

PRECIOUS METALS: GLOBAL MARKETS



AVM098A
November 2014

Vijay Subramanian
Project Analyst

ISBN: 1-56965-996-6



BCC Research
49 Walnut Park, Building 2
Wellesley, MA 02481 USA
866-285-7215 (toll-free within the USA),
or (+1) 781-489-7301
www.bccresearch.com
information@bccresearch.com

TABLE OF CONTENTS

TOPIC	PAGE NO.
CHAPTER 1 INTRODUCTION	2
STUDY GOALS AND OBJECTIVES	2
REASONS FOR DOING THE STUDY	3
INTENDED AUDIENCE	3
METHODOLOGIES AND INFORMATION SOURCES	4
ANALYST'S CREDENTIALS	4
RELATED BCC RESEARCH REPORTS	5
BCC RESEARCH WEBSITE	5
DISCLAIMER	5
CHAPTER 2 EXECUTIVE SUMMARY	7
<i>SUMMARY TABLE GLOBAL PRECIOUS METALS MARKET, THROUGH 2019 (\$ BILLIONS)</i>	8
<i>SUMMARY FIGURE A GLOBAL PRECIOUS METALS MARKET, 2011-2019 (\$ BILLIONS)</i>	8
<i>SUMMARY FIGURE B PRECIOUS METALS MARKET SIZE BY CATEGORY, 2013 AND 2019 (%)</i>	8
CHAPTER 3 OVERVIEW: PRECIOUS METALS	11
<i>FIGURE 1 PERIODIC TABLE AND POSITION OF PRECIOUS METALS</i>	11
GOLD	12
SILVER	13
PLATINUM GROUP METALS	14
PLATINUM	14
PALLADIUM	14
RHODIUM	14
RUTHENIUM	15
IRIDIUM	15
OSMIUM	15
CHAPTER 4 OVERVIEW: GLOBAL GOLD MARKET	17
<i>FIGURE 2 MAP OF GLOBAL GOLD RESERVES</i>	17
GOLD MINING COMPANIES	17
<i>TABLE 1 MEMBER COMPANIES IN THE WORLD GOLD COUNCIL</i>	18
<i>FIGURE 3 COMPARISON OF GOLD RESERVES IN VARIOUS COMPANY MINES, BY QUANTITY AND QUALITY</i>	18
<i>FIGURE 4 GOLD PRODUCTION AT TOP TEN COMPANIES, 2013 (MILLIONS OZ.)</i>	19
<i>FIGURE 5 GOLD RESERVES AT TOP TEN COMPANIES, 2013 (MILLIONS OZ.)</i>	20
<i>FIGURE 6 GLOBAL GOLD PRICES, 2004-2019 (\$/OZ.)</i>	21
<i>TABLE 2 GLOBAL GOLD PRICES, THROUGH 2019 (\$/OZ.)</i>	22
<i>FIGURE 7 GLOBAL GOLD PRODUCTION FROM MINES, 2004-2013 (METRIC TONS)</i>	22
<i>TABLE 3 GLOBAL GOLD PRODUCTION FROM MINES, THROUGH 2019 (METRIC TONS)</i>	23
<i>FIGURE 8 GLOBAL GOLD RECYCLING, 2007-2013 (METRIC TONS)</i>	24
<i>TABLE 4 GOLD MINE PRODUCTION BY COUNTRY, THROUGH 2019 (METRIC TONS)</i>	24
<i>FIGURE 9 GOLD MINE PRODUCTION BY COUNTRY, 2013 (%)</i>	25
GLOBAL GOLD MARKET-APPLICATIONS	26
MONEY AND JEWELRY	27

TOPIC	PAGE NO.
ELECTRONICS	27
DENTISTRY	27
ENGINEERING	28
FDA-APPROVED LIST OF MEDICAL APPLICATIONS OF GOLD	28
<i>FIGURE 10 NUMBER OF FDA 510K APPROVALS SINCE 1976 IN WHICH GOLD IS MENTIONED, 1976-2014</i>	28
<i>TABLE 5 SELECTED LIST OF FDA-LISTED COMPANIES WITH GOLD PRODUCTS FOR MEDICAL APPLICATIONS</i>	29
GOLD EXCHANGE TRADED FUNDS	30
<i>FIGURE 11 GLOBAL ETF HOLDINGS IN GOLD, 2007-2019 (MILLION OZ.)</i>	30
<i>TABLE 6 GLOBAL ETF HOLDINGS IN GOLD, THROUGH 2019 (MILLIONS OZ.)</i>	31
CENTRAL BANKS - STRONG INFLUENCER	31
<i>FIGURE 12 NET GOLD SALES BY EUROPEAN CENTRAL BANKS UNDER CBGA 1, 2 AND 3, 2000-2013 (METRIC TONS)</i>	31
<i>FIGURE 13 NET GOLD PURCHASES BY CENTRAL BANKS OF THE WORLD BY YEAR, 2004-2013 (METRIC TONS)</i>	32
<i>FIGURE 14 OFFICIAL GOLD HOLDINGS BY CENTRAL BANKS OF THE WORLD AS A PERCENTAGE OF TOTAL RESERVES, 2011-2013</i>	33
<i>FIGURE 15 NET GOLD HOLDINGS BY CENTRAL BANKS OF THE WORLD, APRIL 2014 (METRIC TONS, TOTAL = 31,829 MT)</i>	34
<i>FIGURE 16 VALUE OF GOLD HOLDINGS BY CENTRAL BANKS, 2012 DATA (%)</i>	35
GOLD DEMAND - STATISTICS	36
<i>FIGURE 17 GLOBAL GOLD DEMAND BY SEGMENT, 2004-2013 (METRIC TONS)</i>	36
<i>FIGURE 18 GLOBAL GOLD DEMAND BY SEGMENT, 2004-2013 (\$ BILLIONS)</i>	37
<i>TABLE 7 GLOBAL DEMAND FOR GOLD, METRIC TONS, 2004-2013 (METRIC TONS)</i>	38
<i>TABLE 8 GLOBAL DEMAND FOR GOLD, 2004-2013 (\$ BILLIONS)</i>	38
CASE STUDY - GOLD LOAN MARKET IN INDIA	39
BACKGROUND	39
PLAYERS AND MARKET SIZE	40
Manappuram Finance	40
<i>FIGURE 19 TOTAL INCOME FOR MANAPPURAM FINANCE, 2006-2013 (BILLION INR)</i>	40
Muthoot Finance	41
<i>FIGURE 20 GOLD LOAN PORTFOLIO OF MUTHOOT FINANCE, 2005-2013 (BILLION INR)</i>	41
<i>FIGURE 21 GOLD HOLDINGS OF MUTHOOT FINANCE, 2005-2014 (METRIC TONS)</i>	41
ROLE OF TECHNOLOGY	42
SUMMARY AND FUTURE	43
CHAPTER 5 OVERVIEW: GLOBAL SILVER MARKET	45
<i>TABLE 9 GLOBAL SUPPLY DATA FOR SILVER, 2008-2013 (MILLIONS OZ.)</i>	45
<i>FIGURE 22 GLOBAL SILVER SUPPLIES, 2008-2013 (MILLIONS OZ.)</i>	45
<i>TABLE 10 GLOBAL SUPPLY DATA FOR SILVER, 2008-2013 (\$ BILLIONS)</i>	46
<i>TABLE 11 SILVER MINE PRODUCTION BY COUNTRY, 2011-2013 (METRIC TONS)</i>	47
<i>FIGURE 23 SILVER MINE PRODUCTION BY COUNTRY, 2013 (%)</i>	48
SILVER MINING COMPANIES	49
<i>TABLE 12 COMPANIES RELATED TO THE SILVER INSTITUTE</i>	49
<i>FIGURE 24 SILVER PRODUCTION AT TOP TEN COMPANIES, 2013 (MILLION OZ.)</i>	49
<i>TABLE 13 GLOBAL DEMAND DATA FOR SILVER, 2008-2013 (MILLION OZ.)</i>	51
<i>TABLE 14 GLOBAL DEMAND FOR SILVER, THROUGH 2013 (\$ BILLIONS)</i>	51

