

Supplementary Appendix

This supplementary appendix contains robustness analysis of the discrete choice models. It contains a review and preview of research using payment diaries. Finally, we provide ancillary tables and figures for the supplementary materials along with an extensive variable list for the macroeconomic and aggregate variables.

Robustness Analysis

This section provides a detailed discussion of the robustness analysis conducted for the paper. We first discuss the unconditional evidence, or the cross-tabs of the proportion of respondents who hold any form of a payment card (either debit or credit). Later, we focus our attention on the conditional analysis via logit models.

Unconditional Evidence

Table A1 provides a table of the proportion of respondents who hold any form of a payment card (either debit or credit). Adding this tighter restriction does not change the proportions significantly, with the exception of the United States, where the rate of card ownership increases. The Dutch numbers are not updated, since debit card ownership is almost universal. For Australia, the results would be similar to Canada.

Conditional Evidence

Tables A2 and A3 summarize the results from the respective robustness test. We have conducted the test for five countries. NL was omitted because card ownership is universal. We could not get the regressions for AU in time; however, the structure of card ownership is very similar to CA. As CA has almost universal card ownership, we expect the results for AU to be very comparable to those from CA.

Specifically, table A2 compares, country by country, the results for the full sample of respondents (as shown in table 9 of the paper) with the results for a sample of respondents who possess either a debit or a credit card. The first result we note is that the sample

Table A1. Card Ownership by Sociodemographics

	AU	AT	CA	FR	DE	NL	US
<i>Debit Card Ownership by Sociodemographics</i>							
Age:							
18–35	0.96	0.95	0.97	0.91	0.96	1.00	0.77
36–60	0.94	0.89	0.98	0.91	0.95	0.99	0.79
60+	0.88	0.69	0.94	0.86	0.91	0.99	0.69
Education:							
Low	0.94	0.79	0.89	0.81	0.86	0.99	0.71
Medium	0.86	0.91	0.98	0.90	0.98	0.99	0.86
High	0.91	0.96	0.97	0.96	0.99	0.99	0.80
Income:							
Low	0.88	0.78	0.96	0.83	0.89	0.98	0.62
Medium	0.95	0.90	0.97	0.93	0.96	0.99	0.82
High	0.94	0.93	0.97	0.96	0.97	0.99	0.82
<i>Any Card Ownership by Sociodemographics</i>							
Age:							
18–35	—	0.95	0.98	0.83	0.96	—	0.79
36–60	—	0.91	0.99	0.92	0.96	—	0.89
60+	—	0.70	1.00	0.97	0.91	—	0.96
Education:							
Low	—	0.80	0.95	0.83	0.87	—	0.82
Medium	—	0.92	0.99	0.92	0.98	—	0.96
High	—	0.97	0.99	0.97	0.99	—	0.98
Income:							
Low	—	0.78	0.99	0.84	0.89	—	0.69
Medium	—	0.91	0.99	0.95	0.96	—	0.94
High	—	0.94	0.99	0.96	0.98	—	0.97
Notes: The top part of the table is taken from table 6 of the main paper. The bottom portion shows calculations based on respondents reporting ownership of either a debit or credit card. AU is similar to CA, while in NL ownership of debit cards is almost universal, so this exercise is omitted.							

size is reduced by 9.5 percent in AT, 6.6 percent in DE, 4.5 percent in US, 4.2 percent in FR, and only 0.3 percent in CA (and presumably about the same value in AU). The estimation results reveal only very slight differences between the estimates from the

Table A2. Robustness: Cash versus Non-cash Payment Choice for Full Sample and for Card Owners (marginal effects)

