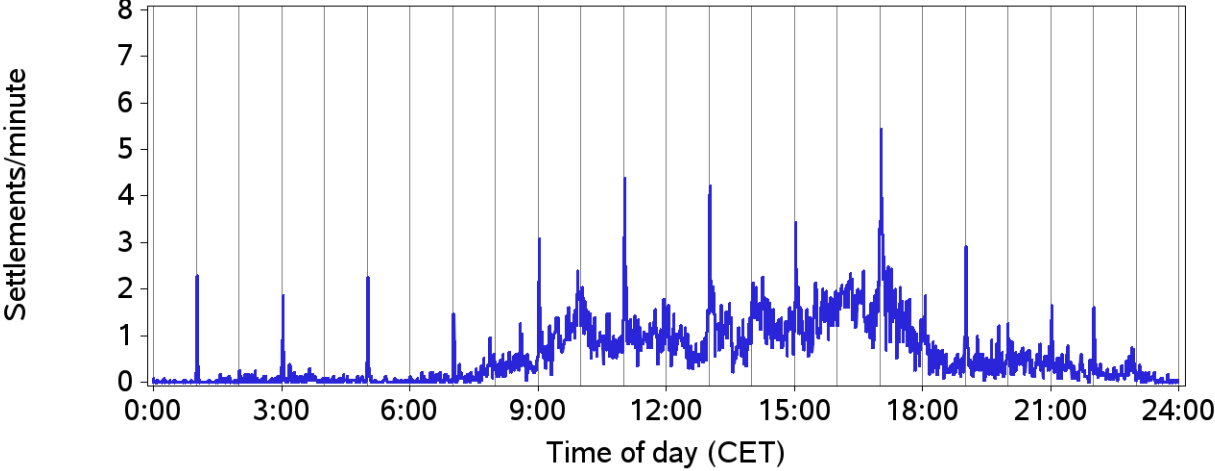
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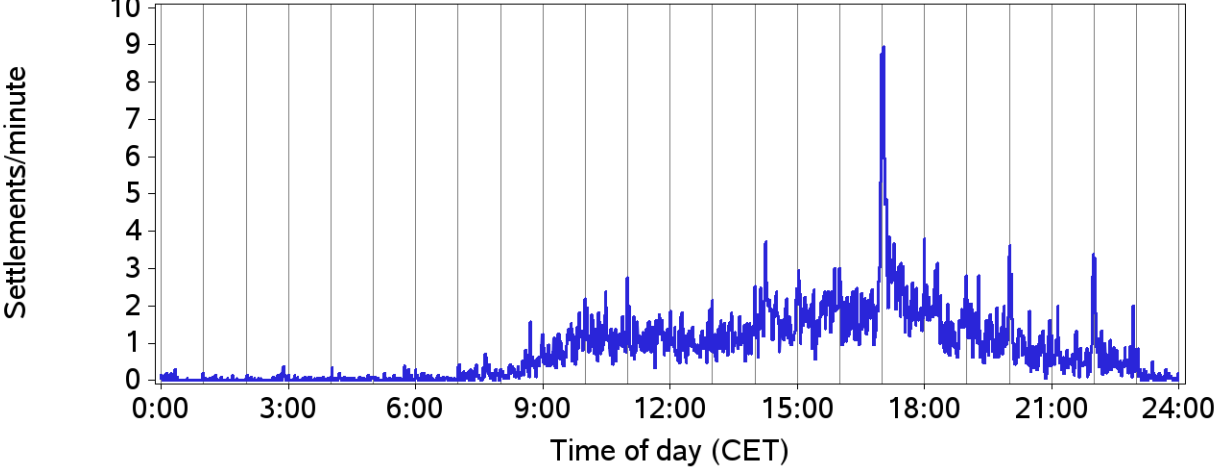
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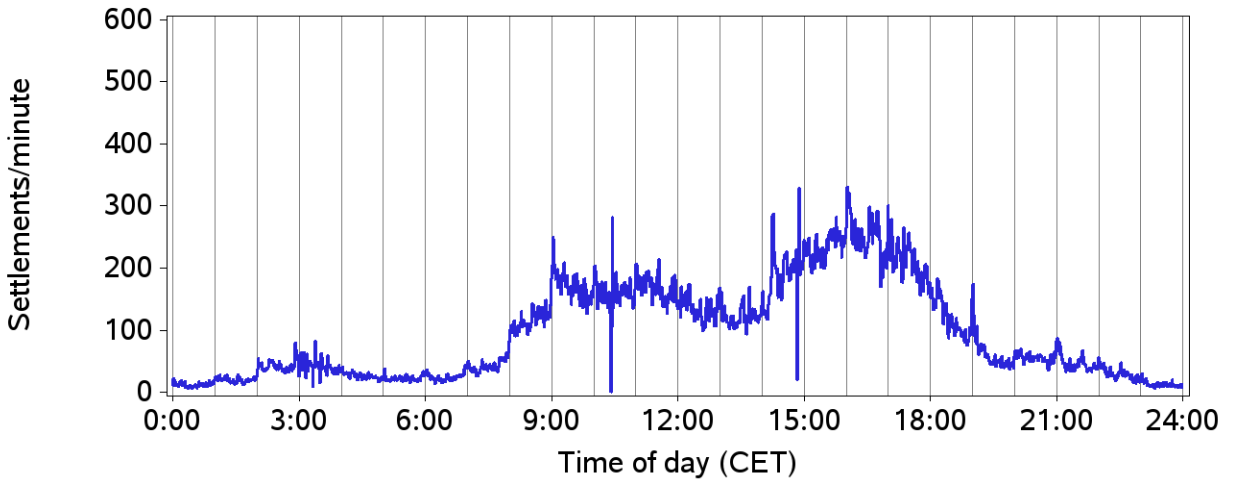
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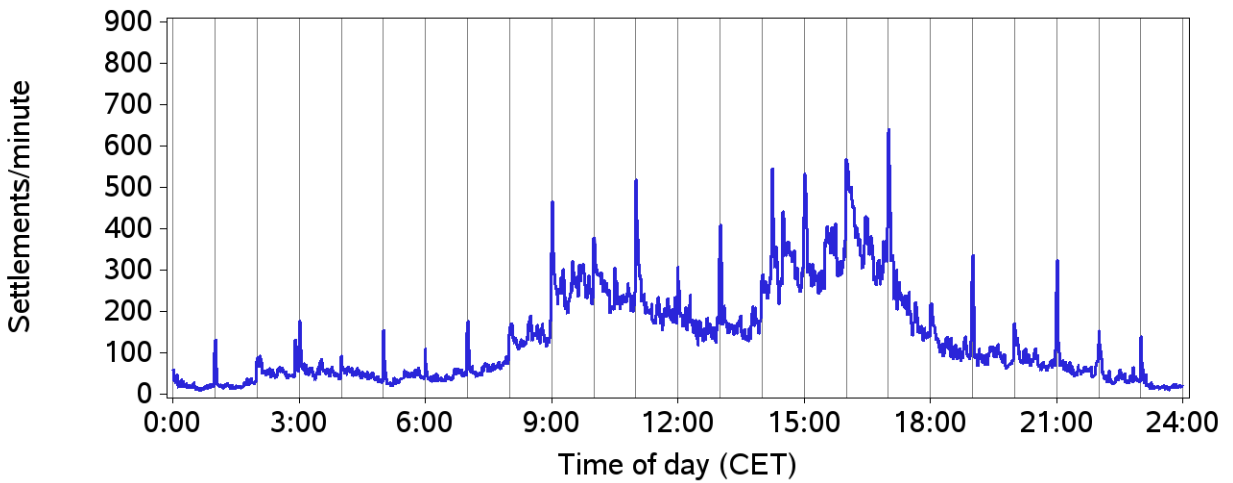
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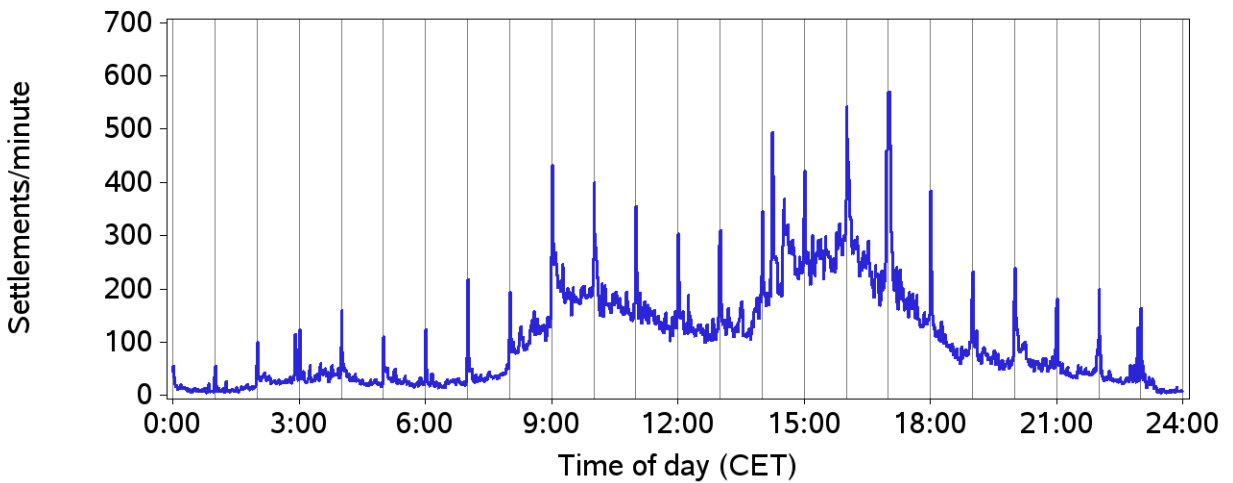
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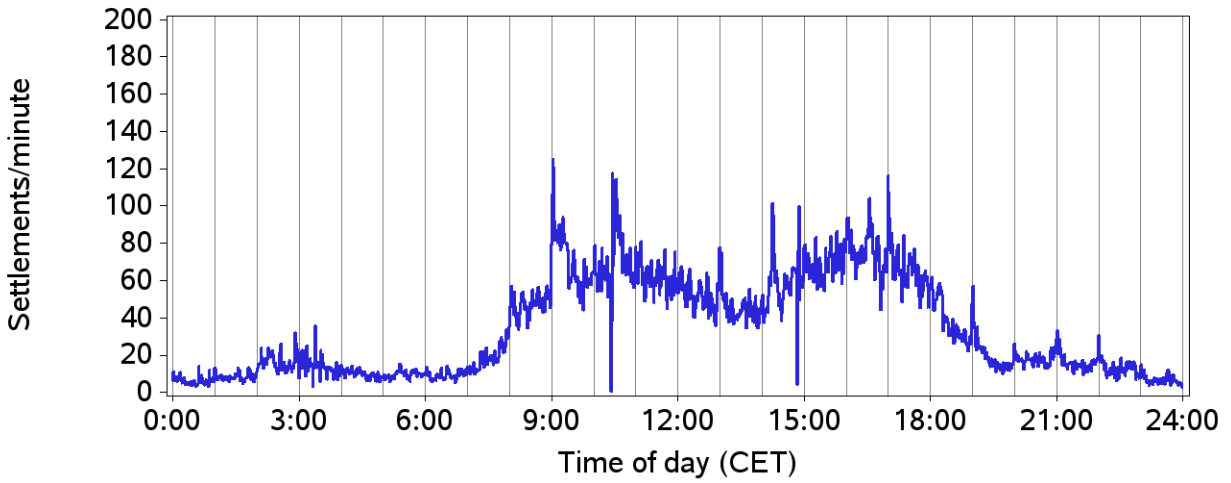
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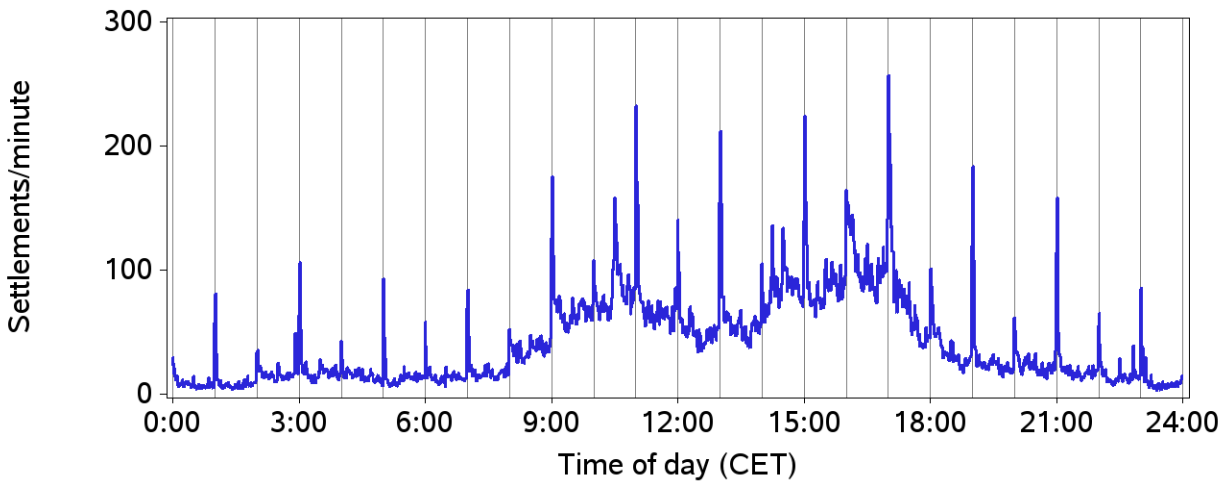
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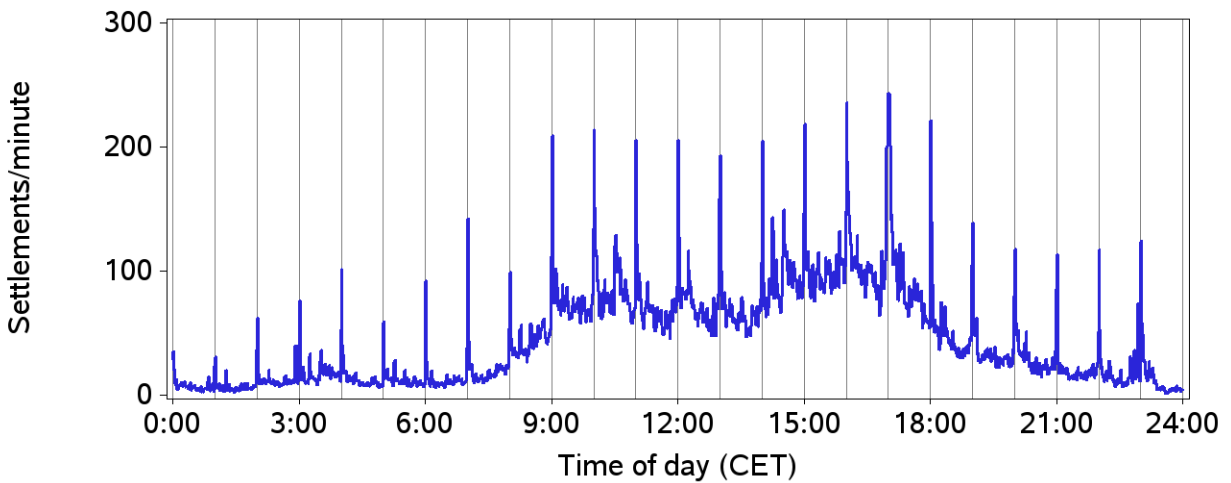
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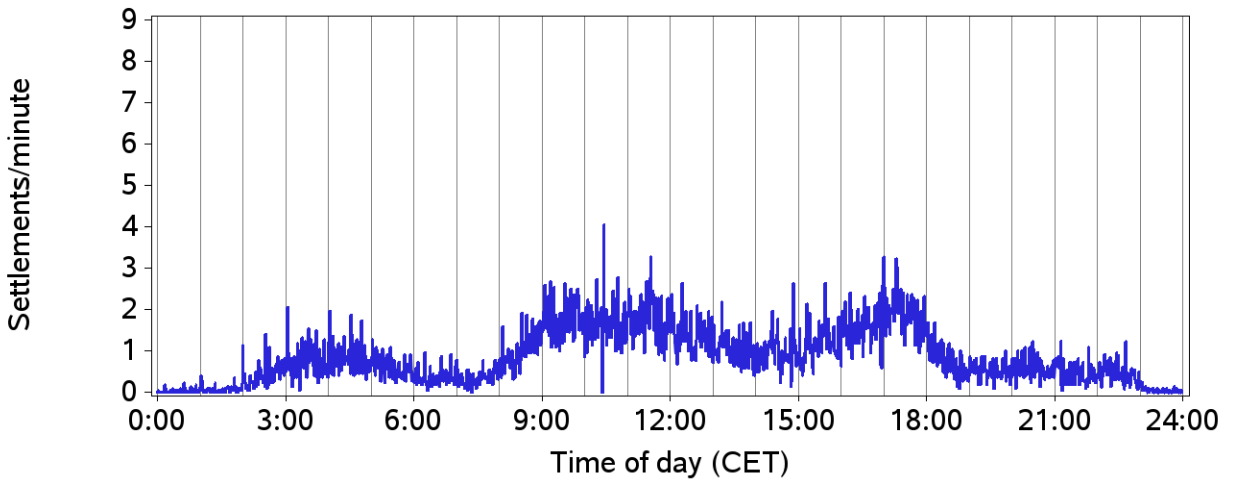
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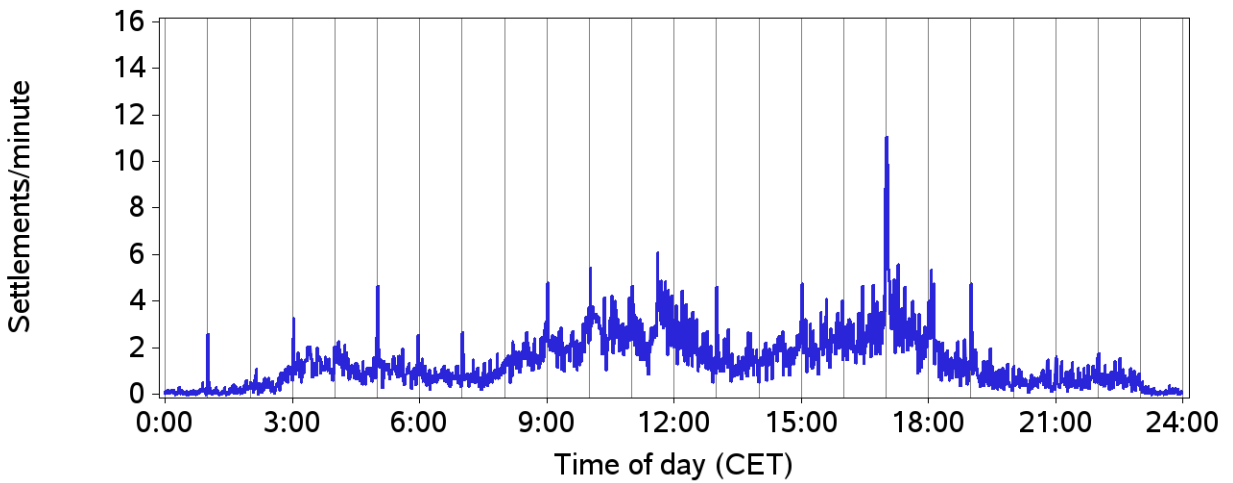
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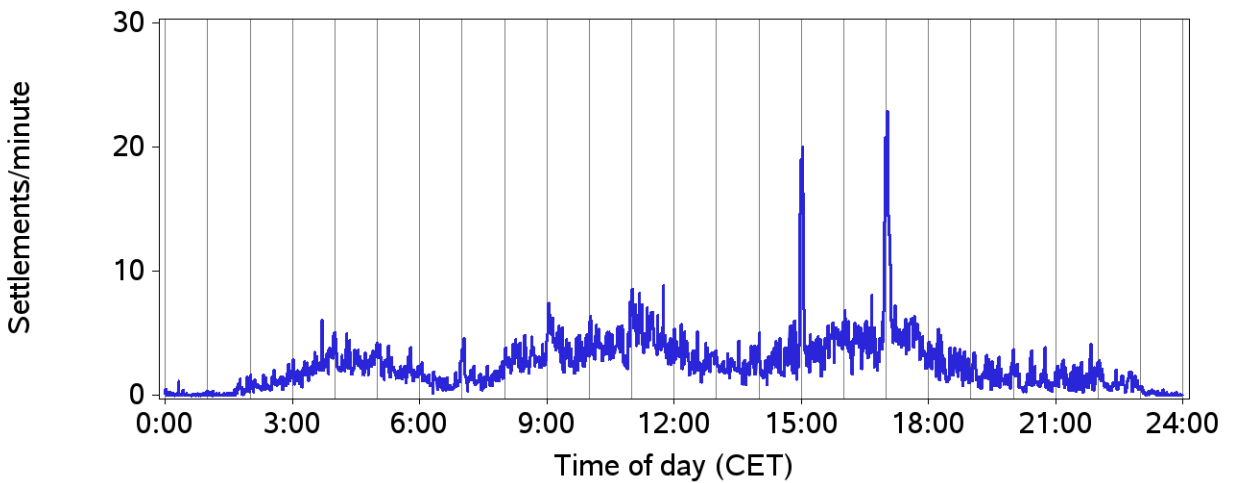
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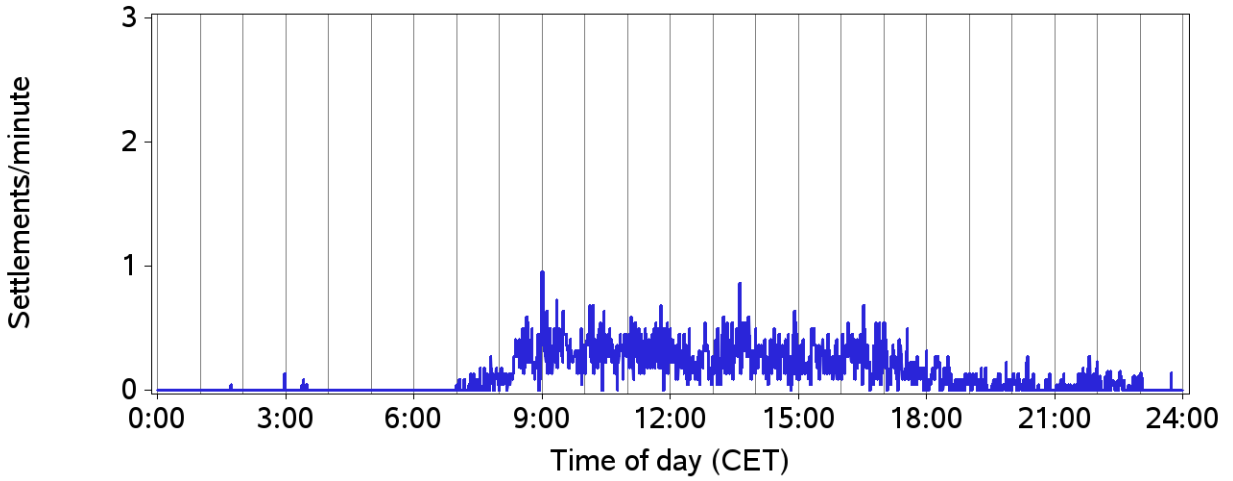
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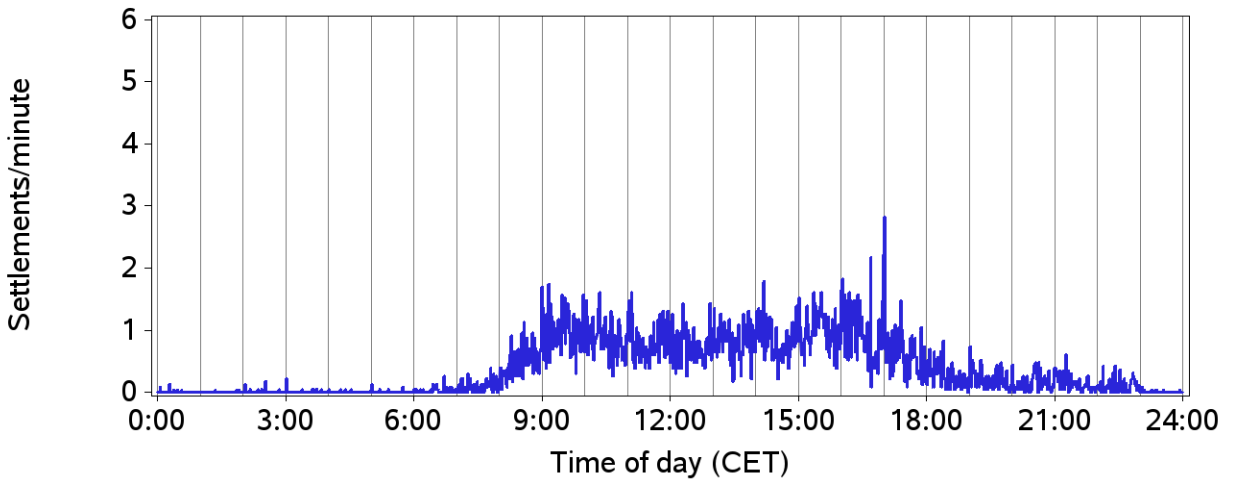
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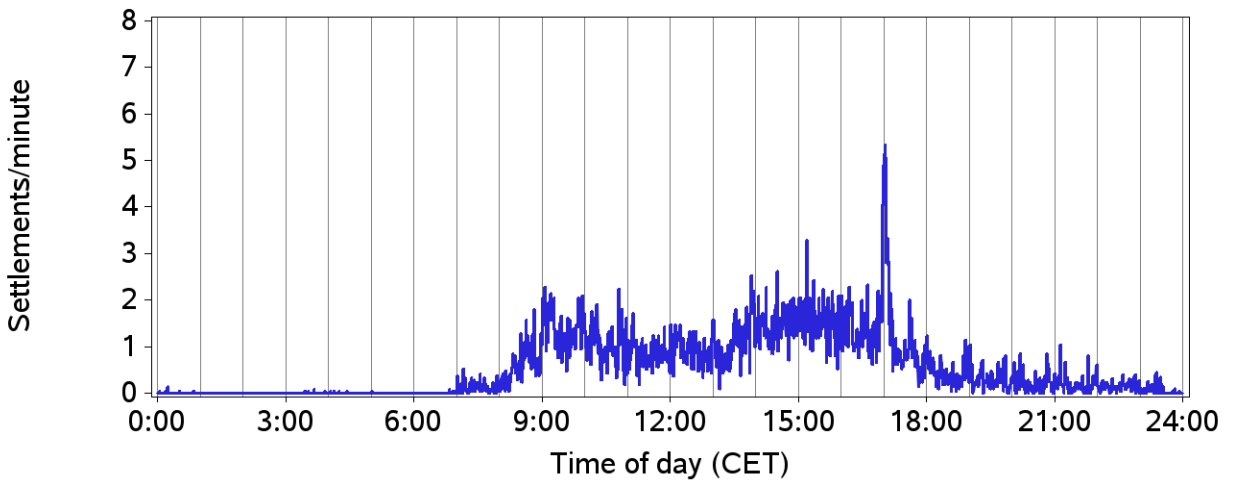
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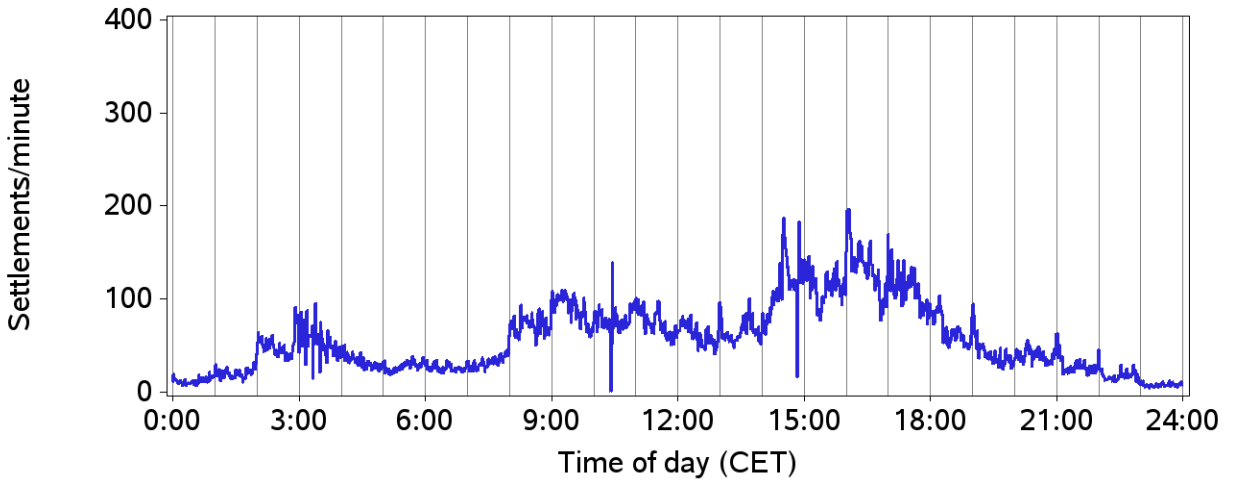
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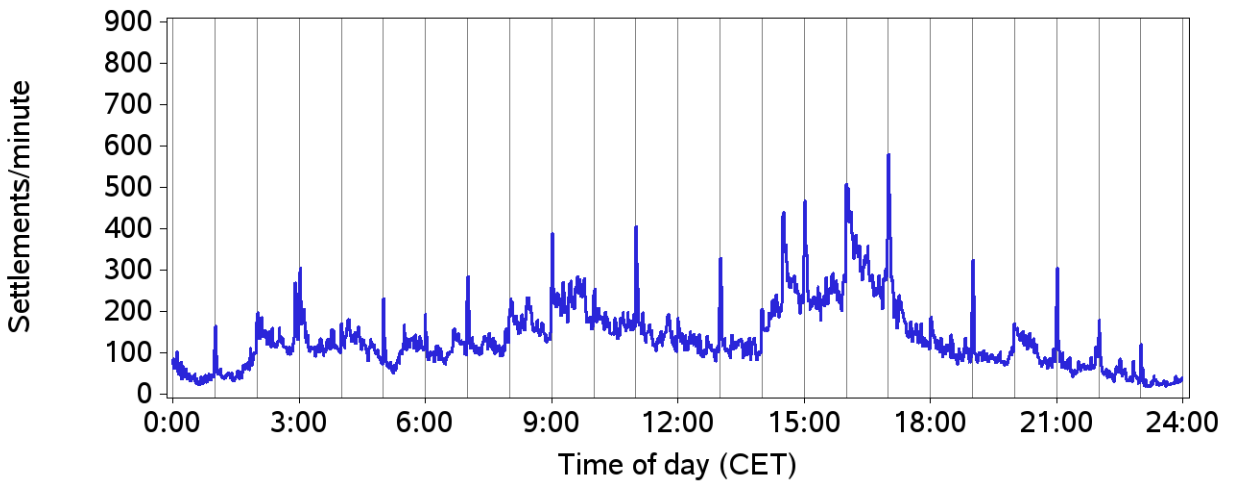
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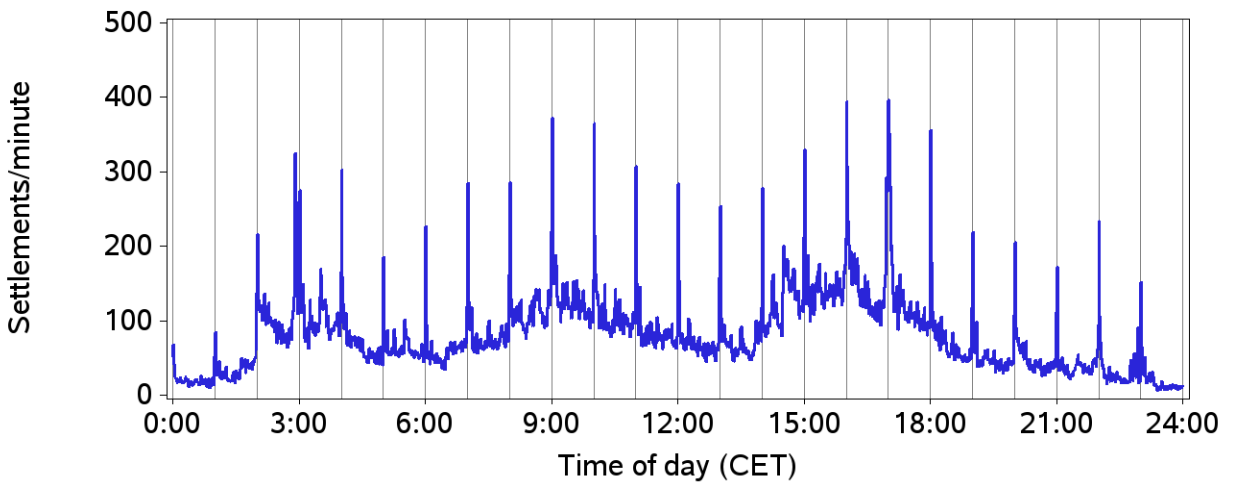
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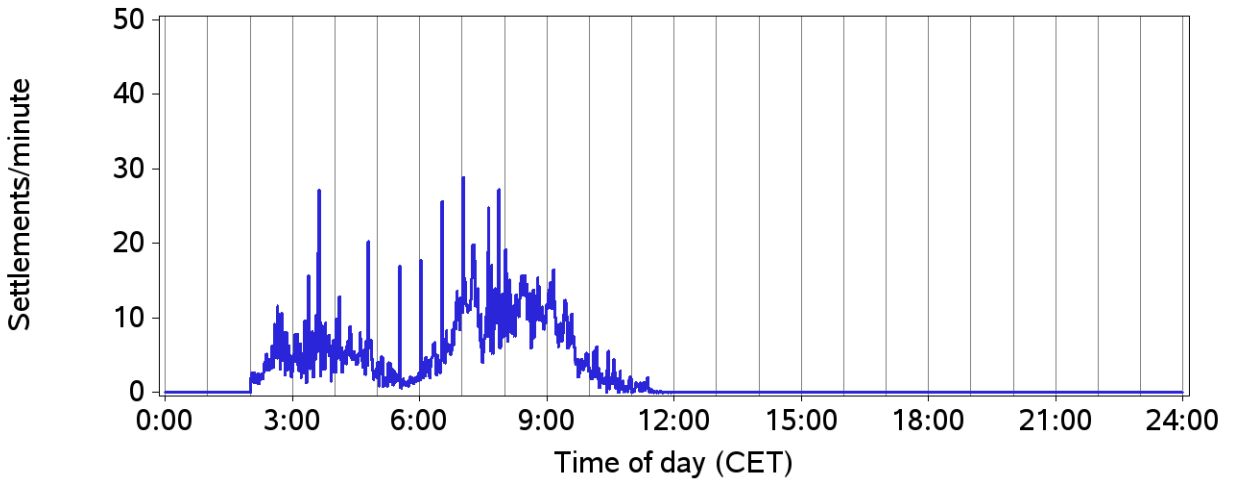
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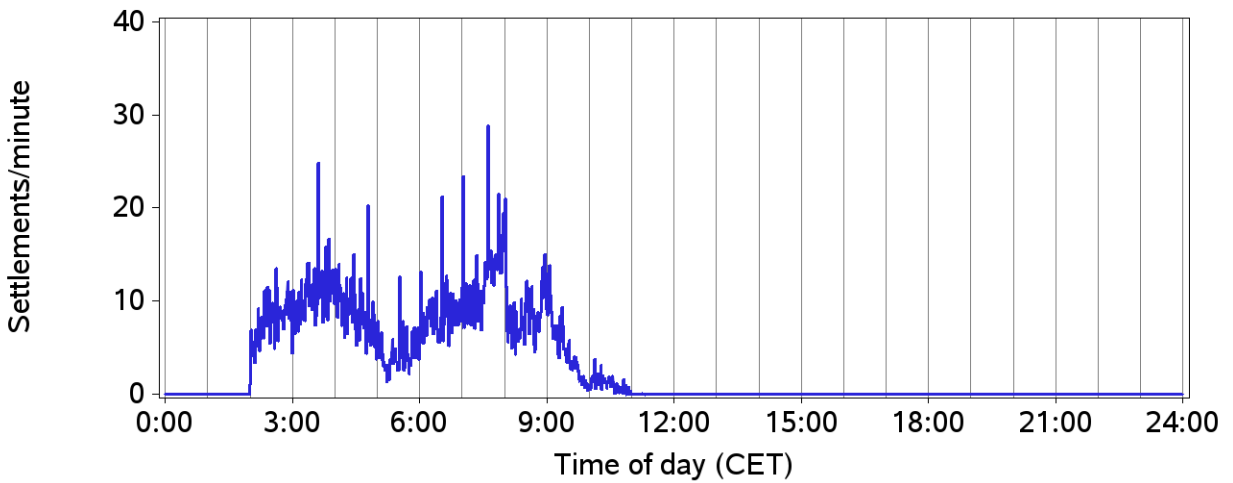
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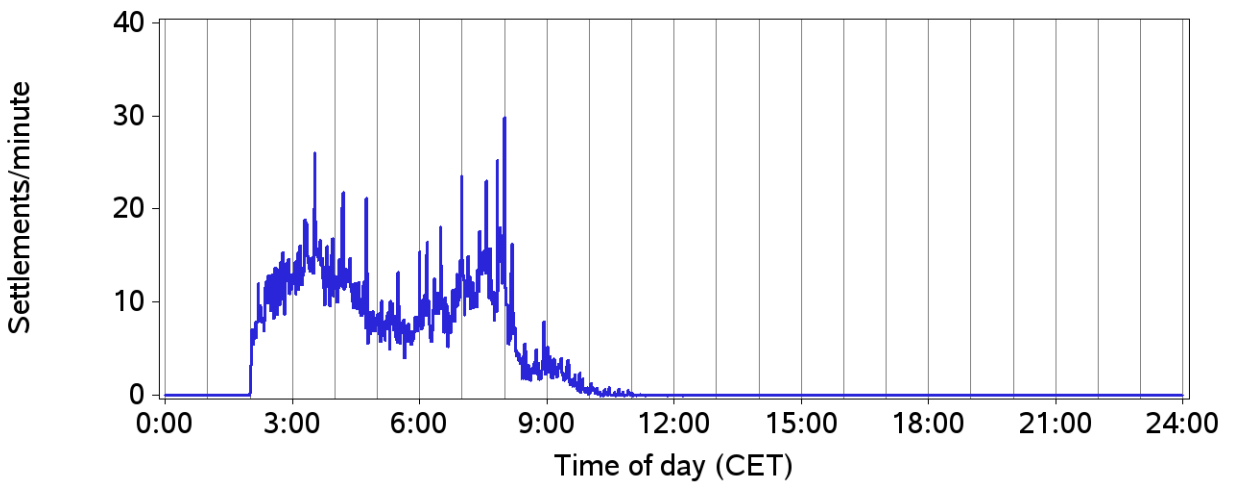
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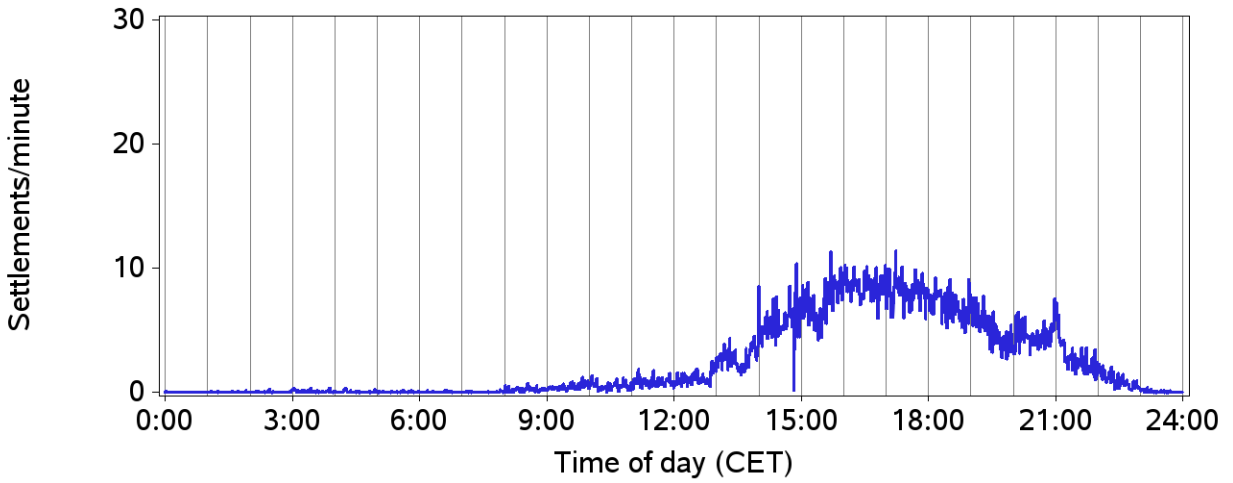
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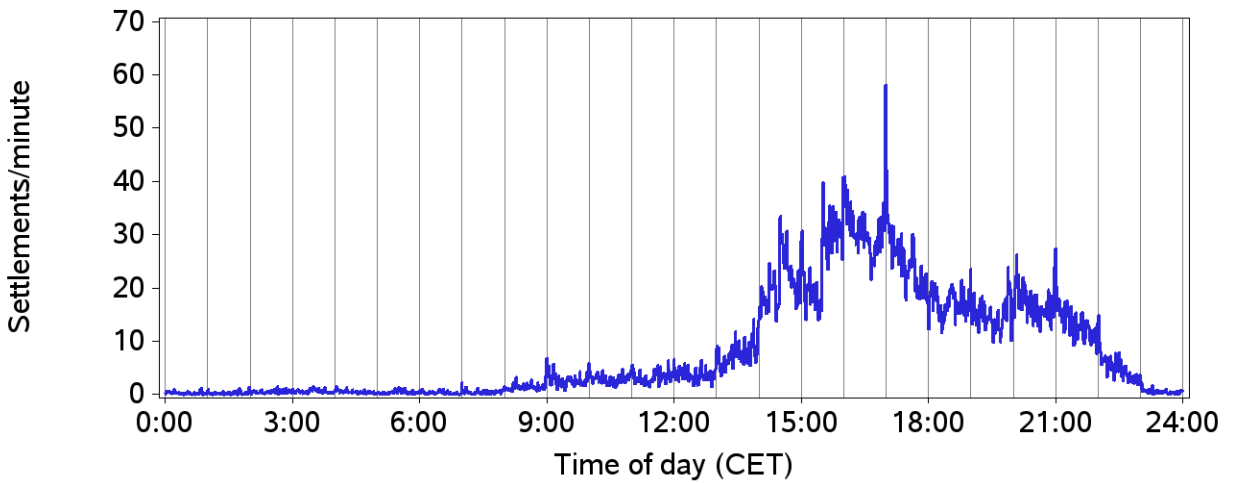
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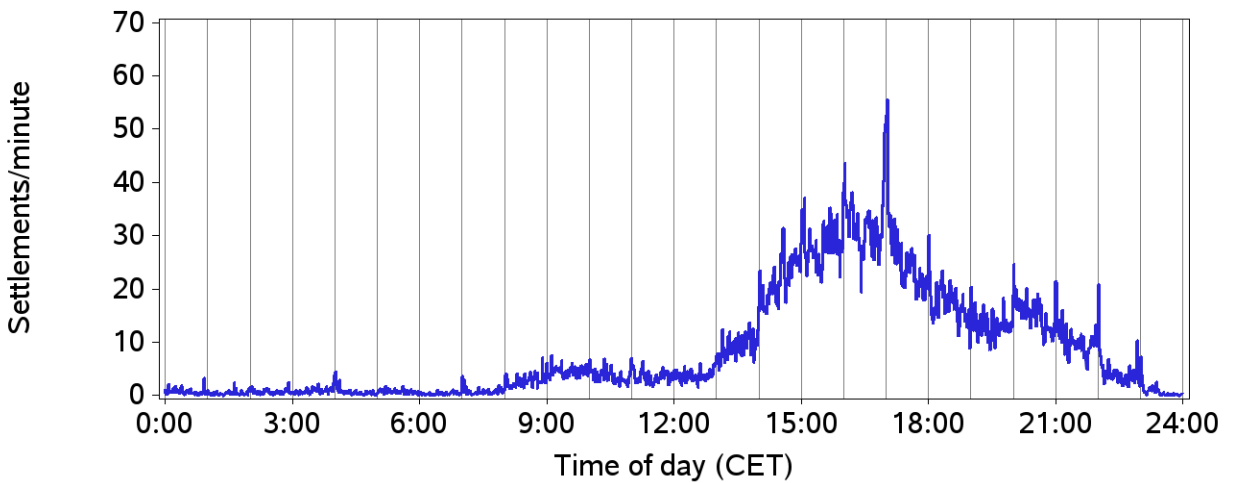
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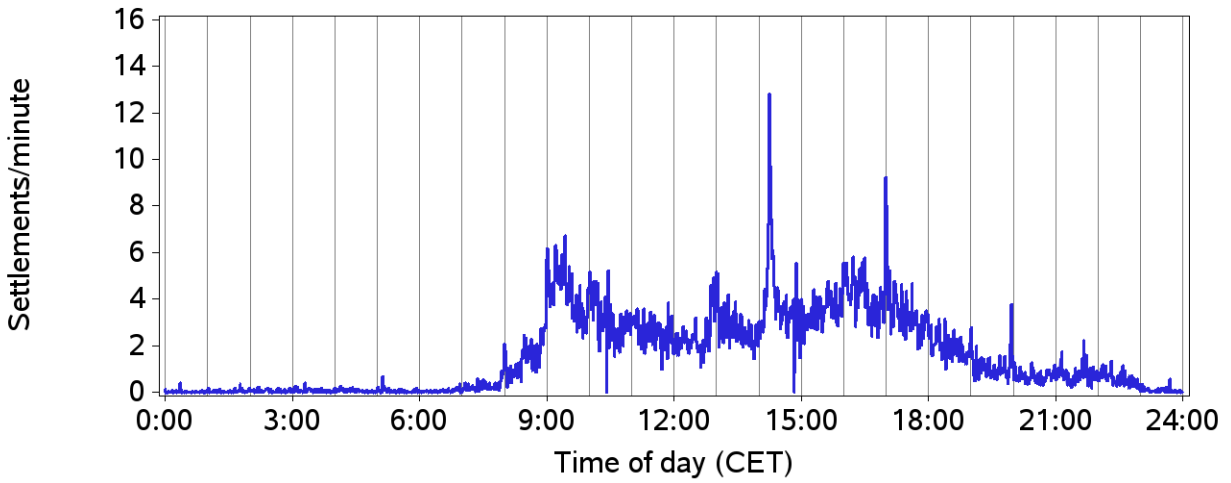
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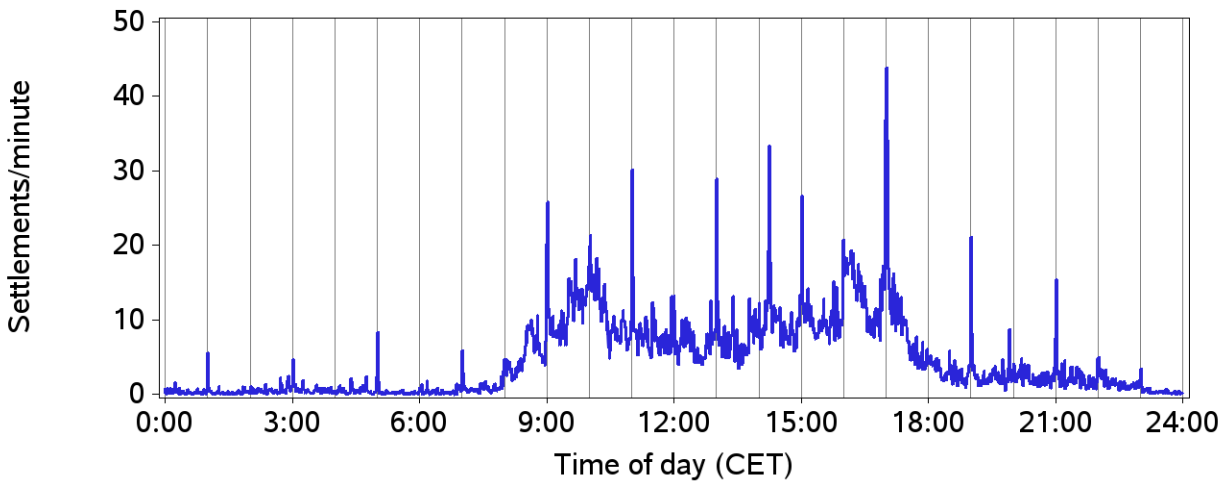
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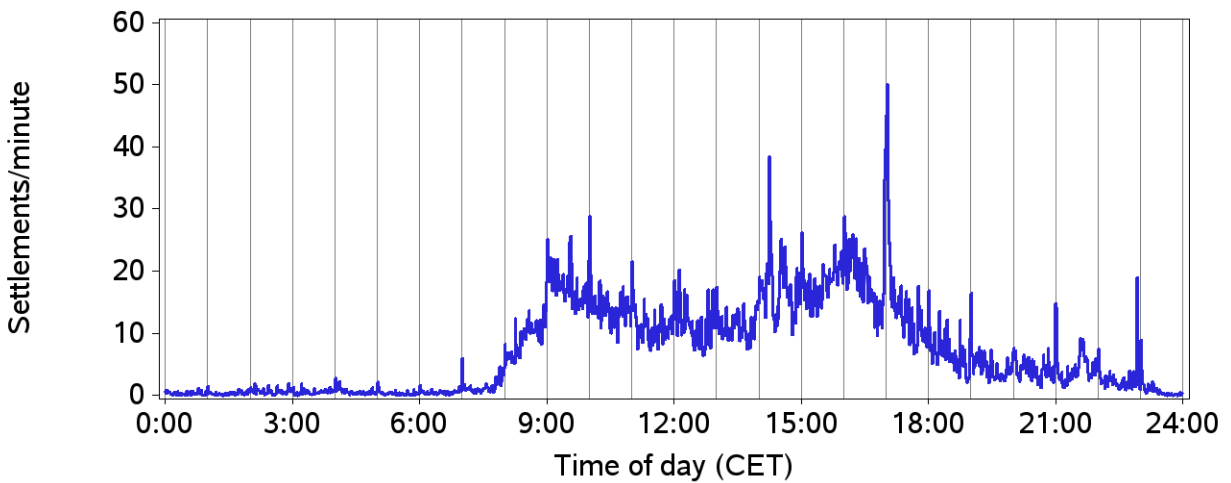
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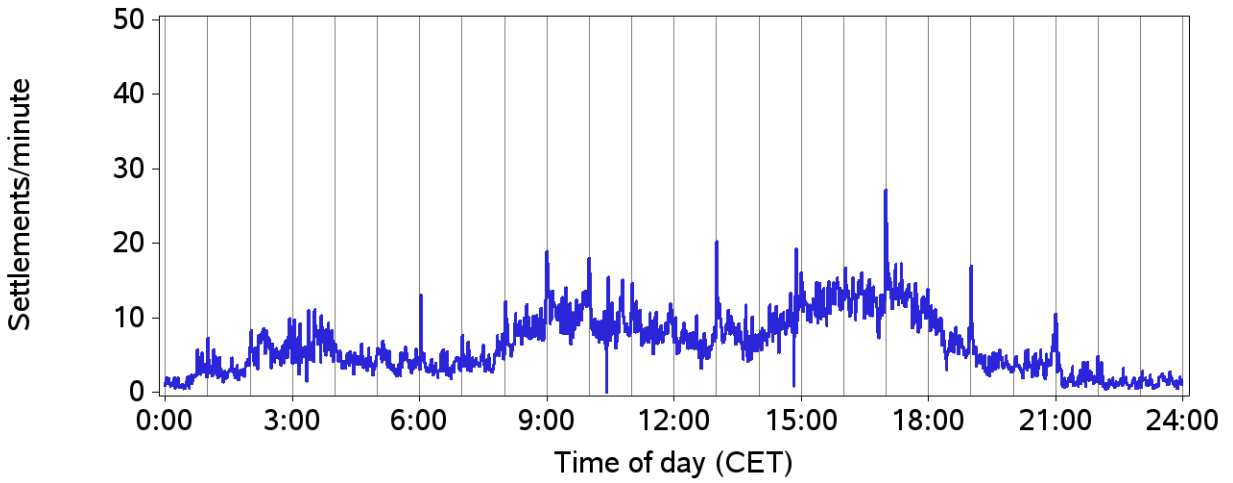
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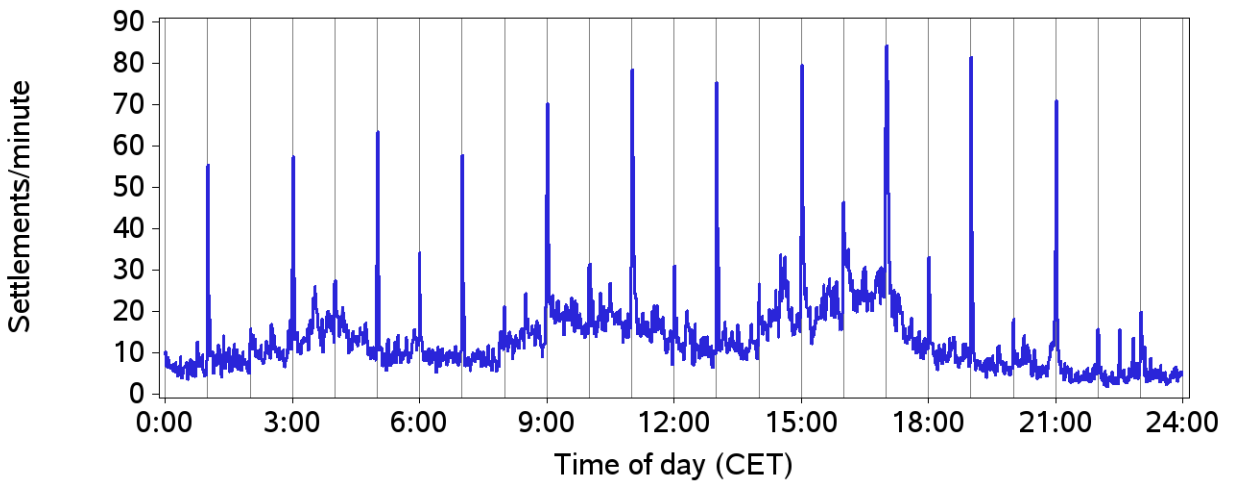
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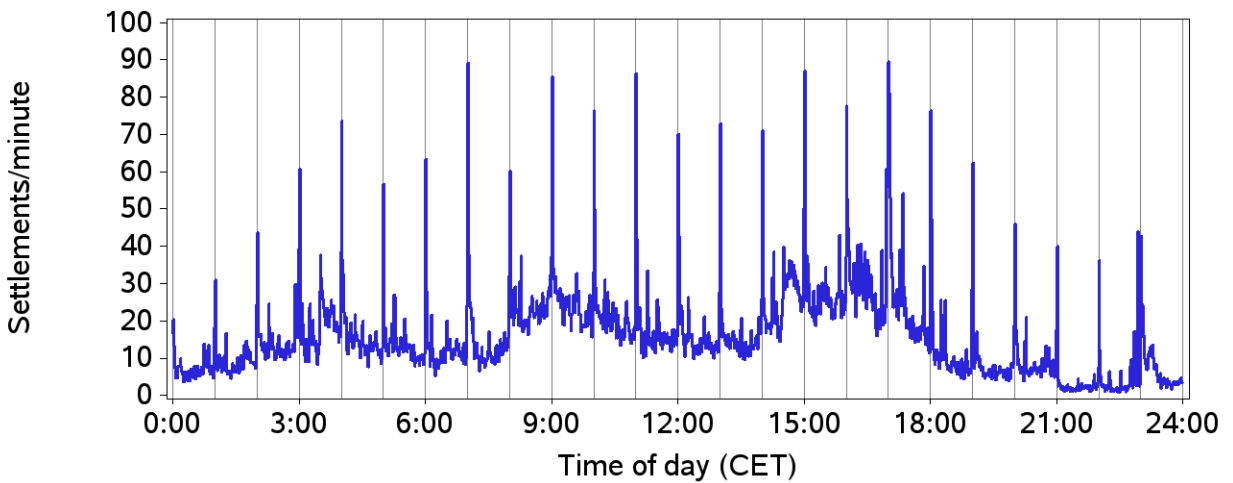
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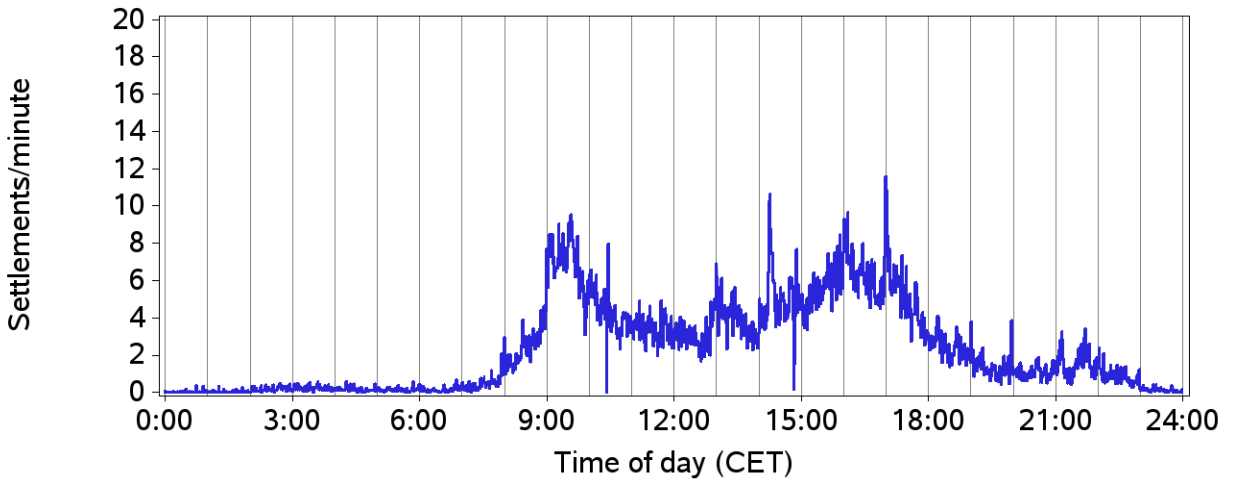
Currency=NZD; Spot settlements in April 2013