TOPIC	PAGE NO.
<i>FIGURE 25 GLOBAL SILVER MARKET, 2008-2019 (\$ BILLIONS)</i>	52
<i>TABLE 15 GLOBAL SILVER MARKET, THROUGH 2019 ESTIMATES (\$ BILLIONS)</i>	52
<i>FIGURE 26 GLOBAL MARKET PRICES FOR SILVER, 2008-2019 ESTIMATE (\$/OZ.)</i>	52
<i>TABLE 16 GLOBAL MARKET PRICES FOR SILVER, THROUGH 2019 (\$/OZ)</i>	53
FDA-APPROVED LIST OF MEDICAL APPLICATIONS OF SILVER	54
<i>TABLE 17 NUMBER OF FDA 510K APPROVALS IN WHICH SILVER IS MENTIONED, 1976-2014</i>	54
<i>TABLE 18 SELECTED LIST OF FDA-APPROVED COMPANIES WITH SILVER PRODUCTS FOR MEDICAL APPLICATIONS</i>	55
CHAPTER 6 OVERVIEW: GLOBAL PGM MARKET	58
<i>TABLE 19 GLOBAL PGM MARKET, THROUGH 2019 (\$ BILLIONS)</i>	58
<i>FIGURE 27 GLOBAL PGM MARKET, 2009-2019 ESTIMATE (\$ BILLIONS)</i>	58
<i>TABLE 20 MAJOR PLAYERS FOR EACH OF THE PGM GROUP METALS AND MARKET SHARE, 2012 (%)</i>	59
<i>TABLE 21 MAJOR USES FOR PGM METALS BY INDUSTRY</i>	60
PLATINUM	62
<i>FIGURE 28 GLOBAL PLATINUM MARKET, 1997-2013, 2019 ESTIMATE (\$ BILLIONS)</i>	62
<i>FIGURE 29 GLOBAL PLATINUM DEMAND, 1997-2013, 2019 ESTIMATE (THOUSANDS OZ.)</i>	63
<i>FIGURE 30 GLOBAL PLATINUM PRICES, 1997-2019 ESTIMATE (\$/OZ.)</i>	64
<i>TABLE 22 GLOBAL PLATINUM MARKET, 1997-2013 AND 2019 ESTIMATE</i>	65
<i>TABLE 23 GLOBAL PLATINUM MARKET DEMAND AND SUPPLY, 2008-2013 (THOUSAND OZ)</i>	67
<i>FIGURE 31 DISTRIBUTION OF PLATINUM MINE SUPPLY, BY REGION, 2013 (%)</i>	67
<i>TABLE 24 GLOBAL PLATINUM SUPPLY BY REGION, 2008-2013 (THOUSAND OZ.)</i>	68
<i>TABLE 25 GLOBAL PLATINUM DEMAND BY MARKET SEGMENT, 2008-2013 (THOUSAND OZ.)</i>	68
<i>TABLE 26 GLOBAL PLATINUM DEMAND FOR AUTOCATALYTIC MARKET, BY REGION, 2008-2013 (THOUSAND OZ.)</i>	69
<i>FIGURE 32 PLATINUM DEMAND FOR AUTOCATALYST MARKET, BY REGION, 2013 (%)</i>	69
<i>TABLE 27 GLOBAL PLATINUM DEMAND FOR JEWELRY MARKET, BY REGION, 2008-2013 (THOUSAND OZ)</i>	70
<i>FIGURE 33 PLATINUM DEMAND FOR JEWELRY MARKET, BY REGION, 2013 (%)</i>	71
FDA-APPROVED LIST OF MEDICAL APPLICATIONS OF PLATINUM	71
<i>TABLE 28 SELECTED LIST OF FDA-APPROVED COMPANIES WITH PLATINUM PRODUCTS FOR MEDICAL APPLICATIONS</i>	71
ETF HOLDINGS OF PLATINUM	72
<i>FIGURE 34 CHANGES IN GLOBAL PLATINUM ETF HOLDINGS, 2007-2013 (THOUSAND OZ.)</i>	72
PALLADIUM	73
<i>FIGURE 35 GLOBAL PALLADIUM MARKET, 1997-2019 ESTIMATE (\$ BILLIONS)</i>	73
<i>FIGURE 36 GLOBAL PALLADIUM DEMAND, 1997-2019 ESTIMATE, (THOUSAND OZ.)</i>	74
<i>FIGURE 37 GLOBAL PALLADIUM PRICES, 1997-2013, 2019 ESTIMATE (\$/OZ.)</i>	75
<i>TABLE 29 GLOBAL PALLADIUM MARKET, 1997-2019 ESTIMATE</i>	76
<i>TABLE 30 GLOBAL PALLADIUM MARKET DEMAND AND SUPPLY, 2008-2013 (THOUSAND OZ)</i>	76
<i>TABLE 31 GLOBAL PALLADIUM SUPPLY BY REGION, 2008-2013 (THOUSAND OZ)</i>	77
<i>FIGURE 38 DISTRIBUTION OF PALLADIUM SUPPLIES, BY REGION, 2013 (%)</i>	77

TOPIC	PAGE NO.
<i>TABLE 32 GLOBAL PALLADIUM DEMAND BY MARKET SEGMENT, 2008-2013 (THOUSAND OZ)</i>	78
<i>TABLE 33 GLOBAL PALLADIUM DEMAND FOR AUTOCATALYTIC MARKET, BY REGION, 2008-2013 (THOUSANDS OZ.)</i>	79
<i>TABLE 34 GLOBAL PALLADIUM DEMAND FOR ELECTRICAL MARKET, BY REGION, 2008-2013 (THOUSAND OZ)</i>	79
FDA-APPROVED LIST OF MEDICAL APPLICATIONS OF PALLADIUM	80
<i>TABLE 35 FDA-APPROVED COMPANIES WITH PALLADIUM PRODUCTS FOR MEDICAL APPLICATIONS</i>	80
ETF HOLDINGS OF PALLADIUM	80
<i>FIGURE 39 CHANGES IN GLOBAL PALLADIUM ETF HOLDINGS, 2007-2013 (THOUSAND OZ.)</i>	81
RHODIUM	81
<i>TABLE 36 GLOBAL RHODIUM MARKET 1997-2019 ESTIMATE</i>	82
<i>TABLE 37 GLOBAL RHODIUM MARKET DEMAND AND SUPPLY, 2008-2013 (THOUSAND OZ)</i>	82
<i>TABLE 38 GLOBAL RHODIUM SUPPLY BY REGION, 2008-2013 (THOUSAND OZ)</i>	83
<i>FIGURE 40 DISTRIBUTION OF RHODIUM SUPPLIES, BY REGION, 2013 (%)</i>	83
<i>TABLE 39 GLOBAL RHODIUM DEMAND BY MARKET SEGMENT, 2008-2013 (THOUSAND OZ)</i>	84
<i>FIGURE 41 RHODIUM MARKET DEMAND BY CATEGORY, 2013 (%)</i>	84
RUTHENIUM	85
<i>TABLE 40 GLOBAL RUTHENIUM MARKET, 2005-2019 ESTIMATE</i>	86
<i>TABLE 41 GLOBAL RUTHENIUM DEMAND BY MARKET SEGMENT, 2008-2013 (THOUSAND OZ)</i>	86
IRIDIUM	87
<i>TABLE 42 GLOBAL IRIDIUM MARKET, 2005-2013, 2019 ESTIMATE</i>	87
<i>TABLE 43 GLOBAL IRIDIUM DEMAND BY MARKET SEGMENT, 2008-2013 (THOUSAND OZ)</i>	88
CHAPTER 7 REGULATIONS AND GOVERNMENT CONTROLS	90
MINING REGULATIONS	90
ARGENTINA	90
AUSTRALIA	90
CANADA	91
CHILE	92
GUINEA	92
INDONESIA	93
MEXICO	93
MOZAMBIQUE	94
NEW CALEDONIA	94
PERU	95
RUSSIA	96
SOUTH AFRICA	96
Mines in South Africa - Historic Changes	97
UNITED STATES	97
CYANIDE CODE	98
MINING ROYALTIES	98
RISK FACTORS FACED BY THE MINING COMPANIES	99