	AT		CA		DE		FR		US	
	Full Sample	Card=1	Full Sample	Card=1	Full Sample	Card=1	Full Sample	Card=1	Full Sample	Card=1
Medium Income	-0.031 (0.017)	-0.020 (0.018)	0.021 (0.021)	0.020 (0.021)	-0.005 (0.011)	-0.006 (0.012)	-0.046** (0.017)	-0.031 (0.017)	-0.119*** (-0.020)	-0.103*** (0.021)
High Income	-0.035 (0.019)	-0.022 (0.021)	0.014 (0.027)	0.014 (0.027)	-0.013 (0.012)	-0.013 (0.012)	-0.071* (0.031)	-0.059 (0.033)	-0.119*** (-0.025)	-0.101*** (0.026)
Aged 36 to 59	0.071*** (0.017)	0.080*** (0.018)	0.041* (0.019)	0.044* (0.019)	0.024* (0.010)	0.025* (0.011)	0.051** (0.017)	0.042* (0.017)	0.091*** (-0.023)	0.101*** (0.024)
Aged over 60	0.112*** (0.027)	0.107*** (0.030)	0.026 (0.031)	0.029 (0.031)	0.047** (0.018)	0.046* (0.019)	0.042 (0.028)	0.048 (0.029)	0.073* (-0.029)	0.094*** (0.030)
Medium Education	-0.040* (0.020)	-0.033 (0.022)	-0.106** (0.039)	-0.105** (0.039)	-0.034*** (0.010)	-0.034** (0.010)	-0.045* (0.022)	-0.045 (0.024)	-0.126** (-0.047)	-0.095 (0.058)
High Education	-0.080*** (0.015)	-0.068*** (0.016)	-0.134*** (0.040)	-0.132** (0.040)	-0.085*** (0.014)	-0.085*** (0.014)	-0.097*** (0.027)	-0.089** (0.028)	-0.194*** (-0.046)	-0.167** (0.057)
Not Homeowner	0.012 (0.014)	0.008 (0.015)	0.027 (0.022)	0.030 (0.022)					0.010 (-0.021)	0.004 (0.022)
Perceptions of: Ease Cost	0.123*** (0.037)	0.107** (0.041)	0.170*** (0.045)	0.170*** (0.046)					0.212*** (-0.035)	0.202*** (0.036)
	-0.046 (0.025)	-0.059* (0.026)	0.082 (0.043)	0.075 (0.043)					0.037 (-0.045)	0.040 (0.050)
Security	0.082*** (0.016)	0.083*** (0.017)	-0.054** (0.020)	-0.053** (0.020)					0.064*** (-0.014)	0.061*** (0.015)
Acceptance	-0.023 (0.042)	0.031 (0.047)	-0.080 (0.045)	-0.078 (0.045)					0.054 (-0.045)	0.029 (0.045)
Card Acceptance Share at the POS	-0.104*** (0.025)	-0.110*** (0.029)	-0.480*** (0.033)	-0.483*** (0.033)	-0.105*** (0.016)	-0.095*** (0.016)				

(continued)

Table A2. (Continued)

	AT		CA		DE		FR		US	
	Full Sample	Card=1	Full Sample	Card=1	Full Sample	Card=1	Full Sample	Card=1	Full Sample	Card=1
Cash on Hand	0.002 (0.001)	0.002 (0.001)	0.005*** (0.001)	0.005*** (0.001)	0.002*** (0.001)	0.002*** (0.001)	0.001*** (0.000)	0.001*** (0.000)	0.003*** (-0.001)	0.003*** (0.001)
Gasoline	-0.071*** (0.014)	-0.076*** (0.016)	-0.008 (0.028)	-0.008 (0.028)	-0.098*** (0.007)	-0.099*** (0.007)	-0.161*** (0.027)	-0.167*** (0.030)	0.020 (-0.019)	0.011 (0.021)
Semi-durables	-0.047*** (0.012)	-0.053*** (0.013)	-0.036* (0.017)	-0.036* (0.018)	-0.082*** (0.008)	-0.084*** (0.008)	-0.098*** (0.016)	-0.106*** (0.016)	-0.060*** (-0.019)	-0.059*** (0.020)
Services	0.080** (0.025)	0.086** (0.027)	0.031 (0.029)	0.027 (0.029)	0.048*** (0.011)	0.051*** (0.011)	-0.029* (0.014)	-0.031* (0.015)	0.138*** (-0.019)	0.144 (0.019)
Entertainment	0.167*** (0.021)	0.179*** (0.022)	0.109*** (0.017)	0.108*** (0.017)	0.081*** (0.012)	0.086*** (0.012)	-0.098*** (0.018)	-0.101*** (0.018)	0.090*** (-0.016)	0.102*** (0.016)
Other (Not Groceries)	0.075*** (0.017)	0.088*** (0.019)	0.084*** (0.018)	0.084*** (0.018)	0.061*** (0.010)	0.066*** (0.010)	0.040** (0.015)	0.041** (0.016)	0.409*** (-0.040)	0.427*** (0.041)
TV Q2	-0.168*** (0.022)	-0.175*** (0.023)	-0.254*** (0.016)	-0.256*** (0.016)	-0.117*** (0.021)	-0.120*** (0.021)	-0.241*** (0.035)	-0.244*** (0.036)	-0.178*** (-0.016)	-0.185*** (0.016)
TV Q3	-0.263*** (0.023)	-0.278*** (0.025)	-0.397*** (0.015)	-0.398*** (0.015)	-0.243*** (0.020)	-0.249*** (0.021)	-0.454*** (0.033)	-0.464*** (0.033)	-0.305*** (-0.015)	-0.315*** (0.015)
TV Q4	-0.364*** (0.023)	-0.393*** (0.024)	-0.549*** (0.015)	-0.549*** (0.015)	-0.373*** (0.020)	-0.380*** (0.021)	-0.629*** (0.028)	-0.643*** (0.028)	-0.462*** (-0.017)	-0.472*** (0.017)
Observations	7,841	7,095	12,652	12,617	18,676	17,884	7,098	6,631	10,671	10,189