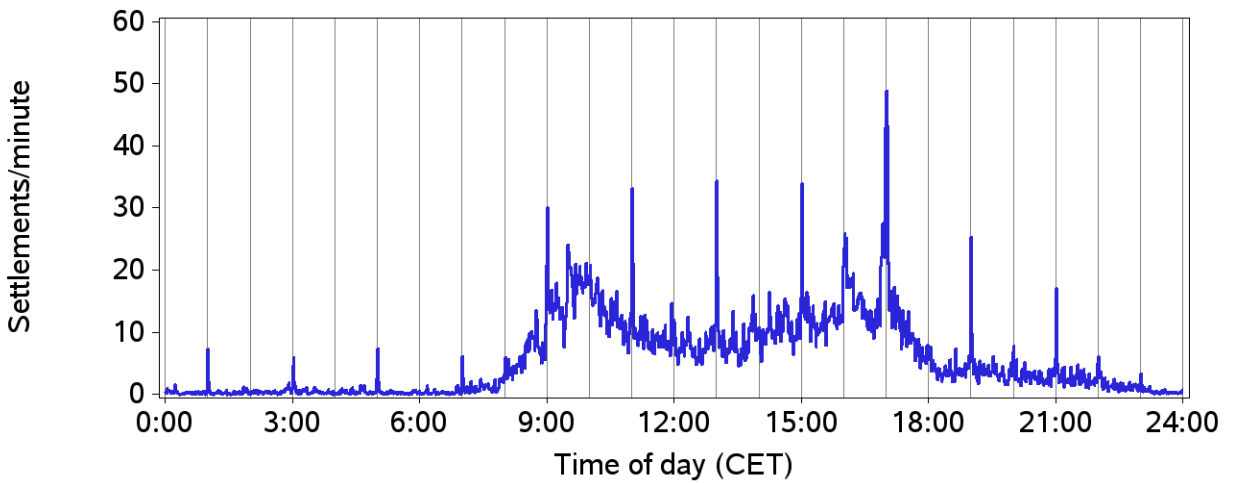
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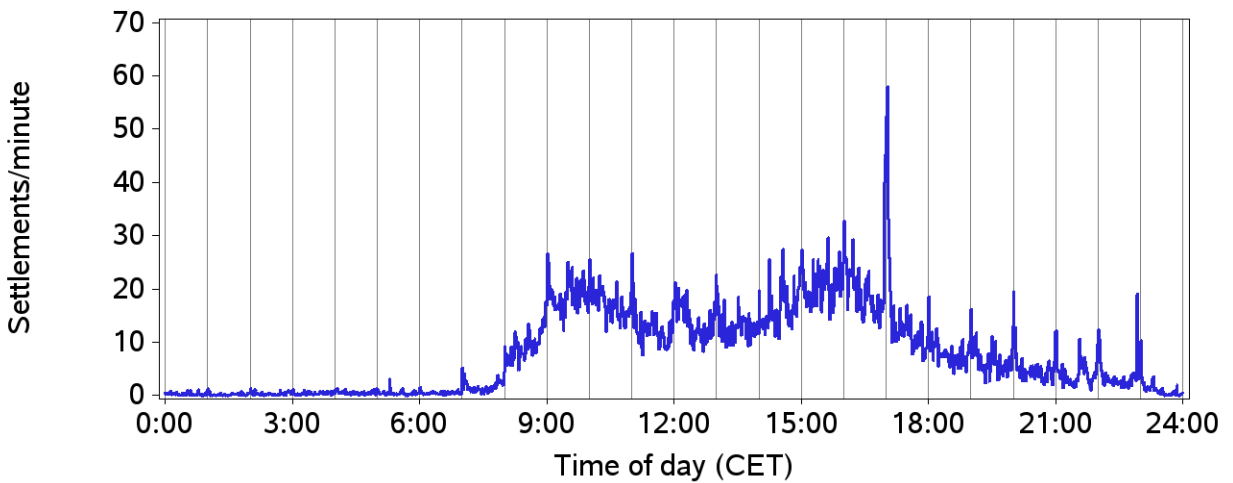
Currency=SEK; Spot settlements in April 2010