TOPIC	PAGE NO.
CHAPTER 8 PATENT ANALYSIS	101
GOLD	101
<i>FIGURE 42 NUMBER OF U.S. PATENTS ISSUED SINCE 1976 ON GOLD TECHNOLOGIES AND APPLICATIONS, BY FIVE-YEAR PERIOD</i>	101
<i>FIGURE 43 U.S. PATENTS ISSUED RELATED TO GOLD, BY SELECTED APPLICATION SEGMENTS, 1976-2013 (%)</i>	102
GOLD AS A CATALYST	103
<i>TABLE 44 U.S. PATENTS AWARDED ON GOLD AS A CATALYST FOR VINYL ACETATE MANUFACTURING</i>	103
<i>TABLE 45 U.S. PATENTS AWARDED ON GOLD AS A CATALYST FOR EXHAUST AND OTHER APPLICATIONS</i>	105
GOLD IN THE DENTAL INDUSTRY	105
<i>TABLE 46 U.S. PATENTS ON GOLD FOR DENTAL APPLICATIONS</i>	106
GOLD IN ELECTRONICS APPLICATIONS	107
<i>TABLE 47 U.S. PATENTS ON GOLD FOR ELECTRONICS APPLICATIONS</i>	107
GOLD IN ELECTRIC APPLICATIONS	108
<i>TABLE 48 U.S. PATENTS ON GOLD FOR ELECTRIC APPLICATIONS</i>	108
GOLD IN JEWELRY APPLICATIONS	109
<i>TABLE 49 U.S. PATENTS ON GOLD FOR JEWELRY APPLICATIONS</i>	109
SILVER	111
<i>FIGURE 44 NUMBER OF U.S. PATENTS ISSUED SINCE 1976 ON SILVER TECHNOLOGIES AND APPLICATIONS, BY FIVE-YEAR PERIOD</i>	111
<i>FIGURE 45 NUMBER OF U.S. PATENTS ISSUED SINCE 1976 ON SILVER HALIDE TECHNOLOGIES, BY FIVE-YEAR PERIOD</i>	112
<i>FIGURE 46 NUMBER OF U.S. PATENTS ISSUED SINCE 1976 ON SILVER TO NON-SILVER HALIDE TECHNOLOGIES, BY FIVE-YEAR PERIOD</i>	112
<i>FIGURE 47 NUMBER OF U.S. PATENTS ISSUED ON SILVER, BY SELECTED APPLICATION SEGMENTS, 1976-2013</i>	113
SILVER AS AN ANTIMICROBIAL AGENT	114
<i>FIGURE 48 NUMBER OF U.S. PATENTS ISSUED SINCE 1976 THAT DESCRIBE SILVER ANTIMICROBIAL TECHNOLOGIES, BY FIVE-YEAR PERIOD</i>	114
<i>TABLE 50 COMPANIES WITH PATENTS FOR ANTIMICROBIAL APPLICATIONS OF SILVER</i>	115
SILVER AS A CATALYST	116
PLATINUM	116
<i>FIGURE 49 NUMBER OF U.S. PATENTS ISSUED SINCE 1976 ON PLATINUM TECHNOLOGIES AND APPLICATIONS, BY FIVE-YEAR PERIOD</i>	117
<i>FIGURE 50 NUMBER OF U.S. PATENTS ISSUED ON PLATINUM, BY SELECTED APPLICATION SEGMENTS, 1976-2013</i>	117
PLATINUM AS A CATALYST	118
<i>TABLE 51 COMPANIES WITH PATENTS ON FUEL CELL APPLICATIONS OF PLATINUM</i>	119
<i>TABLE 52 COMPANIES WITH PATENTS ON EXHAUST APPLICATIONS OF PLATINUM</i>	120
PLATINUM SENSORS	120
<i>TABLE 53 COMPANIES WITH PATENTS ON SENSOR APPLICATIONS OF PLATINUM</i>	121
PLATINUM IN JEWELRY	121
<i>TABLE 54 PATENTS ON PLATINUM USE IN JEWELRY</i>	122
PALLADIUM	123
<i>FIGURE 51 NUMBER OF U.S. PATENTS ISSUED SINCE 1976 ON PALLADIUM TECHNOLOGIES AND APPLICATIONS, BY FIVE-YEAR PERIOD</i>	123

TOPIC	PAGE NO.
<i>FIGURE 52 NUMBER OF U.S. PATENTS ISSUED ON PLATINUM, BY SELECTED APPLICATION SEGMENTS, 1976-2013</i>	123
RHODIUM, RUTHENIUM AND IRIIDIUM	124
<i>FIGURE 53 NUMBER OF U.S. PATENTS ISSUED SINCE 1976 ON RHODIUM, RUTHENIUM AND IRIIDIUM TECHNOLOGIES, AND SHARE OF PATENTS ON CATALYSTS</i>	124
CHAPTER 9 COMPANY PROFILES	127
<i>TABLE 55 MAJOR COMPANIES IN THE GLOBAL PRECIOUS METALS MARKET</i>	127
AGNICO EAGLE MINES LTD.	128
PRODUCTS	128
<i>TABLE 56 PRECIOUS METALS PRODUCTION FOR AGNICO EAGLE, 2011-2013 (THOUSAND OZ.)</i>	129
<i>TABLE 57 GOLD AND SILVER PRODUCTION FOR AGNICO EAGLE BY MINE, FY 2013 (THOUSAND OZ)</i>	129
FINANCIALS	129
<i>TABLE 58 REVENUES FOR AGNICO EAGLE 2011-2013, BY METAL MINED (\$ MILLIONS)</i>	129
ALMADEN MINERALS LTD.	130
SUBSIDIARIES	130
PROPERTIES OF INTEREST	130
<i>TABLE 59 ALMADEN MINERALS, LIST OF PROPERTIES</i>	131
FINANCIALS	132
<i>TABLE 60 FINANCIAL RESULTS FOR ALMADEN MINERALS, 2009-2013 (CANADIAN \$ THOUSANDS)</i>	132
AMADOR GOLD CORP.	132
PROPERTIES OF INTEREST	132
<i>TABLE 61 AMADOR GOLD CORP., LIST OF PROPERTIES</i>	133
FINANCIALS	133
<i>TABLE 62 FINANCIAL RESULTS FOR AMADOR GOLD CORP., 2009-2013 (CANADIAN \$ THOUSANDS)</i>	133
ANGLO AMERICAN PLATINUM	133
LOCATIONS	134
<i>TABLE 63 PGM PRODUCTION DATA FOR AMPLATS, 2009 TO 2013</i>	134
COMPETITORS	134
CUSTOMERS AND APPLICATIONS	135
<i>TABLE 64 SOUTH AFRICAN PLATINUM JEWELERS</i>	135
PATENTS	136
<i>TABLE 65 PATENTS ASSIGNED TO ANGLO AMERICAN PLATINUM</i>	137
FINANCIALS	137
<i>TABLE 66 REVENUES FOR AMPLATS, 2009-2013 (MILLIONS RANDS)</i>	137
ANGLOGOLD ASHANTI LTD.	137
LOCATIONS	138
<i>TABLE 67 OPERATION LOCATIONS FOR ANGLOGOLD ASHANTI</i>	138
PRODUCTS	139
<i>TABLE 68 GOLD AND SILVER PRODUCTION FOR ANGLOGOLD ASHANTI BY REGION, 2011-2013, (THOUSAND OZ)</i>	139
<i>FIGURE 54 GOLD PRODUCTION FOR ANGLOGOLD ASHANTI BY REGION, 2013 (%)</i>	139
FINANCIALS	140