Notes: The dependent variable takes a value of 1 if a payment is made by cash and 0 if it is made by debit or credit. For each country, the first column shows the results for the full sample (as in table 9 of the main paper) and the second column shows the results for the restricted sample, which includes only owners of debit or credit cards. Results for location (urban/rural), marital status, gender, employment status, and family size are not shown. Variables are defined in table 13 in the main paper. TV Q2, TV Q3, and TV Q4 denote the second to fourth quartile of transaction values. Standard errors are in parentheses and the 1, 5, and 10 percent levels of significance are denoted by ***, **, and *, respectively.

Table A3. Robustness Gas and Grocery Transactions: Cash vs. Non-cash Payment Choice
at Gas and Groceries for Full Sample and for Card Owners (marginal effects)

	AT		CA		DE		FR		US	
	Full Sample	Card=1	Full Sample	Card=1	Full Sample	Card=1	Full Sample	Card=1	Full Sample	Card=1
Medium Income	-0.025 (0.024)	-0.012 (0.026)	0.042 (0.029)	0.042 (0.029)	-0.009 (0.014)	-0.007 (0.015)	-0.047** (0.000)	-0.033 (0.000)	-0.133*** (0.000)	-0.119*** (0.000)
High Income	-0.039 (0.029)	-0.022 (0.031)	0.002 (0.037)	0.002 (0.037)	-0.012 (0.015)	-0.009 (0.015)	-0.073* (0.000)	-0.062 (0.000)	-0.162*** (0.000)	-0.146*** (0.000)
Aged 36 to 59	0.086*** (0.023)	0.102*** (0.026)	0.077** (0.024)	0.077** (0.024)	0.026 (0.014)	0.027 (0.015)	0.057** (0.000)	0.049* (0.000)	0.105*** (0.000)	0.121*** (0.000)
Aged over 60	0.127*** (0.039)	0.124** (0.043)	0.080 (0.043)	0.080 (0.043)	0.069* (0.022)	0.070** (0.023)	0.043 (0.000)	0.047 (0.000)	0.059 (0.000)	0.093* (0.000)
Medium Education	-0.069* (0.028)	-0.064* (0.031)	-0.073 (0.051)	-0.073 (0.051)	-0.043*** (0.013)	-0.004*** (0.013)	-0.051* (0.000)	-0.052* (0.000)	-0.138* (0.000)	-0.087 (0.000)
High Education	-0.102*** (0.021)	-0.088*** (0.024)	-0.123* (0.052)	-0.124* (0.052)	-0.118*** (0.019)	-0.120*** (0.020)	-0.106*** (0.000)	-0.099*** (0.000)	-0.210*** (0.000)	-0.164* (0.000)
Not Homeowner	0.035 (0.020)	0.033 (0.021)	0.046 (0.029)	0.046 (0.029)					0.053 (0.000)	0.044 (0.000)
Perceptions of: Ease Cost	0.212*** (0.055)	0.193** (0.063)	0.161** (0.055)	0.161** (0.055)					0.240*** (0.000)	0.227*** (0.000)
Security	-0.077* (0.037)	-0.090* (0.041)	0.108 (0.061)	0.108 (0.061)					0.000 (0.000)	-0.014 (0.000)
Acceptance	0.114*** (0.024)	0.121*** (0.027)	-0.055* (0.026)	-0.055* (0.026)					0.045* (0.000)	0.041* (0.000)
Card Acceptance Share at the POS	-0.134* (0.056)	-0.072 (0.067)	-0.051 (0.076)	-0.051 (0.076)					-0.008 (0.000)	-0.042 (0.000)
	-0.178*** (0.032)	-0.178*** (0.039)	-0.561*** (0.036)	-0.560*** (0.036)	-0.080*** (0.018)	-0.065*** (0.019)				

