

# Time delay between discovery and development – is it getting more difficult?

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# Overview

1. High-level analysis of the historic data for 1950-2016
  - Average likelihood that a discovery will turn into a mine, and the average time delay between discovery and development
2. Detailed assessment in the trend over time for selected commodities
  - Number of discoveries made
  - Total amount of metal found
3. Conclusions

On average only half of all discoveries turn into mines. And of those that deposits that do get mined, there is a 12 year delay between discovery and development

## **1. HIGH-LEVEL ANALYSIS**

# Less than half of all discoveries made in the World since 1950 have been put into production

And for those deposits that did get developed, the average delay was 12 years

	<u>Number of Deposits</u>			Average Delay (Years)
	Discovered	Developed	Conversion Rate	
<b>Total</b>	<b>4676</b>	<b>2120</b>	<b>45%</b>	<b>12.4</b>

Note: Based on deposits >100 koz Au, >100kt Cu, >300kt Zn+Pb, >10kt Ni, > 5kt U<sub>3</sub>O<sub>8</sub> or other minerals of equivalent size  
Excludes Bulk Mineral discoveries and satellite deposits within existing camps

Source: MinEx Consulting © September 2017

# The conversion rate and delay period varies by commodity

	Number of Deposits			Contained Metal (Pre-Mined Resource basis)			Average Delay (Years)
	Discovered	Developed	Conversion Rate	Discovered	Developed	Conversion Rate	
Gold	1992	1018	51%	5751	3793	Moz Au 66%	10.2
Copper	950	353	37%	2541	1363	Mt Cu 54%	16.8
Zinc+Lead	313	169	54%	754	447	Mt Zn+Pb 59%	14.1
Nickel (sulphide)	208	82	39%	106	60	Mt Ni 57%	12.8
Nickel (laterite)	150	48	32%	149	64	Mt Ni 43%	19.5
Uranium	347	156	45%	8.5	4.8	Mt U 57%	13.4
Other	716	294	41%	na	na	na	11.9
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<b>Total / Average</b>	<b>4676</b>	<b>2120</b>	<b>45%</b>			<b>~57%</b>	<b>12.4</b>

In terms of the amount of metal found, the conversion rates were higher ... i.e. bigger deposits are more likely to be developed