TOPIC	PAGE NO.
<i>TABLE 69 REVENUES FOR ANGLOGOLD ASHANTI BY REGION, 2009-2013, (\$ MILLIONS)</i>	140
BARRICK GOLD CORP.	141
PRODUCING MINES AND CAPITAL PROJECTS	141
<i>TABLE 70 PRODUCING MINES AND CAPITAL PROJECTS FOR BARRICK GOLD</i>	141
<i>TABLE 71 JOINT PROJECTS BETWEEN BARRICK GOLD AND OTHER COMPANIES</i>	142
PATENTS	142
<i>TABLE 72 PATENTS ASSIGNED TO BARRICK GOLD</i>	142
FINANCIALS	143
<i>TABLE 73 REVENUES FOR BARRICK GOLD 2009-2013 (\$ MILLIONS)</i>	143
BHP BILLITON LTD.	144
PRODUCTION DATA	144
<i>TABLE 74 GOLD PRODUCTION DATA FOR BHP BILLITON, 2009-2013 (THOUSAND OZ)</i>	144
<i>TABLE 75 SILVER PRODUCTION DATA FOR BHP BILLITON, 2009-2013 (THOUSAND OZ)</i>	145
PATENTS	145
<i>TABLE 76 PATENTS ASSIGNED TO BHP BILLITON RELATED TO GOLD OR SILVER</i>	145
BUENAVENTURA	145
PRODUCTS	146
<i>TABLE 77 GOLD AND SILVER PRODUCTION DATA FOR BUENAVENTURA, 2013 (OZ.)</i>	146
CUSTOMERS	147
<i>TABLE 78 REVENUES FOR BUENAVENTURA, BY CUSTOMER, 2012-2013 (%)</i>	147
<i>FIGURE 55 REVENUES FOR BUENAVENTURA, BY METAL, 2013 (%)</i>	147
FINANCIALS	148
<i>TABLE 79 GOLD AND SILVER SALES FOR BUENAVENTURA, BY VOLUME AND PRICE, 2011-2013</i>	148
<i>TABLE 80 REVENUES FOR BUENAVENTURA, BY METAL, 2012-2013 (\$ THOUSANDS)</i>	149
<i>TABLE 81 FINANCIALS FOR BUENAVENTURA, 2010-2013 (\$ MILLIONS)</i>	149
CENTERRA GOLD INC.	150
PRODUCTS	150
<i>FIGURE 56 GOLD PRODUCTION AT CENTERRA GOLD, 2009-2013 (THOUSAND OZ.)</i>	150
LOCATIONS	151
FINANCIALS	151
<i>TABLE 82 FINANCIALS FOR CENTERRA GOLD, 2011-2013 (\$ MILLIONS)</i>	151
CHINA MINMETALS CORP.	152
CODELCO CHILE	152
PRODUCTION DATA	153
<i>TABLE 83 GOLD AND SILVER PRODUCTION DATA FOR CODELCO, 2010-2013 (METRIC TONS AND \$ MILLIONS)</i>	153
COEUR MINING INC.	153
LOCATIONS	154
PRODUCTS	154
<i>FIGURE 57 SILVER PRODUCTION AT COEUR MINING, 2008-2013 (MILLION OZ)</i>	154
<i>FIGURE 58 GOLD PRODUCTION AT COEUR MINING, 2008-2013 (THOUSANDS OZ.)</i>	155
FINANCIALS	156
<i>TABLE 84 FINANCIALS FOR COEUR MINING, 2009-2013 (\$ MILLIONS)</i>	156
FREEMPORT-MCMORAN COPPER & GOLD INC.	156

TOPIC	PAGE NO.
PRODUCTION DATA	157
TABLE 85 GOLD PRODUCTION FOR FREEPORT-MCMORAN, 2009-2013	157
PATENTS	157
TABLE 86 PATENTS ASSIGNED TO FREEPORT-MCMORAN ON PRECIOUS METALS	157
FRESNILLO PLC	158
PRODUCTS	158
FIGURE 59 SILVER PRODUCTION AT FRESNILLO, 2009-2013 (MILLIONS OZ.)	158
FIGURE 60 GOLD PRODUCTION AT FRESNILLO, 2008-2013 (THOUSANDS OZ.)	159
TABLE 87 GOLD AND SILVER PRODUCTION DATA FOR FRESNILLO, BY LOCATION, 2013	159
FINANCIALS	160
TABLE 88 FINANCIALS FOR FRESNILLO, 2012-2013 (\$ MILLIONS)	160
GLENCORE XSTRATA PLC	160
PRODUCTION DATA	161
TABLE 89 PRECIOUS METALS DATA FOR GLENCORE XSTRATA, 2012-2013 (THOUSANDS OZ.)	161
PATENTS	161
TABLE 90 PATENTS ASSIGNED TO GLENCORE XSTRATA	162
GOLDCORP INC.	162
PRODUCTION DATA	163
TABLE 91 GOLD AND SILVER PRODUCTION DATA FOR GOLDCORP, BY LOCATION, 2012 AND 2013 DATA (THOUSAND OZ)	163
FINANCIALS	163
TABLE 92 REVENUES FOR GOLDCORP, 2011-2013 (\$ MILLIONS)	164
GOLD FIELDS LTD.	164
OPERATIONS	165
TABLE 93 GOLD PRODUCTION FOR GOLD FIELDS, 2011-2013 (THOUSAND OZ)	165
FINANCIALS	166
TABLE 94 FINANCIALS FOR GOLD FIELDS, 2011-2013 (MILLION RANDS)	166
GREAT BASIN GOLD LTD.	166
IMPALA PLATINUM HOLDINGS LTD.	167
PRODUCTS	167
TABLE 95 PGM PRODUCTION AND SALES FOR IMPALA PLATINUM, 2009-2013	167
LOCATIONS	168
TABLE 96 PGM PRODUCTION AT IMPALA PLATINUM BY LOCATION, 2012-2013 (THOUSAND OZ)	169
FINANCIALS	169
TABLE 97 METAL SALES REVENUES FOR IMPALA PLATINUM, 2009-2013 (\$ MILLIONS)	169
TABLE 98 FINANCIALS FOR IMPALA PLATINUM, 2009-2013 (MILLION RANDS)	170
KGHM POLSKA MIEDZ S.A.	170
PRODUCTS	171
FIGURE 61 SILVER PRODUCTION AT KGHM, 2000-2013 (MILLIONS OZ)	171
LOCATIONS	172
FINANCIALS	172
TABLE 99 SALES FOR KGHM, BY COUNTRY, 2012 AND 2013 (PLN MILLIONS)	173
TABLE 100 REVENUES FOR KGHM, 2011-2013 (PLN MILLIONS)	173
KINROSS GOLD CORP.	174

TOPIC	PAGE NO.
SUBSIDIARIES	174
TABLE 101 GOLD PRODUCTION AND RESERVES FOR KINROSS, 2005-2013 (MILLIONS OZ.)	175
FINANCIALS	175
TABLE 102 METAL SALES REVENUES FOR KINROSS, BY LOCATION, 2011-2013 (\$ MILLIONS)	176
TABLE 103 METAL SALES REVENUES FOR KINROSS, BY REGION, 2011-2013 (\$ MILLIONS)	176
TABLE 104 FINANCIALS FOR KINROSS, 2011-2013 (\$ MILLIONS)	176
MILLIKEN HEALTHCARE PRODUCTS LLC	177
TABLE 105 PATENTS ASSIGNED TO MILLIKEN COMPANY FOR SILVER- RELATED TECHNOLOGIES	177
MMC NORILSK NICKEL	178
OPERATIONS	178
TABLE 106 PLATINUM AND PALLADIUM PRODUCTION FOR MMC NORILSK NICKEL, 2005-2013 (THOUSAND OZ)	178
TABLE 107 PGM PRODUCTION FOR MMC NORILSK NICKEL, BY LOCATION, 2010-2013 (THOUSAND OZ)	179
FINANCIALS	179
TABLE 108 FINANCIALS FOR MMC NORILSK NICKEL, 2010-2013 (\$ MILLIONS)	179
NEWCREST MINING LTD.	180
LOCATIONS	180
PRODUCTION DATA AND RESERVES	180
TABLE 109 GOLD AND COPPER RESOURCES AND PRODUCTION AT NEWCREST, 2013	181
FINANCIALS	181
TABLE 110 FINANCIALS FOR NEWCREST, 2011-2013 (A\$ MILLIONS)	181
NEWMONT MINING CORP.	181
LOCATIONS	182
TABLE 111 GOLD PRODUCTION FOR NEWMONT, BY REGION, 2011-2013 (THOUSAND OZ)	183
TABLE 112 GOLD PRODUCTION AND SALES FOR NEWMONT, 2011-2013 (MILLIONS OZ.)	183
FINANCIALS	183
TABLE 113 FINANCIALS FOR NEWMONT, 2011-2013 (\$ MILLIONS)	184
TABLE 114 GOLD REVENUES FOR NEWMONT, BY REGION, 2011-2013 (\$ MILLIONS)	184
PAN AMERICAN SILVER CORP.	184
TABLE 115 METAL PRODUCTION FOR PAN AMERICAN, BY LOCATION, 2011-2013 (THOUSAND OZ)	185
FINANCIALS	185
TABLE 116 REVENUES FOR PAN AMERICAN, 2010-2012 (\$ MILLIONS)	185
POLYMETAL INTERNATIONAL PLC	186
LOCATIONS	187
TABLE 117 GOLD EQUIVALENT PRODUCTION FOR POLYMETAL, BY LOCATION, 2008-2013 (THOUSANDS OZ.)	187
FINANCIALS	188
TABLE 118 REVENUES FOR POLYMETAL, BY SEGMENT, 2013 (\$ THOUSANDS)	188
TABLE 119 REVENUES FOR POLYMETAL, BY REGION, 2012-2013 (\$ THOUSANDS)	188
TABLE 120 REVENUES FOR POLYMETAL, BY METAL, 2012-2013	189
TABLE 121 FINANCIALS FOR POLYMETAL, 2011-2013 (\$ MILLIONS)	189