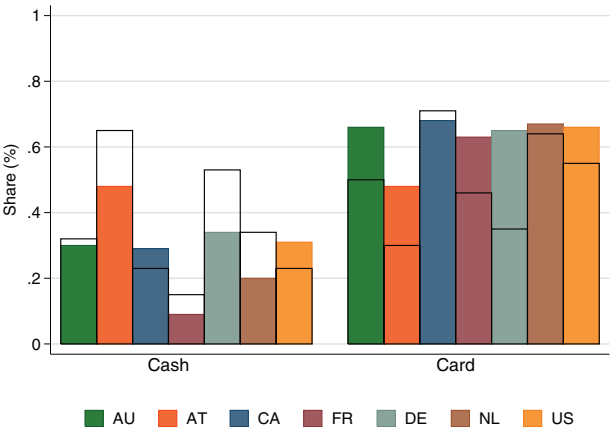
(continued)

Table A3. (Continued)

	AT		CA		DE		FR		US	
	Full Sample	Card=1	Full Sample	Card=1	Full Sample	Card=1	Full Sample	Card=1	Full Sample	Card=1
Cash on Hand	0.003* (0.001)	0.003 (0.002)	0.006*** (0.001)	0.006*** (0.001)	0.003*** (0.001)	0.003** (0.001)	0.001*** (0.000)	0.001*** (0.000)	0.002** (0.000)	0.002** (0.000)
Gasoline	-0.088*** (0.017)	-0.096*** (0.019)	-0.011 (0.028)	-0.011 (0.028)	-0.114*** (0.008)	-0.117*** (0.008)	-0.140*** (0.000)	-0.145*** (0.000)	0.024 (0.000)	0.019 (0.000)
TV Q2	-0.201*** (0.029)	-0.213*** (0.031)	-0.284*** (0.025)	-0.285*** (0.025)	-0.189*** (0.028)	-0.198*** (0.029)	-0.259*** (0.000)	-0.263*** (0.000)	-0.176*** (0.000)	-0.186*** (0.000)
TV Q3	-0.302*** (0.030)	-0.326*** (0.033)	-0.409*** (0.023)	-0.409*** (0.023)	-0.341*** (0.028)	-0.355*** (0.029)	-0.486*** (0.000)	-0.498*** (0.000)	-0.336*** (0.000)	-0.353*** (0.000)
TV Q4	-0.420*** (0.029)	-0.464*** (0.031)	-0.572*** (0.025)	-0.573*** (0.025)	-0.481*** (0.027)	-0.499*** (0.029)	-0.666*** (0.000)	-0.684*** (0.000)	-0.466*** (0.000)	-0.481*** (0.000)
Observations	3,875	3,455	5,079	5,077	10,364	9,839	7,098	6,631	3,688	3,462
Log-Likelihood							-2,546.1	-2,422.9	-75,484.1	-69,920.0

Notes: The dependent variable takes a value of 1 if a payment is made by cash and 0 if it is made by debit or credit. For each country, the first column shows the results for the full sample (as in table 9 of the main paper) and the second column shows the results for the restricted sample, which includes only owners of debit or credit cards. Results for location (urban/rural), marital status, gender, employment status, and family size are not shown. Variables are defined in table 13 in the paper. TV Q2, TV Q3, and TV Q4 denote the second to fourth quartile of transaction values. Standard errors are in parentheses and the 1, 5, and 10 percent levels of significance are denoted by ***, **, and *, respectively.