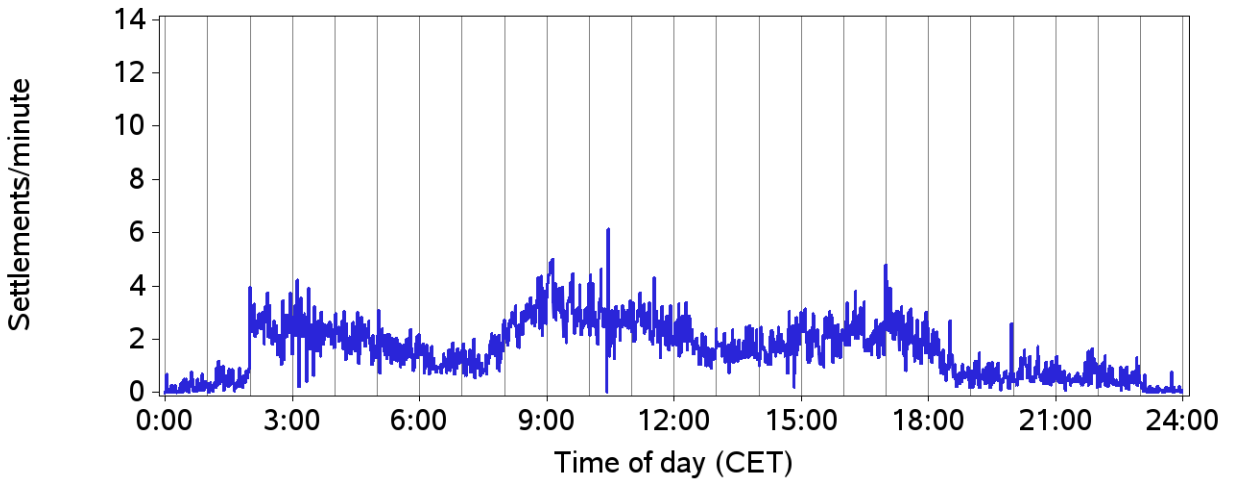
Currency=SEK; Spot settlements in April 2013