TOPIC	PAGE NO.
POLYUS GOLD INTERNATIONAL LTD.	190
PRODUCTS	190
<i>FIGURE 62 GOLD PRODUCTION AT POLYUS, 2009-2013 (THOUSAND OZ.)</i>	190
LOCATIONS	191
<i>TABLE 122 GOLD PRODUCTION AT POLYUS, BY MINE, 2012-2013 (THOUSANDS OZ.)</i>	191
<i>TABLE 123 FINANCIALS FOR POLYUS, SEGMENT DATA, 2012-2013 (\$ MILLIONS)</i>	191
FINANCIALS	192
<i>TABLE 124 FINANCIALS FOR POLYUS, 2012-2013 (\$ MILLIONS)</i>	192
RIO TINTO PLC	192
<i>TABLE 125 GOLD PRODUCTION FOR RIO TINTO, BY LOCATION, 2011-2013 (THOUSANDS OZ.)</i>	193
<i>TABLE 126 SILVER PRODUCTION FOR RIO TINTO, BY LOCATION, 2011-2013 (THOUSANDS OZ.)</i>	193
FINANCIALS	193
<i>TABLE 127 FINANCIALS FOR COPPER SEGMENT OF RIO TINTO, 2011-2013 (\$ MILLIONS)</i>	194
SILVER WHEATON CORP.	194
<i>TABLE 128 GOLD AND SILVER PRODUCTION FOR SILVER WHEATON, BY LOCATION, 2012-2013 (THOUSANDS OZ.)</i>	195
FINANCIALS	195
<i>TABLE 129 REVENUES FOR SILVER WHEATON, BY LOCATION, 2012-2013 (\$ MILLIONS)</i>	195
<i>TABLE 130 FINANCIALS FOR SILVER WHEATON, 2012-2013 (\$ MILLIONS)</i>	196
SOUTHERN COPPER CORP.	196
LOCATIONS	197
FINANCIALS	197
<i>TABLE 131 SILVER REVENUES FOR SOUTHERN COPPER, 2011-2013 (\$ MILLIONS)</i>	197
TECK RESOURCES LTD.	198
GOLD AND SILVER	198
VALE	198
PGMS AND PRECIOUS METALS	199
<i>TABLE 132 PGM AND PRECIOUS METALS PRODUCTION BY VALE, 2011-2013 (THOUSANDS OZ.)</i>	199
FINANCIALS	200
<i>TABLE 133 PGM AND PRECIOUS METALS SALES FOR VALE, 2011-2013</i>	200
VEDANTA RESOURCES PLC	200
VOLCAN COMPANIA MINERA S.A.A	201
PRODUCTS	201
LOCATIONS	201
<i>TABLE 134 SILVER PRODUCTION FOR VOLCAN, BY LOCATION, 2012 AND 2013 (THOUSANDS OZ.)</i>	201
FINANCIALS	201
<i>TABLE 135 REVENUES FOR VOLCAN, 2011-2013 (\$ THOUSANDS)</i>	202
YAMANA GOLD INC.	202
PRODUCTS	203
LOCATIONS	203
<i>TABLE 136 GOLD PRODUCTION FOR YAMANA, BY LOCATION, 2012 AND 2013 (THOUSANDS OZ.)</i>	203

TOPIC	PAGE NO.
OSISKO ACQUISITION	204
FINANCIALS	204
<i>TABLE 137 FINANCIALS FOR YAMANA, 2011-2013 (\$ MILLIONS)</i>	204
ZIJIN MINING GROUP CO. LTD.	204
GOLD AND SILVER	204

LIST OF TABLES

TABLE HEADING	PAGE NO.
SUMMARY TABLE GLOBAL PRECIOUS METALS MARKET, THROUGH 2019 (\$ BILLIONS)	8
TABLE 1 MEMBER COMPANIES IN THE WORLD GOLD COUNCIL	18
TABLE 2 GLOBAL GOLD PRICES, THROUGH 2019 (\$/OZ.)	22
TABLE 3 GLOBAL GOLD PRODUCTION FROM MINES, THROUGH 2019 (METRIC TONS)	23
TABLE 4 GOLD MINE PRODUCTION BY COUNTRY, THROUGH 2019 (METRIC TONS)	24
TABLE 5 SELECTED LIST OF FDA-LISTED COMPANIES WITH GOLD PRODUCTS FOR MEDICAL APPLICATIONS	29
TABLE 6 GLOBAL ETF HOLDINGS IN GOLD, THROUGH 2019 (MILLIONS OZ.)	31
TABLE 7 GLOBAL DEMAND FOR GOLD, METRIC TONS, 2004-2013 (METRIC TONS)	38
TABLE 8 GLOBAL DEMAND FOR GOLD, 2004-2013 (\$ BILLIONS)	38
TABLE 9 GLOBAL SUPPLY DATA FOR SILVER, 2008-2013 (MILLIONS OZ.)	45
TABLE 10 GLOBAL SUPPLY DATA FOR SILVER, 2008-2013 (\$ BILLIONS)	46
TABLE 11 SILVER MINE PRODUCTION BY COUNTRY, 2011-2013 (METRIC TONS)	47
TABLE 12 COMPANIES RELATED TO THE SILVER INSTITUTE	49
TABLE 13 GLOBAL DEMAND DATA FOR SILVER, 2008-2013 (MILLION OZ.)	51
TABLE 14 GLOBAL DEMAND FOR SILVER, THROUGH 2013 (\$ BILLIONS)	51
TABLE 15 GLOBAL SILVER MARKET, THROUGH 2019 ESTIMATES (\$ BILLIONS)	52
TABLE 16 GLOBAL MARKET PRICES FOR SILVER, THROUGH 2019 (\$/OZ)	53
TABLE 17 NUMBER OF FDA 510K APPROVALS IN WHICH SILVER IS MENTIONED, 1976-2014	54
TABLE 18 SELECTED LIST OF FDA-APPROVED COMPANIES WITH SILVER PRODUCTS FOR MEDICAL APPLICATIONS	55
TABLE 19 GLOBAL PGM MARKET, THROUGH 2019 (\$ BILLIONS)	58
TABLE 20 MAJOR PLAYERS FOR EACH OF THE PGM GROUP METALS AND MARKET SHARE, 2012 (%)	59
TABLE 21 MAJOR USES FOR PGM METALS BY INDUSTRY	60
TABLE 22 GLOBAL PLATINUM MARKET, 1997-2013 AND 2019 ESTIMATE	65
TABLE 23 GLOBAL PLATINUM MARKET DEMAND AND SUPPLY, 2008-2013 (THOUSAND OZ)	67
TABLE 24 GLOBAL PLATINUM SUPPLY BY REGION, 2008-2013 (THOUSAND OZ.)	68
TABLE 25 GLOBAL PLATINUM DEMAND BY MARKET SEGMENT, 2008-2013 (THOUSAND OZ.)	68
TABLE 26 GLOBAL PLATINUM DEMAND FOR AUTOCATALYTIC MARKET, BY REGION, 2008-2013 (THOUSAND OZ.)	69
TABLE 27 GLOBAL PLATINUM DEMAND FOR JEWELRY MARKET, BY REGION, 2008-2013 (THOUSAND OZ)	70
TABLE 28 SELECTED LIST OF FDA-APPROVED COMPANIES WITH PLATINUM PRODUCTS FOR MEDICAL APPLICATIONS	71
TABLE 29 GLOBAL PALLADIUM MARKET, 1997-2019 ESTIMATE	76
TABLE 30 GLOBAL PALLADIUM MARKET DEMAND AND SUPPLY, 2008-2013 (THOUSAND OZ)	76
TABLE 31 GLOBAL PALLADIUM SUPPLY BY REGION, 2008-2013 (THOUSAND OZ)	77
TABLE 32 GLOBAL PALLADIUM DEMAND BY MARKET SEGMENT, 2008-2013 (THOUSAND OZ)	78
TABLE 33 GLOBAL PALLADIUM DEMAND FOR AUTOCATALYTIC MARKET, BY REGION, 2008-2013 (THOUSANDS OZ.)	79
TABLE 34 GLOBAL PALLADIUM DEMAND FOR ELECTRICAL MARKET, BY REGION, 2008-2013 (THOUSAND OZ)	79