Source: MinEx Consulting © September 2017

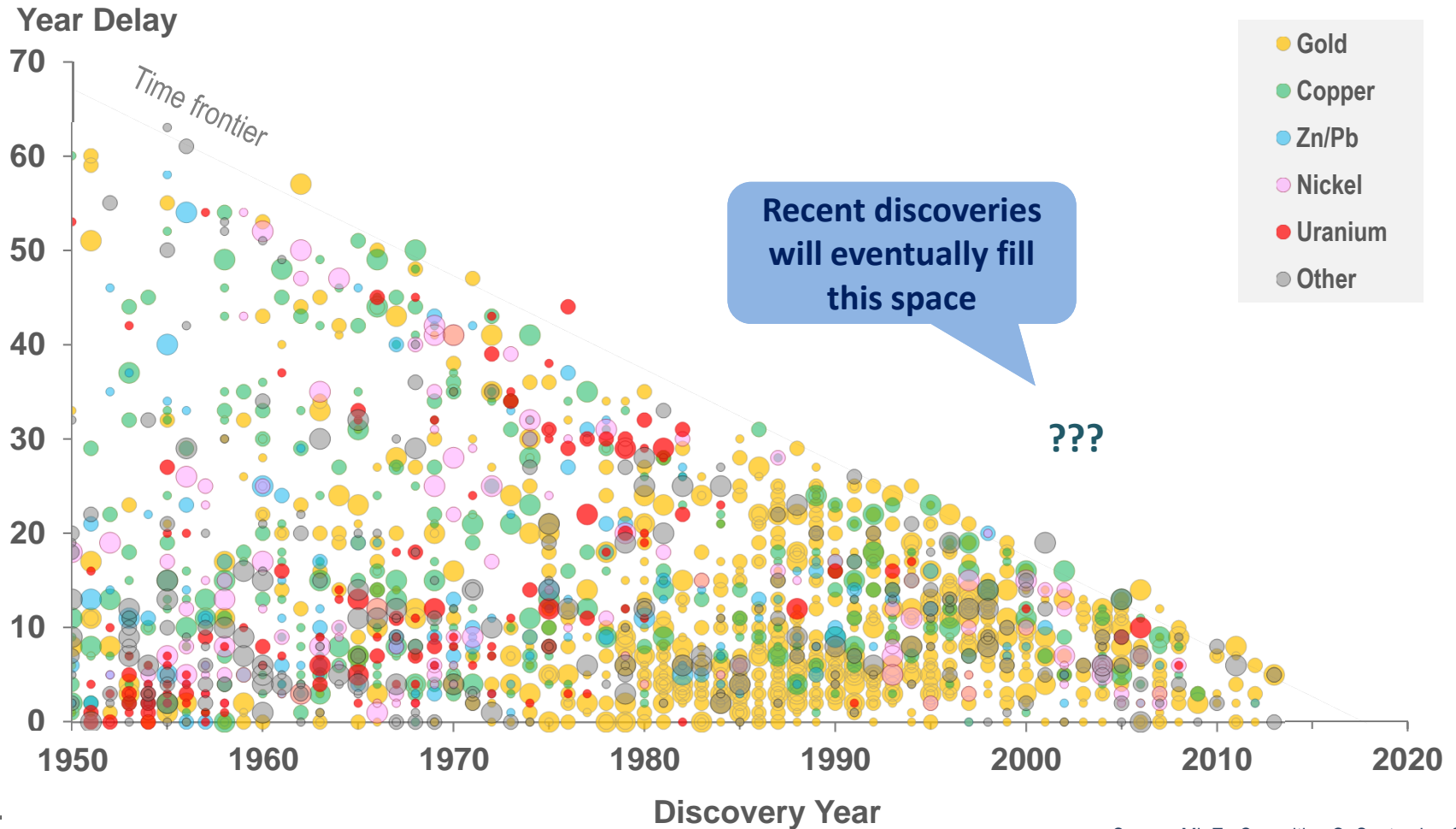
**CAUTION:**

The apparent low conversion rate might simply be due to the fact that can take several years for a discovery to turn into a mine

... perhaps with sufficient time the conversion rate will improve

# Delay between Discovery and Development

## All Commodities : All Countries 1950-2016



Source: MinEx Consulting © September 2017

Note: Bubble size refers to Moderate-, Major- and Giant-sized discoveries

The conversion and delay rates are influenced by the commodity type and deposit size. It also appears that industry performance has declined in recent years – i.e. fewer discoveries are turning into mines, and it is taking longer

## **2. DETAILED ANALYSIS**



# Key Question: Is it getting more difficult to convert a discovery into a mine?

i.e.

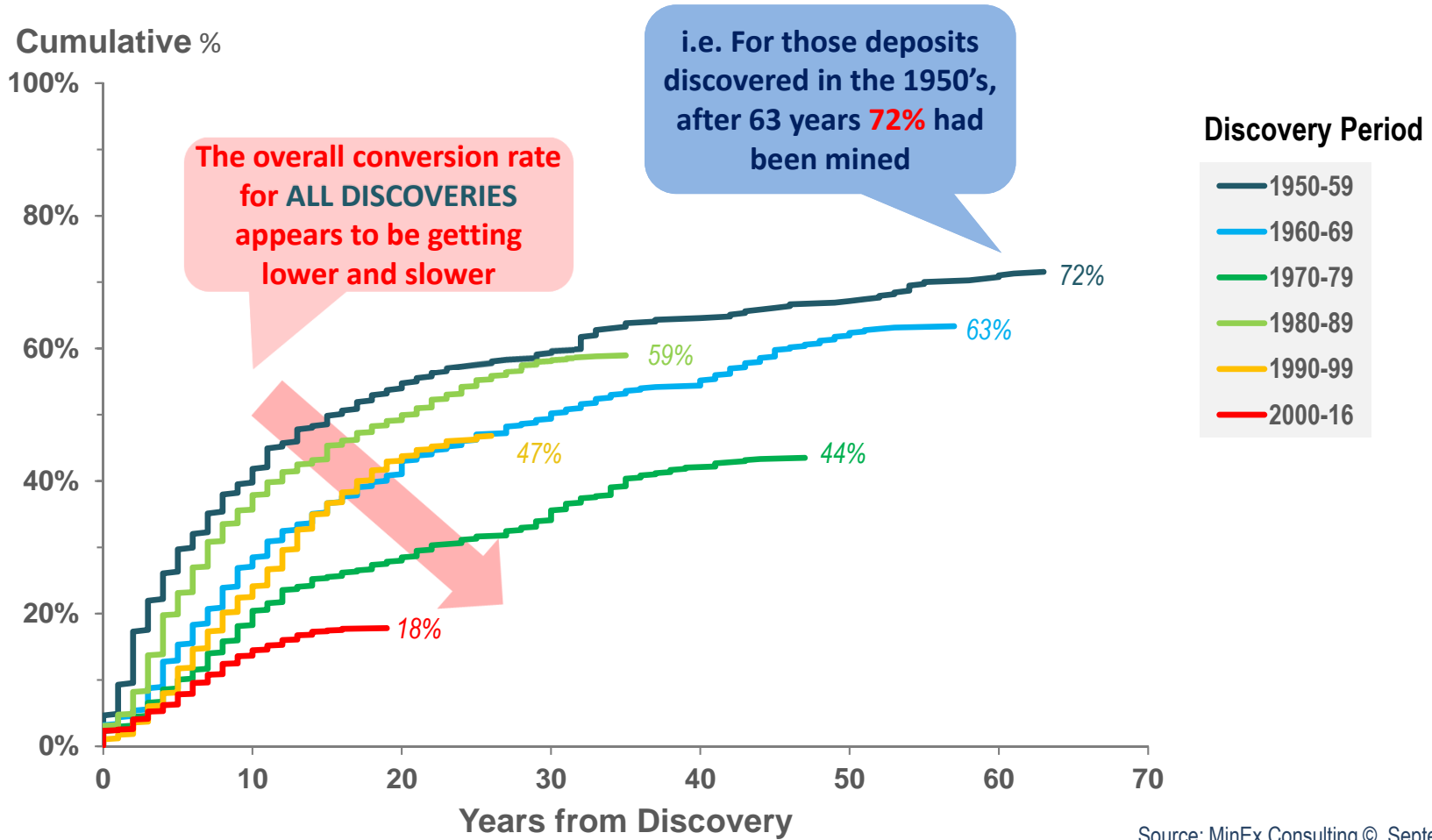
- Is the overall conversion rate getting better/worse?