Figure A1. Cash and Card (Debit and Credit) Share for Purchases at Gas Stations



Note: The transparent bars show the overall cash and card shares, the colored bars the respective shares at gas stations.

unrestricted sample and the estimates from the restricted sample. Notably, this also holds for AT and DE with the largest drop in the number of observations. If at all, differences arise, expectedly, for the sociodemographic variables, e.g., income for FR and education for US. Importantly, the estimates for “Cash on Hand” is not affected by the sample restriction. In other words, “Cash on Hand” does not act as a proxy for payment cardholding. Qualitatively, the same findings apply if we analyze only gas station and grocery transactions (table A3; see also figure A1).

Given these results, we have added a description of the robustness test and its core findings in the paper.

Payment Diaries: Past and Present

The usage of consumer payment diaries to understand monetary and payment economics is in the nascent stage. This section provides a brief summary of how payment diaries have been used to understand (i) cash usage, (ii) determinants of payment instrument choice, and (iii) how market structure may matter for payment choice.

Consumer Cash Usage

A key advantage of payment diaries is the proper accounting of cash payments relative to all methods of payment. Stix (2004) and Bounie, Francois, and Waelbroeck (2013) demonstrate that cash demand is affected by debit card usage for AU and FR, respectively. For DE, credit cards are relatively interchangeable with debit cards for the usage of cash; see von Kalckreuth, Schmidt, and Stix (2014a). Further work by von Kalckreuth, Schmidt, and Stix (2014b) uses payment diary data for DE to show that cash is used as a method to monitor expenditures (*pocket-watching*). Fung, Huynh, and Sabetti (2012) investigate the effect of retail payment innovations (i.e., contactless credit cards and stored-value cards) on cash usage and find that there is a reduction. Finally, Bounie, Francois, and Waelbroeck (2013) and Huynh, Schmidt-Dengler, and Stix (2014) study the impact of card acceptance on cash usage. They find that the lack of card acceptance is a reason for precautionary cash balances.

Consumer Adoption and Use of Payment Instruments

The study by Bounie and Francois (2006), based on a 2005 French payment diary, was an early attempt to disentangle the effect of demographics from the effect of payment characteristics such as transaction value on payment choice. Further work by Bouhdaoui and Bounie (2012) proposes a cash holding model as an alternative to a transaction-size explanation for payment choice.¹ Kosse and Jansen (2013) demonstrate that a variation in demographics such as foreign background has a strong effect on payment choice for NL.

Simon, Smith, and West (2010) (for AU); Arango, Huynh, and Sabetti (2011) (for CA); and Wakamori and Welte (2012) (for CA) extend the analysis beyond demographics and payment characteristics to pricing incentives such as card affinity programs (rewards) and acceptance of payment cards. The analysis by Briglevics and Schuh (2013) estimates a structural inventory model of cash holdings and finds a significant effect on payment choice.

¹Arango et al. (2013) extend this work by conducting the test for CA, FR, DE, and NL.

Merchant Steering

The payment diaries have been used to study the effect of market structure on payment choice. Recent work by Shy (2014) investigates the effect of the debit card interchange fees and sorts out the transaction value at which interchange fees become higher or lower due to the new rule. Briglevics and Shy (2012) use the payment diaries to understand merchant steering. They compute the expected net cost of discounts on cash and debit card payments and find that, for the most part, steering is unprofitable. Welte (2014) studies and extends the steering exercise by embedding a consumer choice into the expected net cost calculations for CA.

Scanner Data Projects

Scanner data have been touted as an alternative to payment diaries as a method of data collection on payments. For US, Klee (2008) uses data to show that payment choice is a function of the amount of time spent processing the items purchased. Research by Polasik et al. (2012) for Poland demonstrates the usage of chronometric methods to enumerate the processing time of payments. Recent work by Wang and Wolman (2014) extends the work of Klee (2008) by using scanner data from a large discount retailer.

These scanner data studies provide rich detailed information, including the opportunity cost of time. One drawback of these scanner data projects is that direct demographic data are not collected. Therefore, it is hard to infer the role of consumer demographics on payment choice. Recent work by Cohen and Rysman (2013) avoids this criticism by obtaining demographic information with the scanner data.

Payment Diaries: Going Forward

This section describes possible future use of payment diaries. We focus on three main points: structural models of cash and alternative means of payment, high-frequency consumption/savings, and the study of two-sided markets. We also discuss some caveats and ideas to improve the collection of data.