TABLE HEADING	PAGE NO.
TABLE 35 FDA-APPROVED COMPANIES WITH PALLADIUM PRODUCTS FOR MEDICAL APPLICATIONS	80
TABLE 36 GLOBAL RHODIUM MARKET 1997-2019 ESTIMATE	82
TABLE 37 GLOBAL RHODIUM MARKET DEMAND AND SUPPLY, 2008-2013 (THOUSAND OZ)	82
TABLE 38 GLOBAL RHODIUM SUPPLY BY REGION, 2008-2013 (THOUSAND OZ)	83
TABLE 39 GLOBAL RHODIUM DEMAND BY MARKET SEGMENT, 2008-2013 (THOUSAND OZ)	84
TABLE 40 GLOBAL RUTHENIUM MARKET, 2005-2019 ESTIMATE	86
TABLE 41 GLOBAL RUTHENIUM DEMAND BY MARKET SEGMENT, 2008-2013 (THOUSAND OZ)	86
TABLE 42 GLOBAL IRIIDIUM MARKET, 2005-2013, 2019 ESTIMATE	87
TABLE 43 GLOBAL IRIIDIUM DEMAND BY MARKET SEGMENT, 2008-2013 (THOUSAND OZ)	88
TABLE 44 U.S. PATENTS AWARDED ON GOLD AS A CATALYST FOR VINYL ACETATE MANUFACTURING	103
TABLE 45 U.S. PATENTS AWARDED ON GOLD AS A CATALYST FOR EXHAUST AND OTHER APPLICATIONS	105
TABLE 46 U.S. PATENTS ON GOLD FOR DENTAL APPLICATIONS	106
TABLE 47 U.S. PATENTS ON GOLD FOR ELECTRONICS APPLICATIONS	107
TABLE 48 U.S. PATENTS ON GOLD FOR ELECTRIC APPLICATIONS	108
TABLE 49 U.S. PATENTS ON GOLD FOR JEWELRY APPLICATIONS	109
TABLE 50 COMPANIES WITH PATENTS FOR ANTIMICROBIAL APPLICATIONS OF SILVER	115
TABLE 51 COMPANIES WITH PATENTS ON FUEL CELL APPLICATIONS OF PLATINUM	119
TABLE 52 COMPANIES WITH PATENTS ON EXHAUST APPLICATIONS OF PLATINUM	120
TABLE 53 COMPANIES WITH PATENTS ON SENSOR APPLICATIONS OF PLATINUM	121
TABLE 54 PATENTS ON PLATINUM USE IN JEWELRY	122
TABLE 55 MAJOR COMPANIES IN THE GLOBAL PRECIOUS METALS MARKET	127
TABLE 56 PRECIOUS METALS PRODUCTION FOR AGNICO EAGLE, 2011-2013 (THOUSAND OZ.)	129
TABLE 57 GOLD AND SILVER PRODUCTION FOR AGNICO EAGLE BY MINE, FY 2013 (THOUSAND OZ)	129
TABLE 58 REVENUES FOR AGNICO EAGLE 2011-2013, BY METAL MINED (\$ MILLIONS)	129
TABLE 59 ALMADEN MINERALS, LIST OF PROPERTIES	131
TABLE 60 FINANCIAL RESULTS FOR ALMADEN MINERALS, 2009-2013 (CANADIAN \$ THOUSANDS)	132
TABLE 61 AMADOR GOLD CORP., LIST OF PROPERTIES	133
TABLE 62 FINANCIAL RESULTS FOR AMADOR GOLD CORP., 2009-2013 (CANADIAN \$ THOUSANDS)	133
TABLE 63 PGM PRODUCTION DATA FOR AMPLATS, 2009 TO 2013	134
TABLE 64 SOUTH AFRICAN PLATINUM JEWELERS	135
TABLE 65 PATENTS ASSIGNED TO ANGLO AMERICAN PLATINUM	137
TABLE 66 REVENUES FOR AMPLATS, 2009-2013 (MILLIONS RANDS)	137
TABLE 67 OPERATION LOCATIONS FOR ANGLOGOLD ASHANTI	138
TABLE 68 GOLD AND SILVER PRODUCTION FOR ANGLOGOLD ASHANTI BY REGION, 2011-2013, (THOUSAND OZ)	139
TABLE 69 REVENUES FOR ANGLOGOLD ASHANTI BY REGION, 2009-2013, (\$ MILLIONS)	140
TABLE 70 PRODUCING MINES AND CAPITAL PROJECTS FOR BARRICK GOLD	141
TABLE 71 JOINT PROJECTS BETWEEN BARRICK GOLD AND OTHER COMPANIES	142