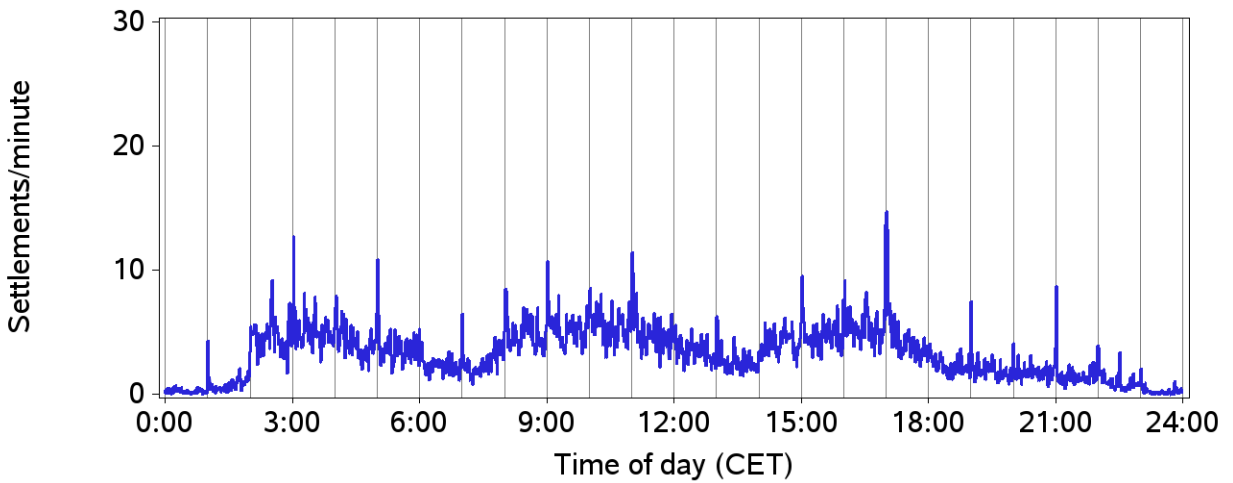
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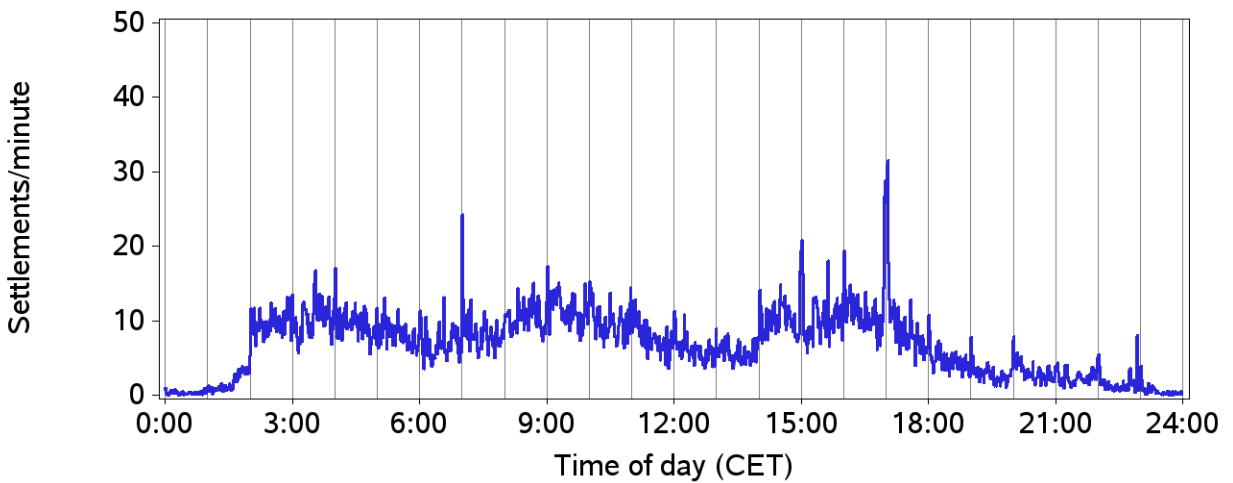
Currency=SGD; Spot settlements in April 2010