Structural Models of Cash and Alternative Method of Payments

The estimation of money demand has relied mostly on the workhorse Baumol-Tobin model. However, this model was constructed in the absence of payment cards. The presence of payment cards has been exploited to understand household money demand elasticities; see Mulligan and Sala-i-Martin (2000) or Attanasio, Guiso, and Jappelli (2002). These studies also document that consumers do not wait until there is a zero cash balance before withdrawing. This inspired Alvarez and Lippi (2009), who explain this puzzle by introducing a positive probability of a *free withdrawal*. Another salient feature is that some consumers hold large amounts of cash. Alvarez and Lippi (2013b) rationalize this feature by modeling the large and lumpy purchases that require cash. Further, Alvarez and Lippi (2013a) allow merchant non-acceptance of cards as a reason to hold precautionary cash balances.

Most payment diaries contain information about cash management behavior, but little is known about the rationale for such holdings. Most diaries do not include questions on precautionary motives or the need to make lumpy purchases. Therefore, it is hard to distinguish between cash management and acceptance of payment cards as a reason to hold cash. Further, care must be taken to conduct the statistical sampling behind these questions. The diaries rely on a short-term window to focus on behavior that may be infrequent.

Nosal and Rocheteau (2012) offer an extensive discussion of the new monetarist approach, which has stressed various real trading frictions to explain the coexistence of cash with cards. For example, Telyukova and Wright (2008) explain why households hold cash while having a credit balance with a rate-of-return dominance puzzle; i.e., cash is held for liquidity reasons to settle claims. The current payment diaries focus mainly on payment choice and expenditures. There is scant information about credit arrangements, i.e., an indicator of whether or not a household has carried a balance from month to month. Therefore, to empirically validate these models would require detailed household balance sheet information.

High-Frequency Consumption and Saving

Recent work by Aruoba, Diebold, and Scotti (2009) highlights the usefulness of real-time monitoring of consumption for business

cycles. Private and public sector forecasters spend enormous resources to understand consumption, as it is a large component of GDP. Galbraith and Tkacz (2013) demonstrate the utility of using network data on debit and credit card payments to understand consumption. The recent financial crisis has highlighted the need to understand high-frequency movements in consumption and consumer confidence; see Lachowska (2013) and Parker et al. (2013).

Payment diaries could be a useful method to track the high-frequency consumption and/or expenditures of households. They could be used to understand the effect of fiscal policy on consumption. Agarwal and McGranahan (2012) argue that sales tax holidays have an effect on consumption but the timing of these effects cannot be clearly identified. Also, Mastrobuoni and Weinberg (2010) demonstrate that exact pay dates have an impact on consumption, especially for social security recipients. Payment diaries would need to be redesigned to incorporate questions to determine these effects.

Two-Sided Markets and Regulation

Rochet and Tirole (2002) and Wright (2003) discuss the theoretical nature of two-sided markets for the payments literature. The work on estimating these two-sided markets, with the exception of Rysman (2007), uses network data to study the usage of credit cards, network externalities, and multi-homing. Also, recent work by Shy and Wang (2011) discusses why interchange fees are proportional.

Payment diaries contain detailed data on consumer payments but only a few questions on merchant characteristics (i.e., venue and acceptance of cards). Recent work by Bounie, Francois, and Hove (2014) matches payment diary data to a nationwide French merchant survey to investigate the probability that the merchant will accept cards. Future payment diaries could attempt to collect or at least link their data to merchant costs, or expand the supply-side information. However, work by Stavins and Shy (2015) illustrates the difficulty of this task, as they attempt to embed questions about merchant steering into US payment diaries. Their results are inconclusive, and they discuss the challenges and pitfalls of this exercise. Future attempts to improve payment diaries should bear this in mind.