TABLE HEADING	PAGE NO.
TABLE 72 PATENTS ASSIGNED TO BARRICK GOLD	142
TABLE 73 REVENUES FOR BARRICK GOLD 2009-2013 (\$ MILLIONS)	143
TABLE 74 GOLD PRODUCTION DATA FOR BHP BILLITON, 2009-2013 (THOUSAND OZ)	144
TABLE 75 SILVER PRODUCTION DATA FOR BHP BILLITON, 2009-2013 (THOUSAND OZ)	145
TABLE 76 PATENTS ASSIGNED TO BHP BILLITON RELATED TO GOLD OR SILVER	145
TABLE 77 GOLD AND SILVER PRODUCTION DATA FOR BUENAVENTURA, 2013 (OZ.)	146
TABLE 78 REVENUES FOR BUENAVENTURA, BY CUSTOMER, 2012-2013 (%)	147
TABLE 79 GOLD AND SILVER SALES FOR BUENAVENTURA, BY VOLUME AND PRICE, 2011-2013	148
TABLE 80 REVENUES FOR BUENAVENTURA, BY METAL, 2012-2013 (\$ THOUSANDS)	149
TABLE 81 FINANCIALS FOR BUENAVENTURA, 2010-2013 (\$ MILLIONS)	149
TABLE 82 FINANCIALS FOR CENTERRA GOLD, 2011-2013 (\$ MILLIONS)	151
TABLE 83 GOLD AND SILVER PRODUCTION DATA FOR CODELCO, 2010-2013 (METRIC TONS AND \$ MILLIONS)	153
TABLE 84 FINANCIALS FOR COEUR MINING, 2009-2013 (\$ MILLIONS)	156
TABLE 85 GOLD PRODUCTION FOR FREEPORT-MCMORAN, 2009-2013	157
TABLE 86 PATENTS ASSIGNED TO FREEPORT-MCMORAN ON PRECIOUS METALS	157
TABLE 87 GOLD AND SILVER PRODUCTION DATA FOR FRESNILLO, BY LOCATION, 2013	159
TABLE 88 FINANCIALS FOR FRESNILLO, 2012-2013 (\$ MILLIONS)	160
TABLE 89 PRECIOUS METALS DATA FOR GLENCORE XSTRATA, 2012-2013 (THOUSANDS OZ.)	161
TABLE 90 PATENTS ASSIGNED TO GLENCORE XSTRATA	162
TABLE 91 GOLD AND SILVER PRODUCTION DATA FOR GOLDCORP, BY LOCATION, 2012 AND 2013 DATA (THOUSAND OZ)	163
TABLE 92 REVENUES FOR GOLDCORP, 2011-2013 (\$ MILLIONS)	164
TABLE 93 GOLD PRODUCTION FOR GOLD FIELDS, 2011-2013 (THOUSAND OZ)	165
TABLE 94 FINANCIALS FOR GOLD FIELDS, 2011-2013 (MILLION RANDS)	166
TABLE 95 PGM PRODUCTION AND SALES FOR IMPALA PLATINUM, 2009-2013	167
TABLE 96 PGM PRODUCTION AT IMPALA PLATINUM BY LOCATION, 2012-2013 (THOUSAND OZ)	169
TABLE 97 METAL SALES REVENUES FOR IMPALA PLATINUM, 2009-2013 (\$ MILLIONS)	169
TABLE 98 FINANCIALS FOR IMPALA PLATINUM, 2009-2013 (MILLION RANDS)	170
TABLE 99 SALES FOR KGHM, BY COUNTRY, 2012 AND 2013 (PLN MILLIONS)	173
TABLE 100 REVENUES FOR KGHM, 2011-2013 (PLN MILLIONS)	173
TABLE 101 GOLD PRODUCTION AND RESERVES FOR KINROSS, 2005-2013 (MILLIONS OZ.)	175
TABLE 102 METAL SALES REVENUES FOR KINROSS, BY LOCATION, 2011-2013 (\$ MILLIONS)	176
TABLE 103 METAL SALES REVENUES FOR KINROSS, BY REGION, 2011-2013 (\$ MILLIONS)	176
TABLE 104 FINANCIALS FOR KINROSS, 2011-2013 (\$ MILLIONS)	176
TABLE 105 PATENTS ASSIGNED TO MILLIKEN COMPANY FOR SILVER- RELATED TECHNOLOGIES	177
TABLE 106 PLATINUM AND PALLADIUM PRODUCTION FOR MMC NORILSK NICKEL, 2005-2013 (THOUSAND OZ)	178
TABLE 107 PGM PRODUCTION FOR MMC NORILSK NICKEL, BY LOCATION, 2010-2013 (THOUSAND OZ)	179
TABLE 108 FINANCIALS FOR MMC NORILSK NICKEL, 2010-2013 (\$ MILLIONS)	179

TABLE HEADING	PAGE NO.
TABLE 109 GOLD AND COPPER RESOURCES AND PRODUCTION AT NEWCREST, 2013	181
TABLE 110 FINANCIALS FOR NEWCREST, 2011-2013 (A\$ MILLIONS)	181
TABLE 111 GOLD PRODUCTION FOR NEWMONT, BY REGION, 2011-2013 (THOUSAND OZ)	183
TABLE 112 GOLD PRODUCTION AND SALES FOR NEWMONT, 2011-2013 (MILLIONS OZ.)	183
TABLE 113 FINANCIALS FOR NEWMONT, 2011-2013 (\$ MILLIONS)	184
TABLE 114 GOLD REVENUES FOR NEWMONT, BY REGION, 2011-2013 (\$ MILLIONS)	184
TABLE 115 METAL PRODUCTION FOR PAN AMERICAN, BY LOCATION, 2011-2013 (THOUSAND OZ)	185
TABLE 116 REVENUES FOR PAN AMERICAN, 2010-2012 (\$ MILLIONS)	185
TABLE 117 GOLD EQUIVALENT PRODUCTION FOR POLYMETAL, BY LOCATION, 2008-2013 (THOUSANDS OZ.)	187
TABLE 118 REVENUES FOR POLYMETAL, BY SEGMENT, 2013 (\$ THOUSANDS)	188
TABLE 119 REVENUES FOR POLYMETAL, BY REGION, 2012-2013 (\$ THOUSANDS)	188
TABLE 120 REVENUES FOR POLYMETAL, BY METAL, 2012-2013	189
TABLE 121 FINANCIALS FOR POLYMETAL, 2011-2013 (\$ MILLIONS)	189
TABLE 122 GOLD PRODUCTION AT POLYUS, BY MINE, 2012-2013 (THOUSANDS OZ.)	191
TABLE 123 FINANCIALS FOR POLYUS, SEGMENT DATA, 2012-2013 (\$ MILLIONS)	191
TABLE 124 FINANCIALS FOR POLYUS, 2012-2013 (\$ MILLIONS)	192
TABLE 125 GOLD PRODUCTION FOR RIO TINTO, BY LOCATION, 2011-2013 (THOUSANDS OZ.)	193
TABLE 126 SILVER PRODUCTION FOR RIO TINTO, BY LOCATION, 2011-2013 (THOUSANDS OZ.)	193
TABLE 127 FINANCIALS FOR COPPER SEGMENT OF RIO TINTO, 2011-2013 (\$ MILLIONS)	194
TABLE 128 GOLD AND SILVER PRODUCTION FOR SILVER WHEATON, BY LOCATION, 2012-2013 (THOUSANDS OZ.)	195
TABLE 129 REVENUES FOR SILVER WHEATON, BY LOCATION, 2012-2013 (\$ MILLIONS)	195
TABLE 130 FINANCIALS FOR SILVER WHEATON, 2012-2013 (\$ MILLIONS)	196
TABLE 131 SILVER REVENUES FOR SOUTHERN COPPER, 2011-2013 (\$ MILLIONS)	197
TABLE 132 PGM AND PRECIOUS METALS PRODUCTION BY VALE, 2011-2013 (THOUSANDS OZ.)	199
TABLE 133 PGM AND PRECIOUS METALS SALES FOR VALE, 2011-2013	200
TABLE 134 SILVER PRODUCTION FOR VOLCAN, BY LOCATION, 2012 AND 2013 (THOUSANDS OZ.)	201
TABLE 135 REVENUES FOR VOLCAN, 2011-2013 (\$ THOUSANDS)	202
TABLE 136 GOLD PRODUCTION FOR YAMANA, BY LOCATION, 2012 AND 2013 (THOUSANDS OZ)	203
TABLE 137 FINANCIALS FOR YAMANA, 2011-2013 (\$ MILLIONS)	204