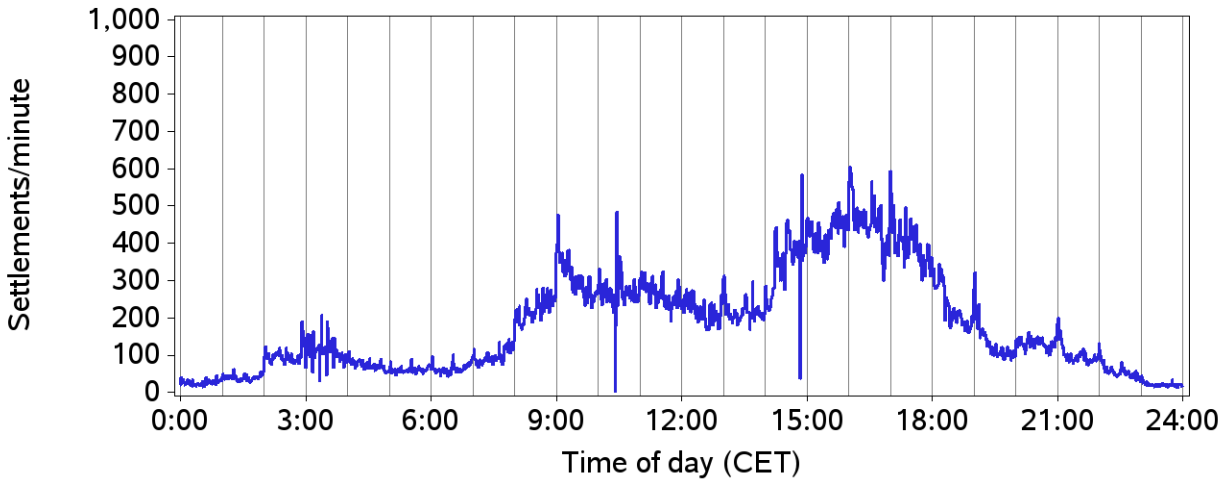
Currency=SGD; Spot settlements in April 2013



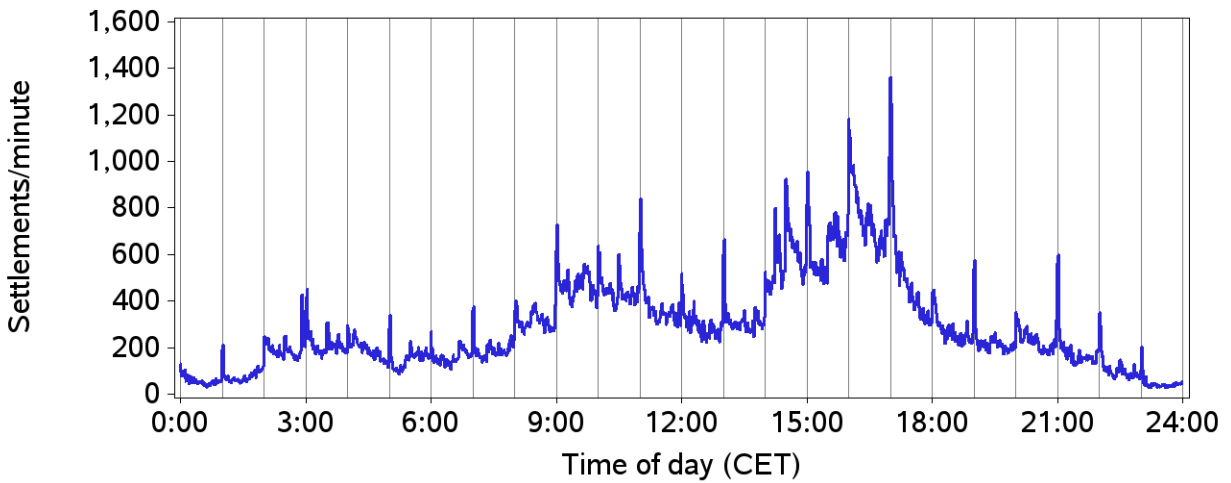
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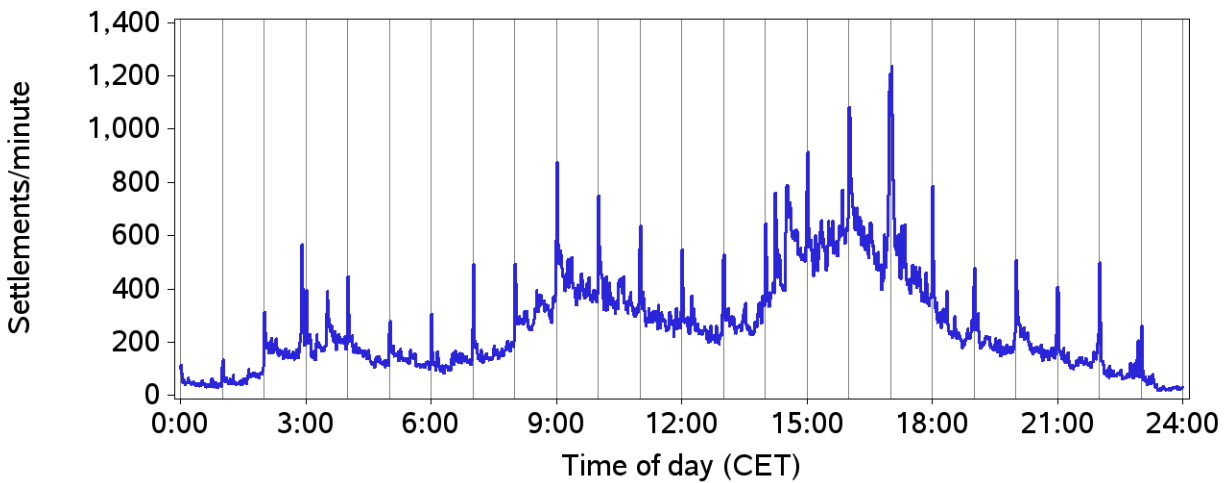
Currency=USD; Spot settlements in April 2010



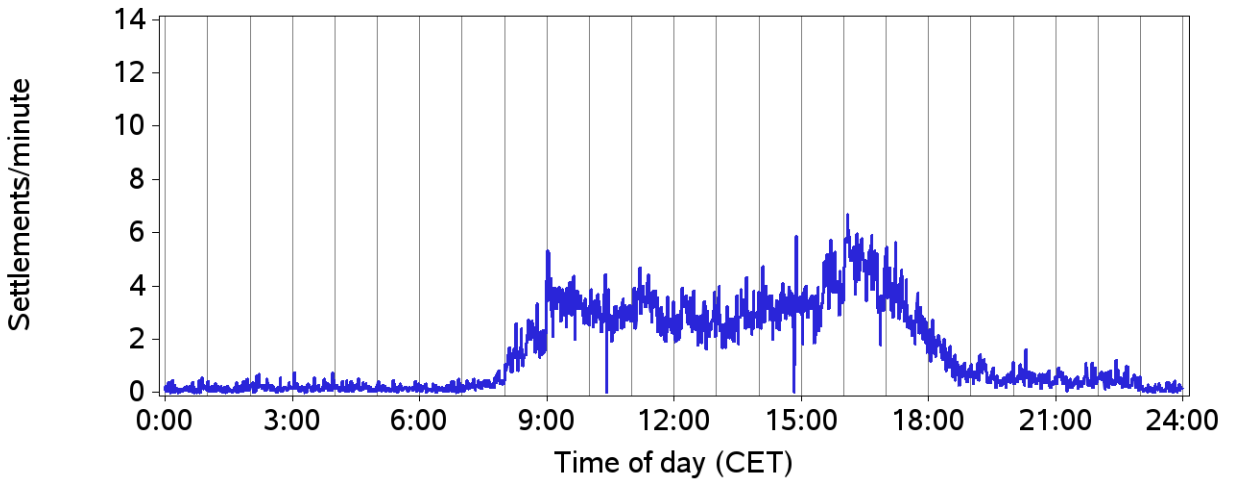
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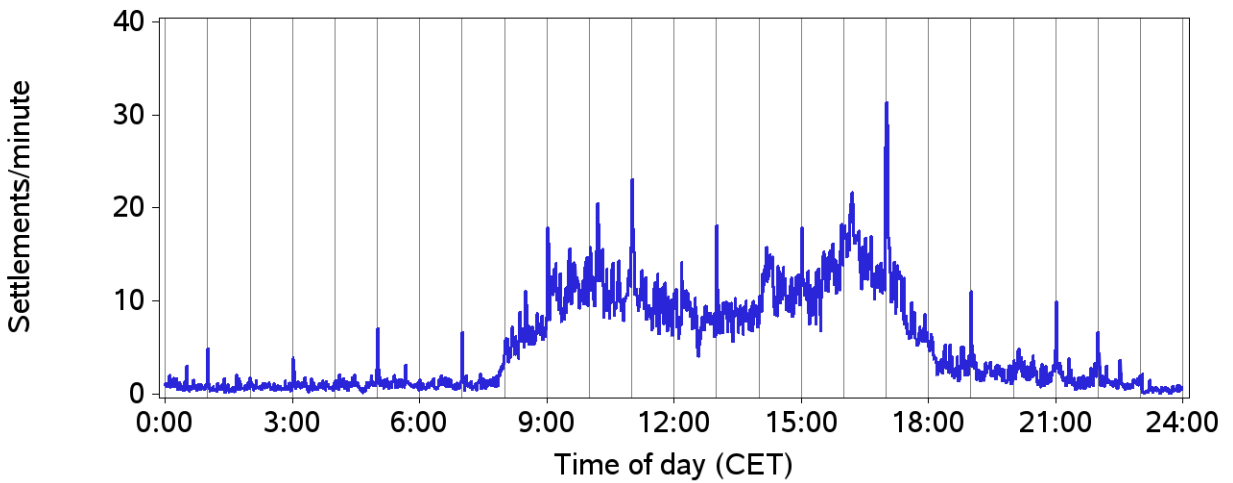
Currency=USD; Spot settlements in April 2016