*Macroeconomic and Aggregate Variables: Definitions***Table A4. Definition of Macro Variables**

<i>Australia</i>	
Core Inflation	Haver Analytics, Series C193CZCY@OECDMEI (Australia: CPI: All Items excl. Food and Energy (NSA, Year/Year % Change)).
Output Gap	OECD Economic Outlook, Vol. 2014, Issue 1. Annex Table 10.
GDP Growth	Haver Analytics, Series C193GPCY@OECDMEI (Australia: Real GDP: Growth Rate Prev. Year (SA, %)).
Unemployment	Haver Analytics, Series C193LRCL@OECDMEI (Australia: Harmonized Unemployment Rate: All Persons All Ages (SA, %)).
NAIRU	Data Set: Economic Outlook No. 95, May 2014, OECD Annual Projections. NAIRU — Unemployment rate with non-accelerating inflation rate.
Currency in Circulation	International Financial Statistics, Series 193"14A____K"J (CURRENCY IN CIRCULATION Millions of). The series starts only in 2001. Older values were constructed using growth rates of 193"14A"J (CURRENCY OUTSIDE BANKS Millions).
Nominal GDP	International Financial Statistics, Series 193"99B_C"J.
<i>Austria</i>	
Core Inflation	Haver Analytics, Series C122CZCY@OECDMEI (Austria: CPI: All Items excl. Food and Energy (NSA, Year/Year % Change)).
Output Gap	OECD Economic Outlook, Vol. 2014, Issue 1. Annex Table 10.
GDP Growth	Haver Analytics, Series C122GPCY@OECDMEI (Austria: Real GDP: Growth Rate Prev. Year (SA, %)).
Unemployment	Haver Analytics, Series C122LRCL@OECDMEI (Austria: Harmonized Unemployment Rate: All Persons All Ages (SA, %)).
NAIRU	Data Set: Economic Outlook No. 95, May 2014, OECD Annual Projections. NAIRU — Unemployment rate with non-accelerating inflation rate.
Currency in Circulation	International Financial Statistics, Series 122"34A_N"J.
Nominal GDP	International Financial Statistics, Series 122"99B"J.

(continued)

Table A4. (Continued)

<i>Canada</i>	
Core Inflation	Haver Analytics, Series C156CZCY@OECDMEI (Canada: CPI: All Items excl. Food and Energy (NSA, Year/Year % Change)).
Output Gap	OECD Economic Outlook, Vol. 2014, Issue 1. Annex Table 10.
GDP Growth	Haver Analytics, Series C156GPCY@OECDMEI (Canada: Real GDP: Growth Rate Prev. Year (SA, %)).
Unemployment	Haver Analytics, Series C156LRCL@OECDMEI (Canada: Harmonized Unemployment Rate: All Persons All Ages (SA, %))
NAIRU	Data Set: Economic Outlook No. 95, May 2014, OECD Annual Projections. NAIRU — Unemployment rate with non-accelerating inflation rate.
Currency in Circulation	Haver Analytics, Series S156FMC@G10 (Money Supply: Currency in Circulation (Avg./Weds, SA, Mil.C\$)).
Nominal GDP	International Financial Statistics, Series 156"99BAC" J.
<i>France</i>	
Core Inflation	Haver Analytics, Series C132CZCY@OECDMEI (France: CPI: All Items excl. Food and Energy (NSA, Year/Year % Change)).
Output Gap	OECD Economic Outlook, Vol. 2014, Issue 1. Annex Table 10.
GDP Growth	Economics: Key tables from OECD — ISSN 2074-384x. Quarterly gross domestic product, change over same quarter, previous year.
Unemployment	Haver Analytics, Series C132LRCL@OECDMEI (France: Harmonized Unemployment Rate: All Persons All Ages (SA, %)).
NAIRU	Data Set: Economic Outlook No. 95, May 2014, OECD Annual Projections. NAIRU — Unemployment rate with non-accelerating inflation rate.
Currency in Circulation	International Financial Statistics, Series 132"14A" J.
Nominal GDP	International Financial Statistics, Series 132"99B_C" and 132"99B_C.

(continued)

Table A4. (Continued)