LIST OF FIGURES

FIGURE TITLE	PAGE NO.
SUMMARY FIGURE A GLOBAL PRECIOUS METALS MARKET, 2011-2019 (\$ BILLIONS)	8
SUMMARY FIGURE B PRECIOUS METALS MARKET SIZE BY CATEGORY, 2013 AND 2019 (%)	8
FIGURE 1 PERIODIC TABLE AND POSITION OF PRECIOUS METALS	11
FIGURE 2 MAP OF GLOBAL GOLD RESERVES	17
FIGURE 3 COMPARISON OF GOLD RESERVES IN VARIOUS COMPANY MINES, BY QUANTITY AND QUALITY	18
FIGURE 4 GOLD PRODUCTION AT TOP TEN COMPANIES, 2013 (MILLIONS OZ.)	19
FIGURE 5 GOLD RESERVES AT TOP TEN COMPANIES, 2013 (MILLIONS OZ.)	20
FIGURE 6 GLOBAL GOLD PRICES, 2004-2019 (\$/OZ.)	21
FIGURE 7 GLOBAL GOLD PRODUCTION FROM MINES, 2004-2013 (METRIC TONS)	22
FIGURE 8 GLOBAL GOLD RECYCLING, 2007-2013 (METRIC TONS)	24
FIGURE 9 GOLD MINE PRODUCTION BY COUNTRY, 2013 (%)	25
FIGURE 10 NUMBER OF FDA 510K APPROVALS SINCE 1976 IN WHICH GOLD IS MENTIONED, 1976-2014	28
FIGURE 11 GLOBAL ETF HOLDINGS IN GOLD, 2007-2019 (MILLION OZ.)	30
FIGURE 12 NET GOLD SALES BY EUROPEAN CENTRAL BANKS UNDER CBGA 1, 2 AND 3, 2000-2013 (METRIC TONS)	31
FIGURE 13 NET GOLD PURCHASES BY CENTRAL BANKS OF THE WORLD BY YEAR, 2004-2013 (METRIC TONS)	32
FIGURE 14 OFFICIAL GOLD HOLDINGS BY CENTRAL BANKS OF THE WORLD AS A PERCENTAGE OF TOTAL RESERVES, 2011-2013	33
FIGURE 15 NET GOLD HOLDINGS BY CENTRAL BANKS OF THE WORLD, APRIL 2014 (METRIC TONS, TOTAL = 31,829 MT)	34
FIGURE 16 VALUE OF GOLD HOLDINGS BY CENTRAL BANKS, 2012 DATA (%)	35
FIGURE 17 GLOBAL GOLD DEMAND BY SEGMENT, 2004-2013 (METRIC TONS)	36
FIGURE 18 GLOBAL GOLD DEMAND BY SEGMENT, 2004-2013 (\$ BILLIONS)	37
FIGURE 19 TOTAL INCOME FOR MANAPPURAM FINANCE, 2006-2013 (BILLION INR)	40
FIGURE 20 GOLD LOAN PORTFOLIO OF MUTHOOT FINANCE, 2005-2013 (BILLION INR)	41
FIGURE 21 GOLD HOLDINGS OF MUTHOOT FINANCE, 2005-2014 (METRIC TONS)	41
FIGURE 22 GLOBAL SILVER SUPPLIES, 2008-2013 (MILLIONS OZ.)	45
FIGURE 23 SILVER MINE PRODUCTION BY COUNTRY, 2013 (%)	48
FIGURE 24 SILVER PRODUCTION AT TOP TEN COMPANIES, 2013 (MILLION OZ.)	49
FIGURE 25 GLOBAL SILVER MARKET, 2008-2019 (\$ BILLIONS)	52
FIGURE 26 GLOBAL MARKET PRICES FOR SILVER, 2008-2019 ESTIMATE (\$/OZ.)	52
FIGURE 27 GLOBAL PGM MARKET, 2009-2019 ESTIMATE (\$ BILLIONS)	58
FIGURE 28 GLOBAL PLATINUM MARKET, 1997-2013, 2019 ESTIMATE (\$ BILLIONS)	62
FIGURE 29 GLOBAL PLATINUM DEMAND, 1997-2013, 2019 ESTIMATE (THOUSANDS OZ.)	63
FIGURE 30 GLOBAL PLATINUM PRICES, 1997-2019 ESTIMATE (\$/OZ.)	64
FIGURE 31 DISTRIBUTION OF PLATINUM MINE SUPPLY, BY REGION, 2013 (%)	67
FIGURE 32 PLATINUM DEMAND FOR AUTOCATALYST MARKET, BY REGION, 2013 (%)	69
FIGURE 33 PLATINUM DEMAND FOR JEWELRY MARKET, BY REGION, 2013 (%)	71
FIGURE 34 CHANGES IN GLOBAL PLATINUM ETF HOLDINGS, 2007-2013 (THOUSAND OZ.)	72
FIGURE 35 GLOBAL PALLADIUM MARKET, 1997-2019 ESTIMATE (\$ BILLIONS)	73
FIGURE 36 GLOBAL PALLADIUM DEMAND, 1997-2019 ESTIMATE, (THOUSAND OZ.)	74
FIGURE 37 GLOBAL PALLADIUM PRICES, 1997-2013, 2019 ESTIMATE (\$/OZ.)	75

FIGURE TITLE	PAGE NO.
FIGURE 38 DISTRIBUTION OF PALLADIUM SUPPLIES, BY REGION, 2013 (%)	77
FIGURE 39 CHANGES IN GLOBAL PALLADIUM ETF HOLDINGS, 2007-2013 (THOUSAND OZ.)	81
FIGURE 40 DISTRIBUTION OF RHODIUM SUPPLIES, BY REGION, 2013 (%)	83
FIGURE 41 RHODIUM MARKET DEMAND BY CATEGORY, 2013 (%)	84
FIGURE 42 NUMBER OF U.S. PATENTS ISSUED SINCE 1976 ON GOLD TECHNOLOGIES AND APPLICATIONS, BY FIVE-YEAR PERIOD	101
FIGURE 43 U.S. PATENTS ISSUED RELATED TO GOLD, BY SELECTED APPLICATION SEGMENTS, 1976-2013 (%)	102
FIGURE 44 NUMBER OF U.S. PATENTS ISSUED SINCE 1976 ON SILVER TECHNOLOGIES AND APPLICATIONS, BY FIVE-YEAR PERIOD	111
FIGURE 45 NUMBER OF U.S. PATENTS ISSUED SINCE 1976 ON SILVER HALIDE TECHNOLOGIES, BY FIVE-YEAR PERIOD	112
FIGURE 46 NUMBER OF U.S. PATENTS ISSUED SINCE 1976 ON SILVER TO NON-SILVER HALIDE TECHNOLOGIES, BY FIVE-YEAR PERIOD	112
FIGURE 47 NUMBER OF U.S. PATENTS ISSUED ON SILVER, BY SELECTED APPLICATION SEGMENTS, 1976-2013	113
FIGURE 48 NUMBER OF U.S. PATENTS ISSUED SINCE 1976 THAT DESCRIBE SILVER ANTIMICROBIAL TECHNOLOGIES, BY FIVE-YEAR PERIOD	114
FIGURE 49 NUMBER OF U.S. PATENTS ISSUED SINCE 1976 ON PLATINUM TECHNOLOGIES AND APPLICATIONS, BY FIVE-YEAR PERIOD	117
FIGURE 50 NUMBER OF U.S. PATENTS ISSUED ON PLATINUM, BY SELECTED APPLICATION SEGMENTS, 1976-2013	117
FIGURE 51 NUMBER OF U.S. PATENTS ISSUED SINCE 1976 ON PALLADIUM TECHNOLOGIES AND APPLICATIONS, BY FIVE-YEAR PERIOD	123
FIGURE 52 NUMBER OF U.S. PATENTS ISSUED ON PLATINUM, BY SELECTED APPLICATION SEGMENTS, 1976-2013	123
FIGURE 53 NUMBER OF U.S. PATENTS ISSUED SINCE 1976 ON RHODIUM, RUTHENIUM AND IRIIDIUM TECHNOLOGIES, AND SHARE OF PATENTS ON CATALYSTS	124
FIGURE 54 GOLD PRODUCTION FOR ANGLOGOLD ASHANTI BY REGION, 2013 (%)	139
FIGURE 55 REVENUES FOR BUENAVENTURA, BY METAL, 2013 (%)	147
FIGURE 56 GOLD PRODUCTION AT CENTERRA GOLD, 2009-2013 (THOUSAND OZ.)	150
FIGURE 57 SILVER PRODUCTION AT COEUR MINING, 2008-2013 (MILLION OZ)	154
FIGURE 58 GOLD PRODUCTION AT COEUR MINING, 2008-2013 (THOUSANDS OZ.)	155
FIGURE 59 SILVER PRODUCTION AT FRESNILLO, 2009-2013 (MILLIONS OZ.)	158
FIGURE 60 GOLD PRODUCTION AT FRESNILLO, 2008-2013 (THOUSANDS OZ.)	159
FIGURE 61 SILVER PRODUCTION AT KGHM, 2000-2013 (MILLIONS OZ)	171
FIGURE 62 GOLD PRODUCTION AT POLYUS, 2009-2013 (THOUSAND OZ.)	190