Currency=ZAR; Spot settlements in April 2010



Currency=ZAR; Spot settlements in April 2013



Currency=ZAR; Spot settlements in April 2016

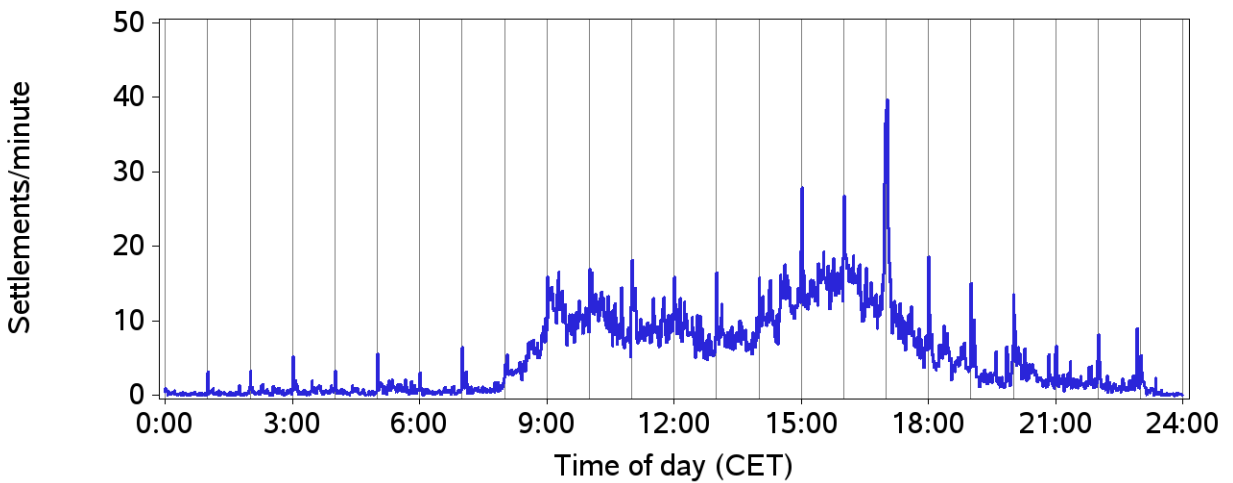
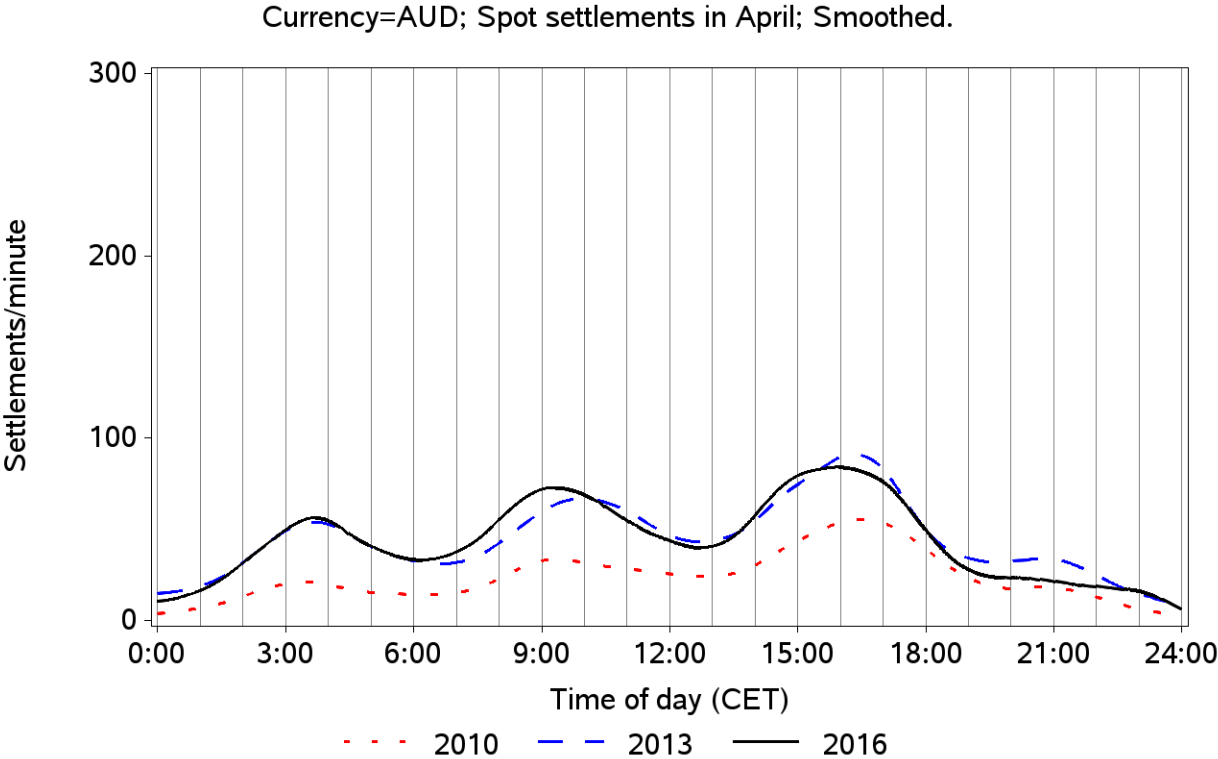
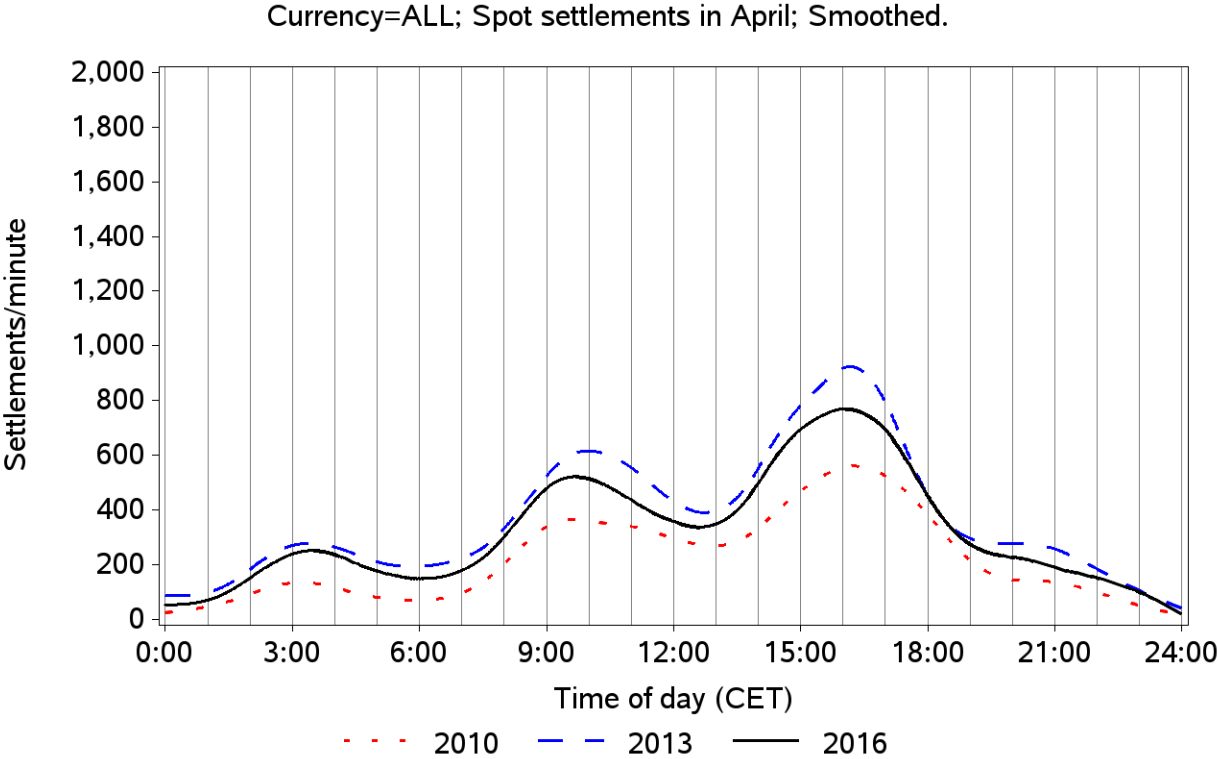
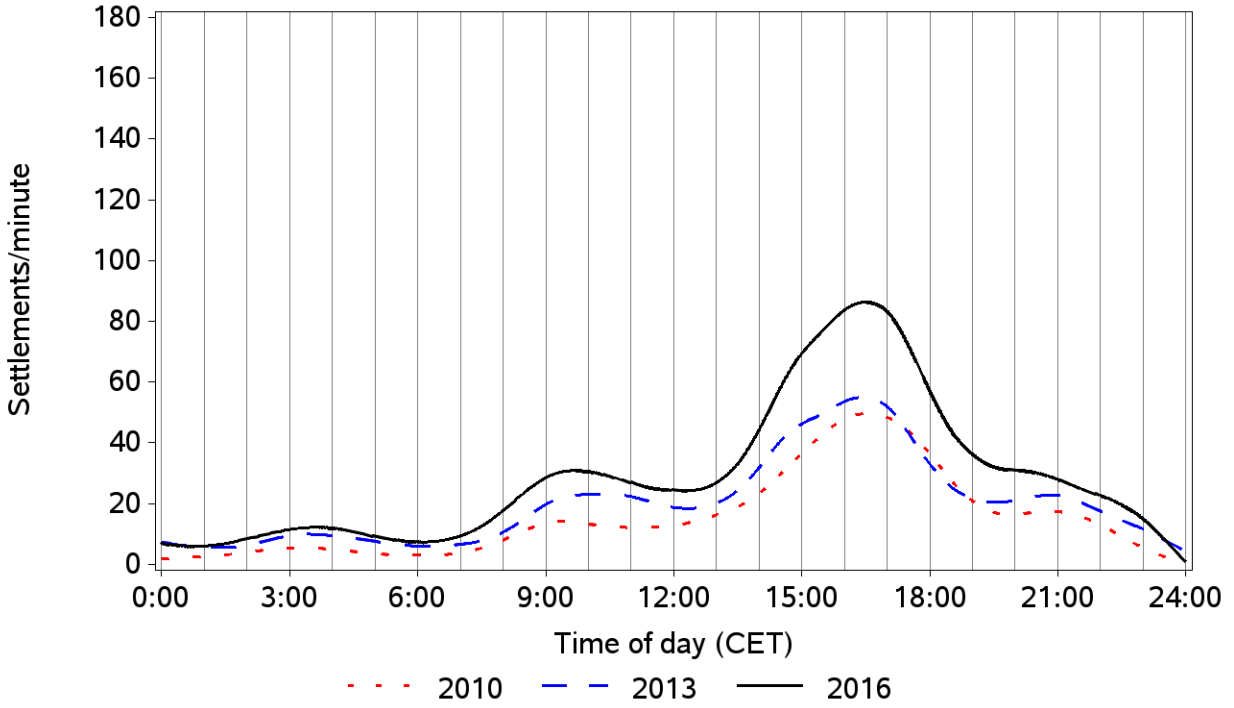


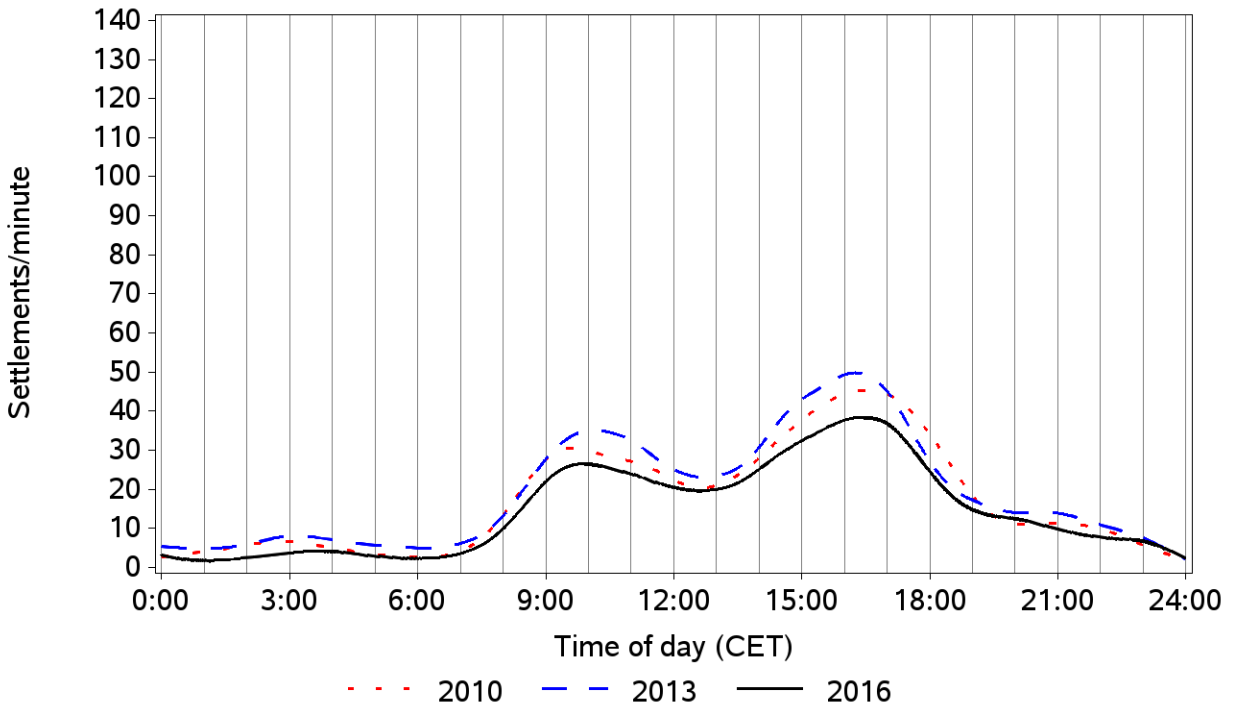
Figure SF2. Intraday patterns in spot settlement activity, smoothed, by currency and year.



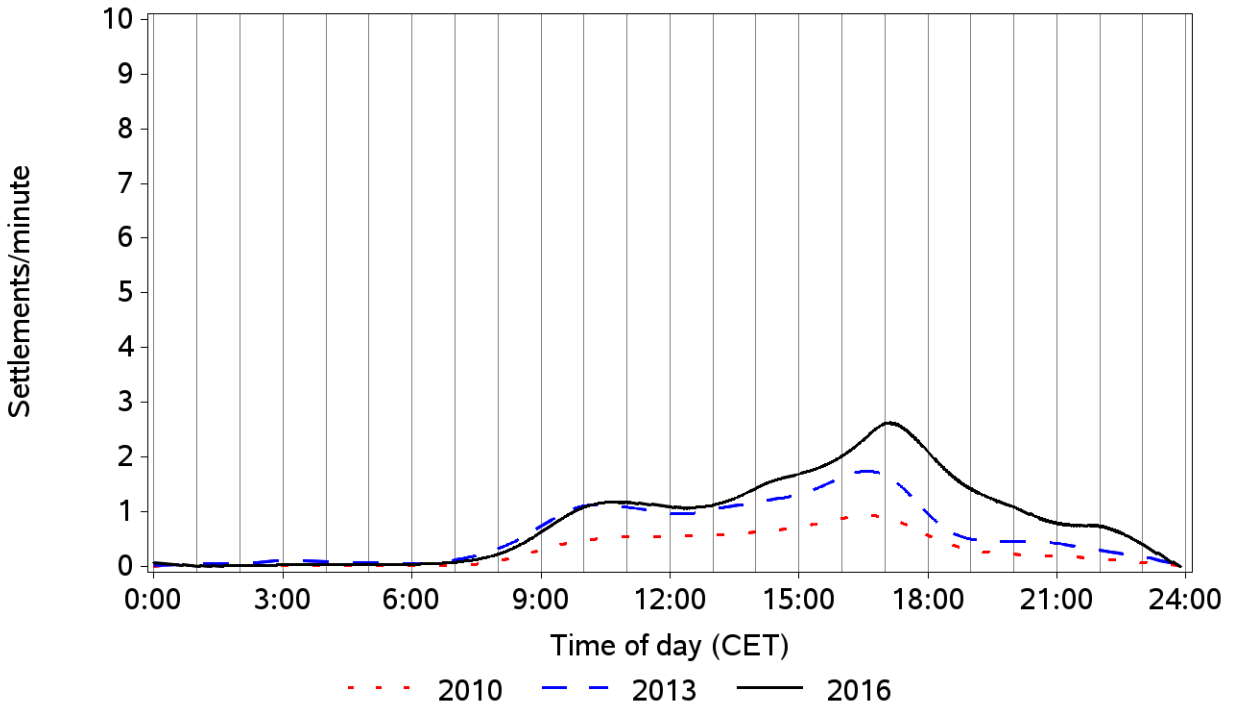
Currency=CAD; Spot settlements in April; Smoothed.



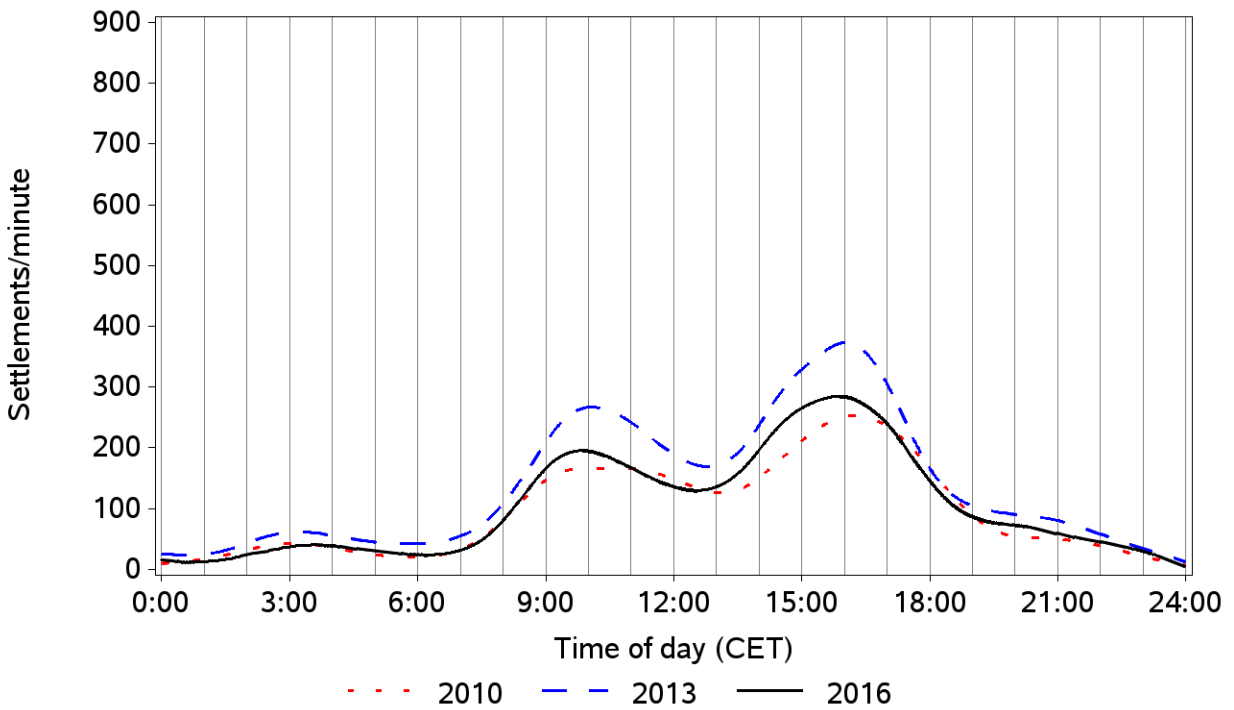
Currency=CHF; Spot settlements in April; Smoothed.