<i>Germany</i>	
Core Inflation	Haver Analytics, Series C134CZCY@OECDMEI (Germany: CPI: All Items excl. Food and Energy (NSA, Year/Year % Change)).
Output Gap	OECD Economic Outlook, Vol. 2014, Issue 1. Annex Table 10.
GDP Growth	Haver Analytics, Series C134GPCY@OECDMEI (Germany: Real GDP: Growth Rate Prev. Year (SA, %)).
Unemployment	Haver Analytics, Series C134LRCL@OECDMEI (Germany: Harmonized Unemployment Rate: All Persons All Ages (SA, %)).
NAIRU	Data Set: Economic Outlook No. 95, May 2014, OECD Annual Projections. NAIRU — Unemployment rate with non-accelerating inflation rate.
Currency in Circulation	Deutsche Bundesbank — Circulation of Currency emitted in Germany, bill euro (“Umlauf von in Deutschlandemittiertem Bargeld, Mrd. Euro”).
Nominal GDP	International Financial Statistics, Series 134”99B_C (Bil DEM) and 134”99B_C__W”J (Bil Euro).
<i>Netherlands</i>	
Core Inflation	Haver Analytics, Series C138CZCY@OECDMEI (Netherlands: CPI: All Items excl. Food and Energy (NSA, Year/Year % Change)).
Output Gap	OECD Economic Outlook, Vol. 2014, Issue 1. Annex Table 10.
GDP Growth	Haver Analytics, Series C138GPCY@OECDMEI (Netherlands: Real GDP: Growth Rate Prev. Year (SA, %)).
Unemployment	Haver Analytics, Series C138LRCL@OECDMEI (Netherlands: Harmonized Unemployment Rate: All Persons All Ages (SA, %)).
NAIRU	Data Set: Economic Outlook No. 95, May 2014, OECD Annual Projections. NAIRU — Unemployment rate with non-accelerating inflation rate.
Currency in Circulation	International Financial Statistics, Series 138”14A”J.
Nominal GDP	International Financial Statistics, Series 138”99B_C” and 138”99B_C.

(continued)

Table A4. (Continued)

<i>United States</i>	
Core Inflation	Haver Analytics, Series C111CZCY@OECDMEI (United States: CPI: All Items excl. Food and Energy (NSA, Year/Year % Change)).
Output Gap	OECD Economic Outlook, Vol. 2014, Issue 1. Annex Table 10.
GDP Growth	Haver Analytics, Series C111GPCY@OECDMEI (United States: Real GDP: Growth Rate Prev. Year (SA, %)).
Unemployment	Haver Analytics, Series C111LRCL@OECDMEI (United States: Harmonized Unemployment Rate: All Persons All Ages (SA, %)).
NAIRU	Data Set: Economic Outlook No. 95, May 2014, OECD Annual Projections. NAIRU — Unemployment rate with non-accelerating inflation rate.
Total Currency in Circulation	Federal Reserve Board, “H.6 Money Stock Measures — Table 3,” http://www.federalreserve.gov/releases/h6/current/default.htm#t3tgflf .
Foreign Currency in Circulation	Federal Reserve Board, “L.204 Checkable Deposits and Currency — Line 25 (Series FL263025003.Q).” (Note that the domestic currency in circulation is found by subtracting the foreign currency in circulation from the total currency in circulation.) http://www.federalreserve.gov/apps/fof/SeriesAnalyzer.aspx?s=FL263025003&t=L.204&suf .
Nominal GDP	U.S. Bureau of Economic Analysis, Table 1.1.5. Gross Domestic Product, http://bea.gov/iTable/iTable.cfm?ReqID=9&step=1#reqid=9&step=3&isuri=1&903=5 .
<i>Euro Area</i>	
Currency in Circulation	ECB Statistical Data Warehouse (http://sdw.ecb.europa.eu/), Series BSI.M.U2.N.C.L10.X.1.Z5.0000.Z01.E. Euro area (changing composition), Outstanding amounts at the end of the period (stocks), Eurosystem reporting sector — Currency in circulation, All currencies combined — World not allocated (geographically) counterpart, Unspecified counterpart sector, denominated in euro, data neither seasonally nor working-day adjusted. This series is only available

(continued)

Table A4. (Continued)

Euro Area	
Nominal GDP	back until 1997. Values from 1980 to 1996 were constructed using annual growth rates of series BSI.M.U2.Y.V.L10.X.1.U2.2300.Z01.E (euro area (changing composition), outstanding amounts at the end of the period (stocks), MFIs, central government and post office giro institutions reporting sector — currency in circulation). New Cronos Database, Gross Domestic Product at Market Prices, Euro Area in changing composition (EA11-2000, EA12-2006, EA13-2007, EA15-2008, EA16-2010, EA17-2013, EA18) Series NAMQ_GDP_C.S_ADJ.SWDA.UNIT.MIO_EUR. INDIC_NA.B1GM.GEO.EA. This nominal GDP construction used growth rates from a nominal GDP series from the ECB area-wide model. See annex 2 in Fagan, Henry, and Mestre (2005).

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