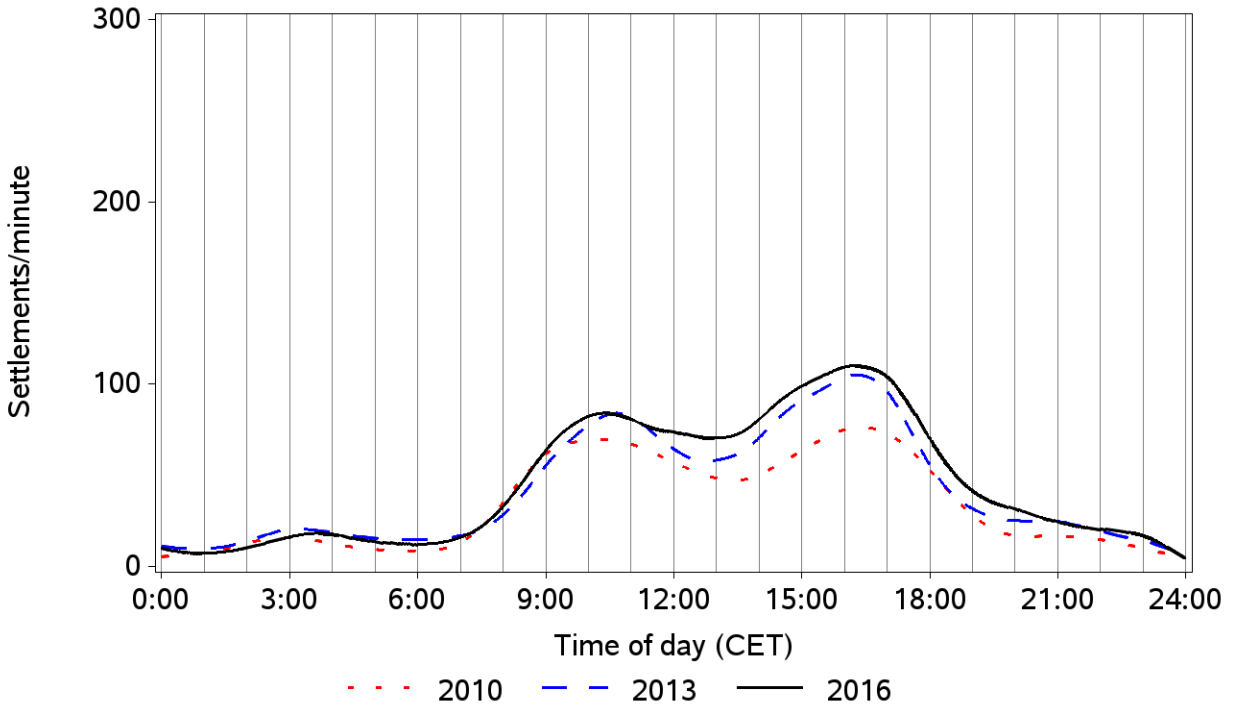
Currency=DKK; Spot settlements in April; Smoothed.



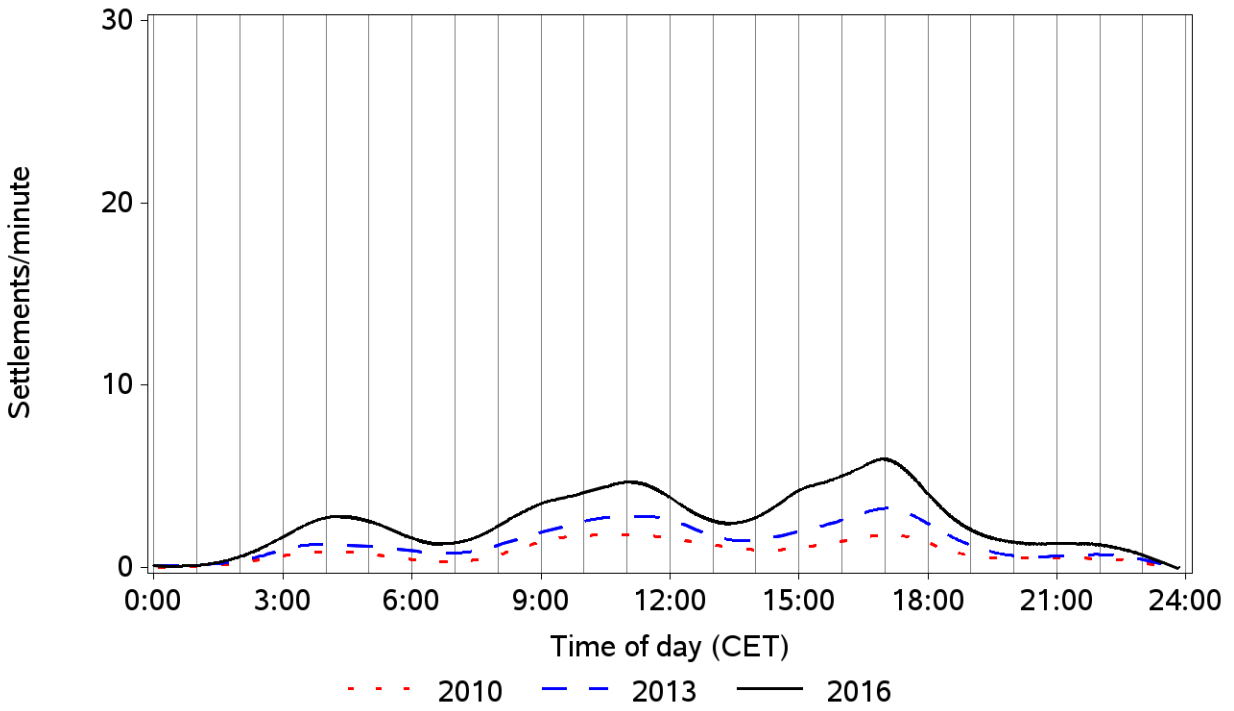
Currency=EUR; Spot settlements in April; Smoothed.



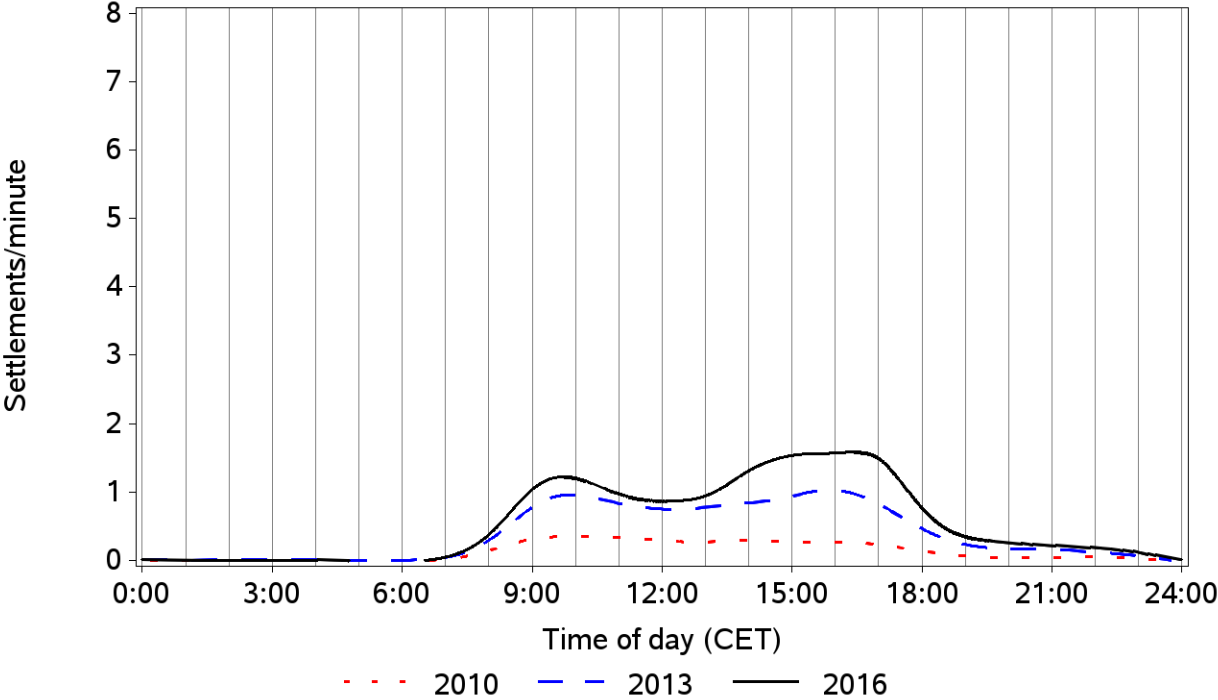
Currency=GBP; Spot settlements in April; Smoothed.



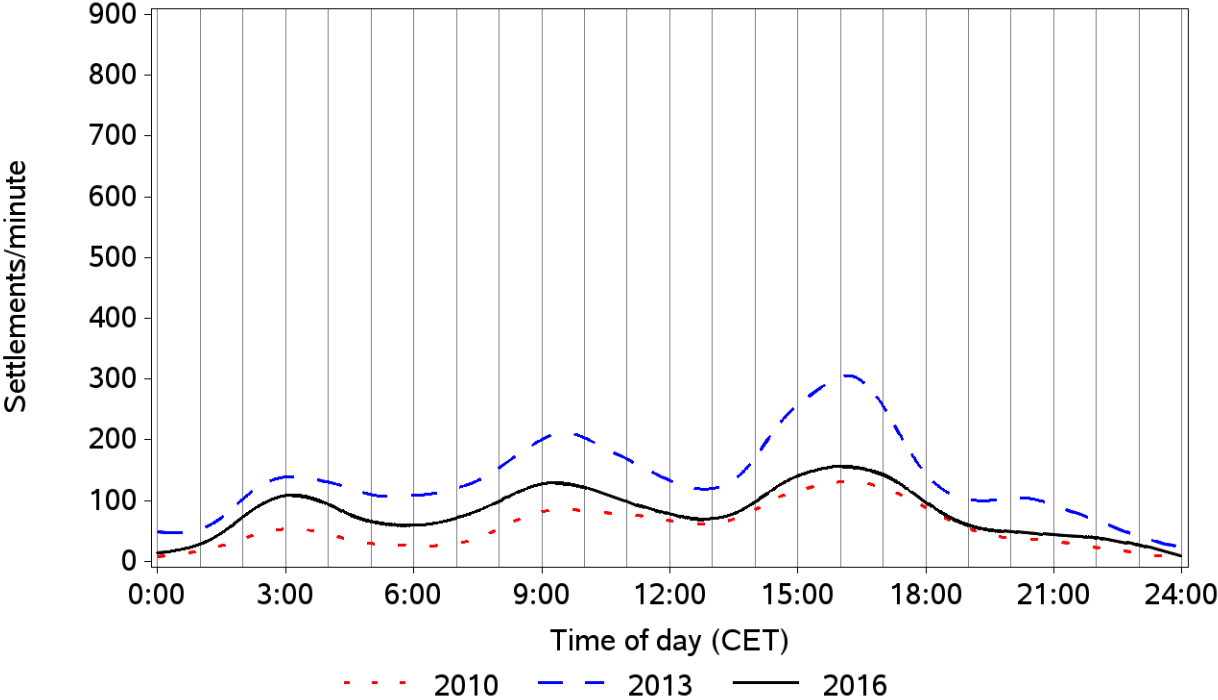
Currency=HKD; Spot settlements in April; Smoothed.



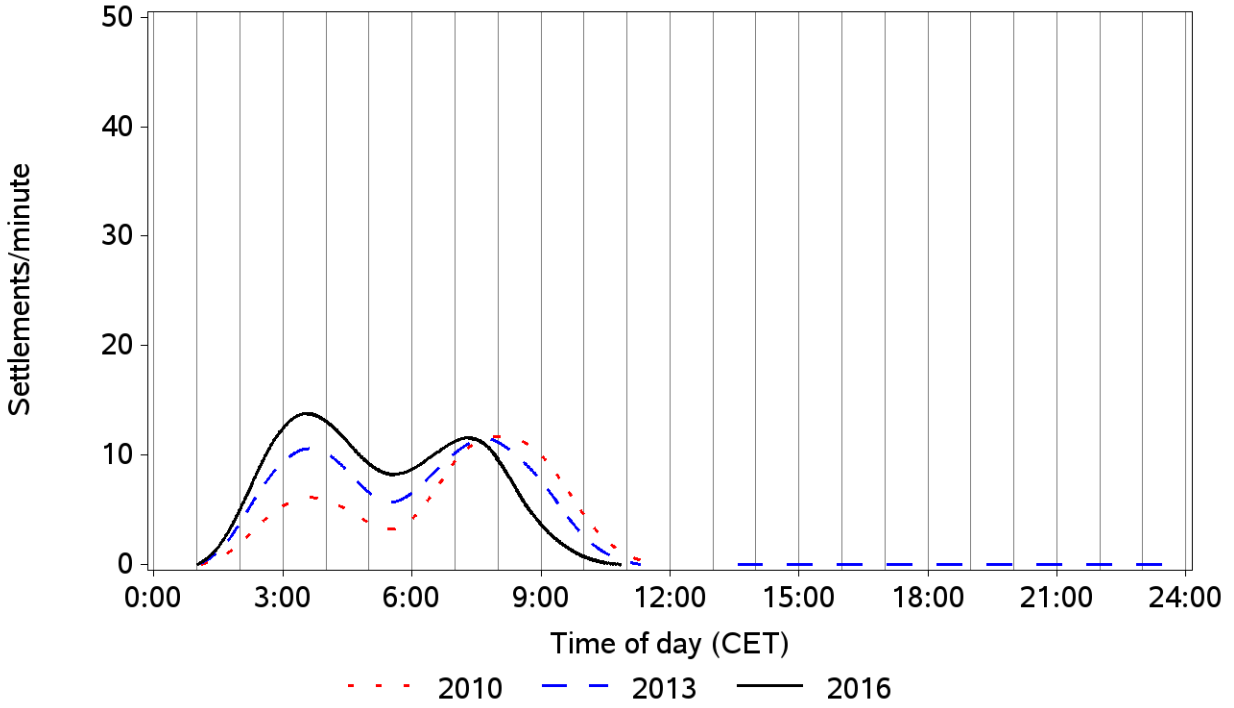
Currency=ILS; Spot settlements in April; Smoothed.



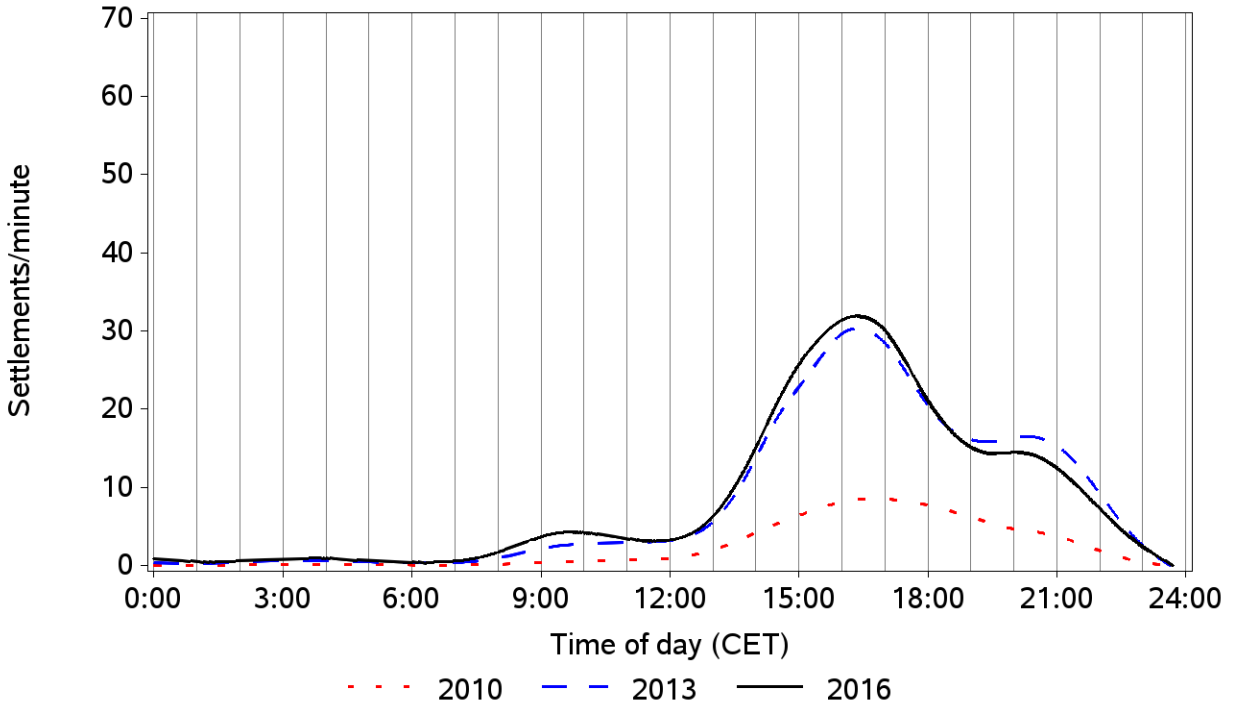
Currency=JPY; Spot settlements in April; Smoothed.



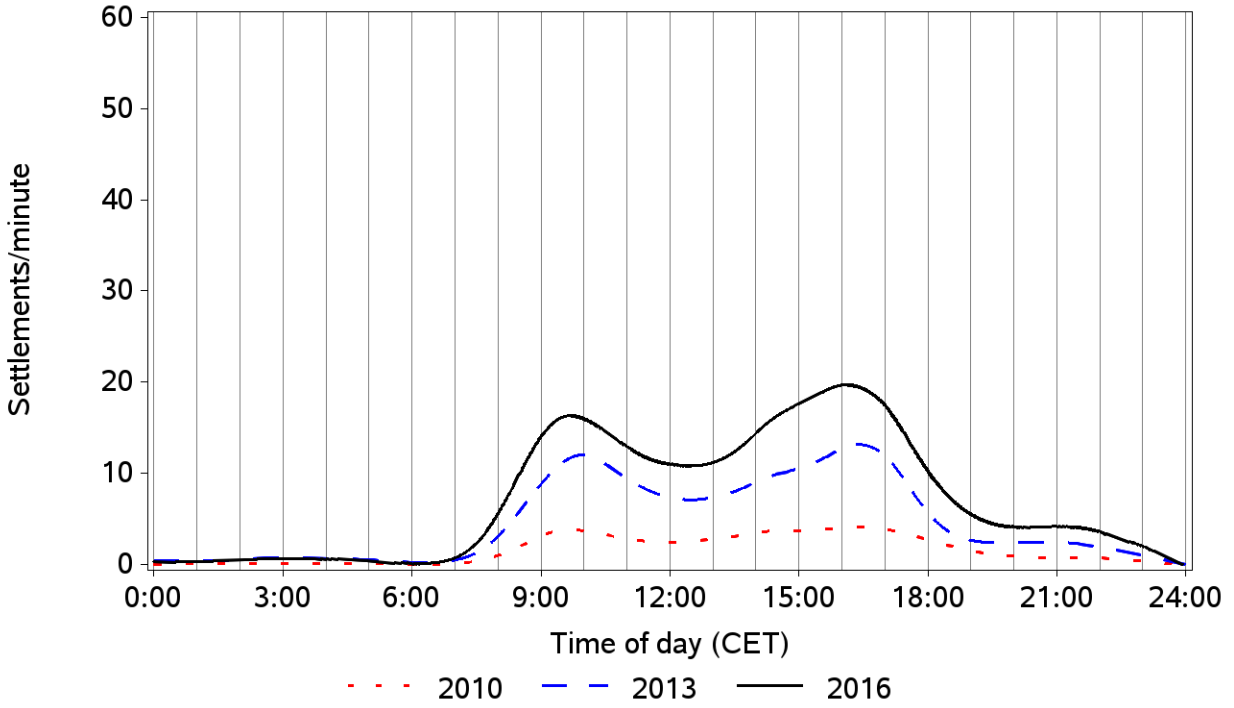
Currency=KRW; Spot settlements in April; Smoothed.



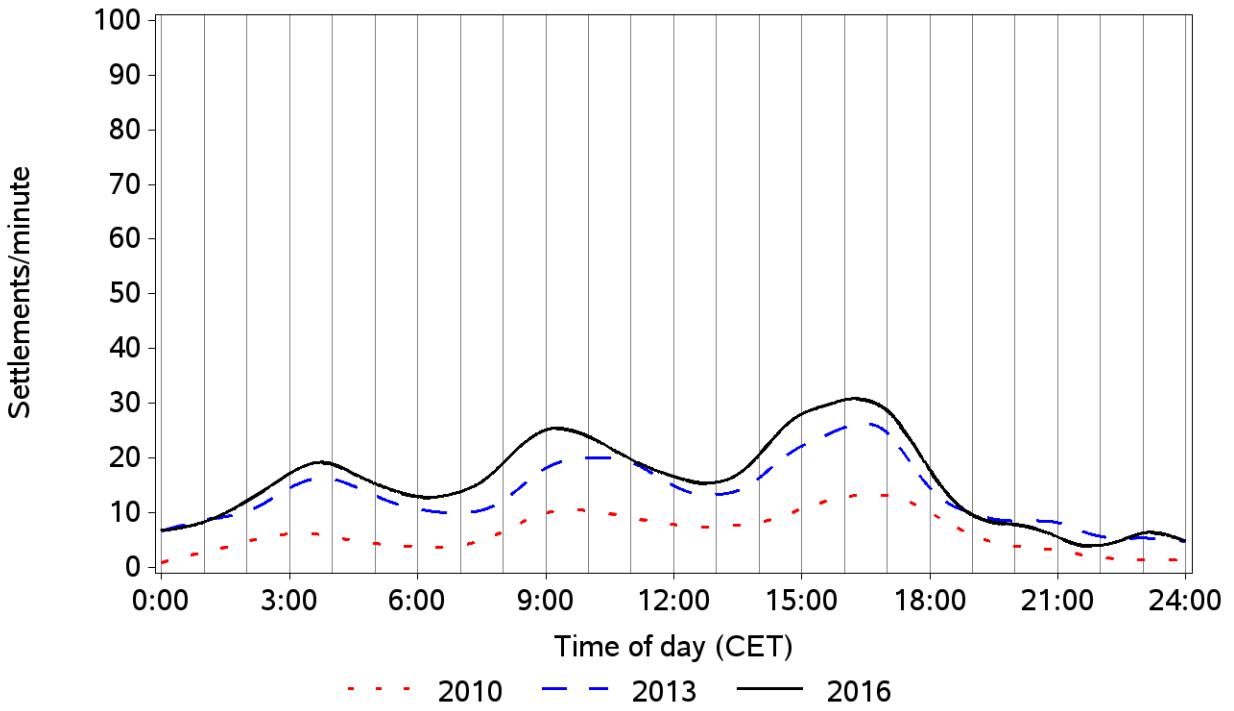
Currency=MXN; Spot settlements in April; Smoothed.



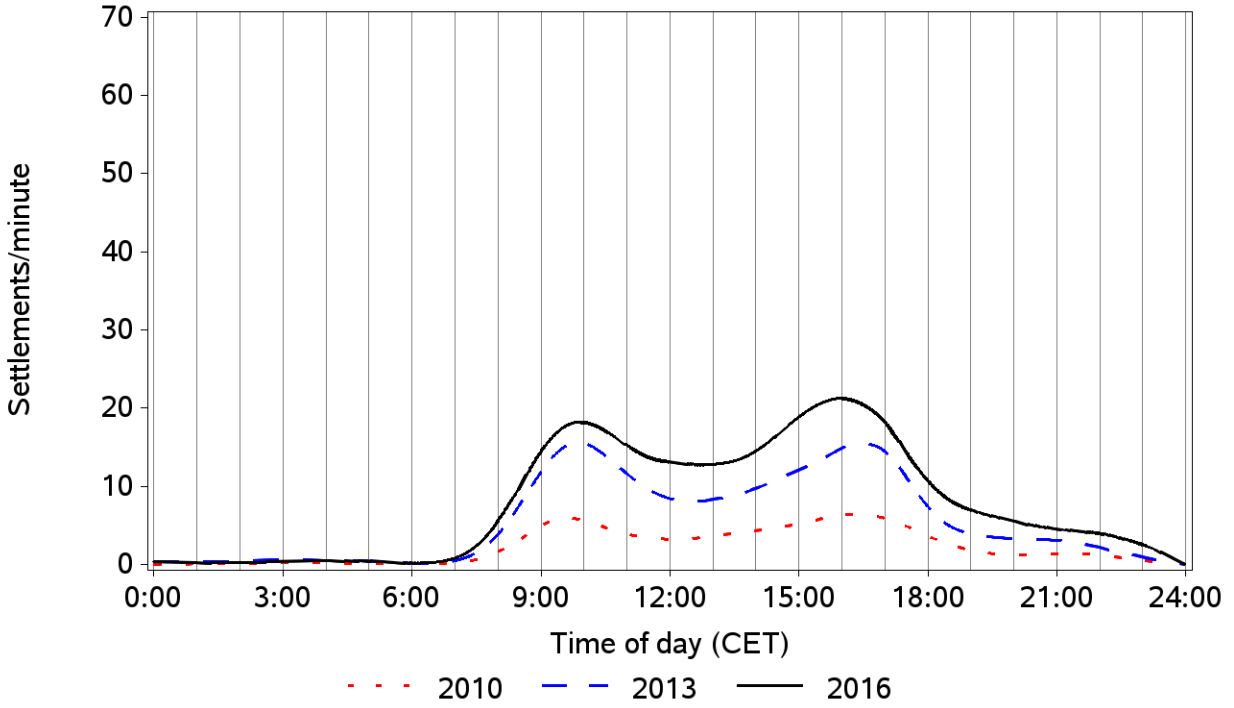
Currency=NOK; Spot settlements in April; Smoothed.



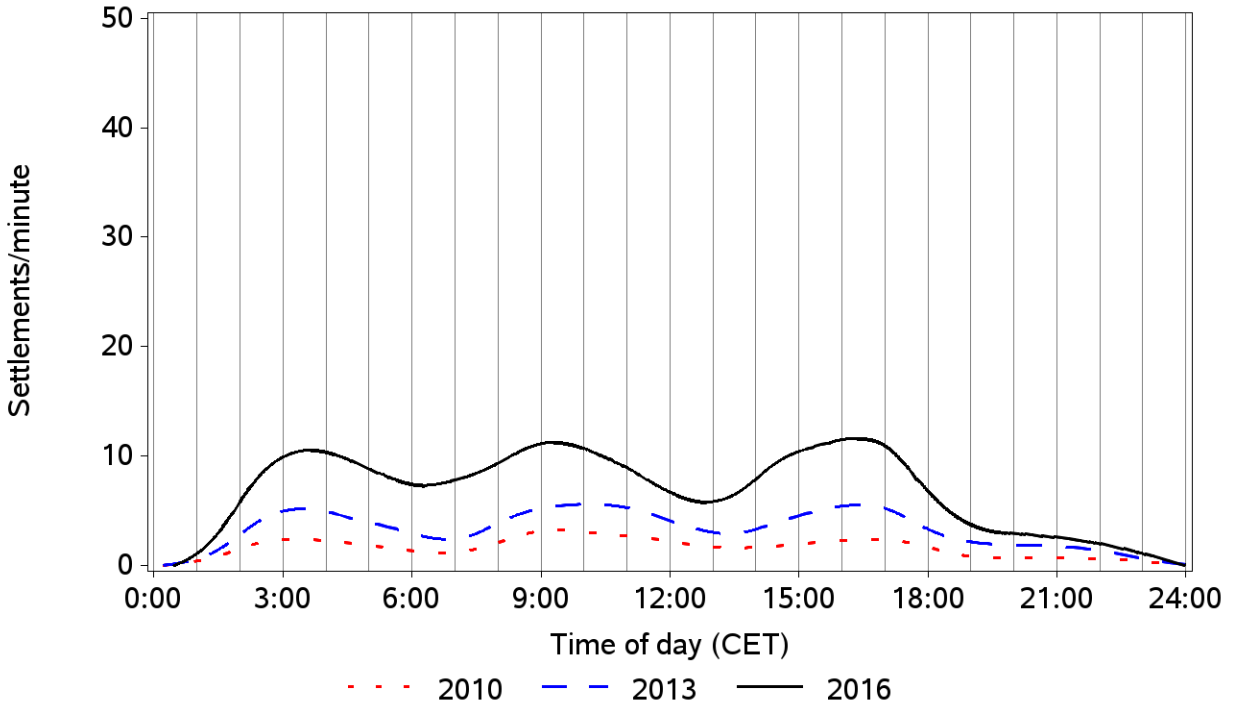
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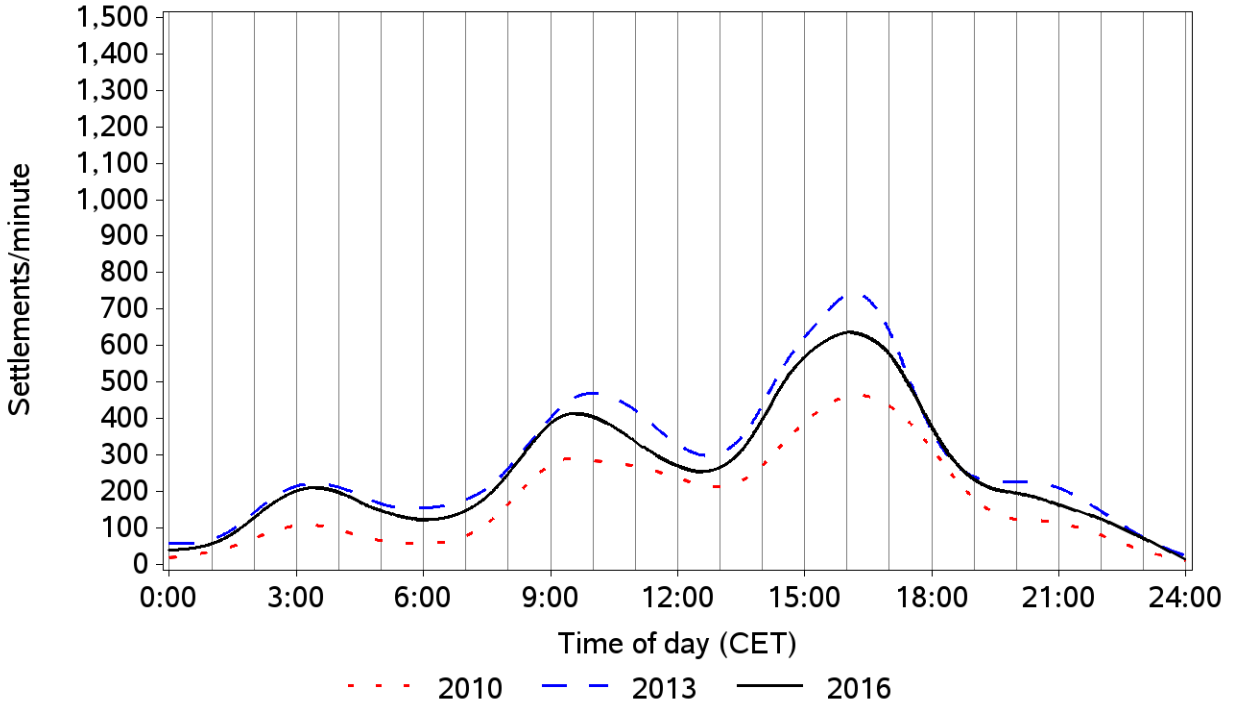
Currency=SEK; Spot settlements in April; Smoothed.



Currency=SGD; Spot settlements in April; Smoothed.



Currency=USD; Spot settlements in April; Smoothed.



Currency=ZAR; Spot settlements in April; Smoothed.