*And for those discoveries that do turn into mines ...*

- Is the delay between discovery and development getting shorter/longer?

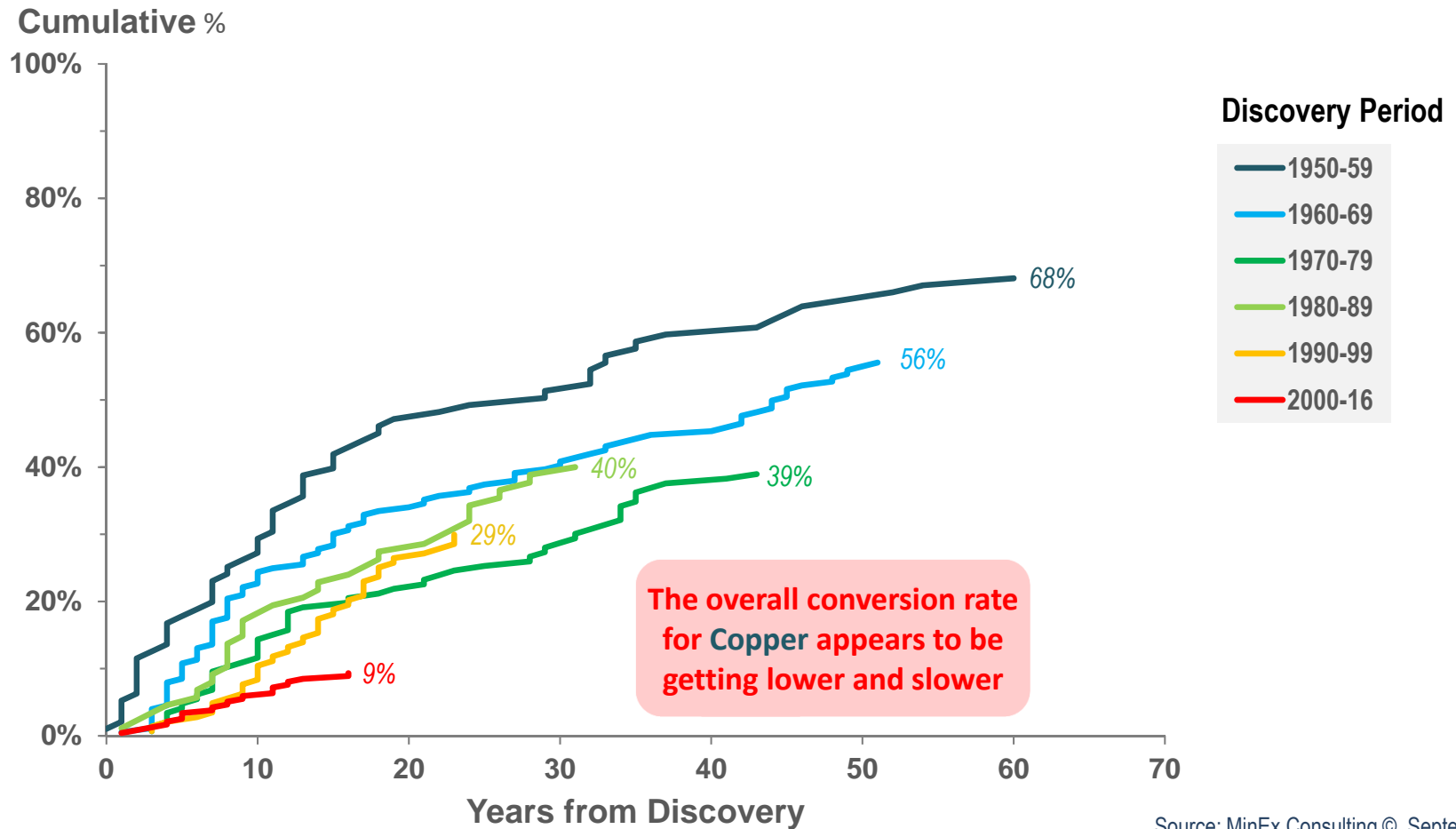
# Cumulative Number of Discoveries that become mines: **ALL**

All Discoveries in the World  $\geq$  Moderate in size



# Cumulative Number of Discoveries that become mines: **COPPER**

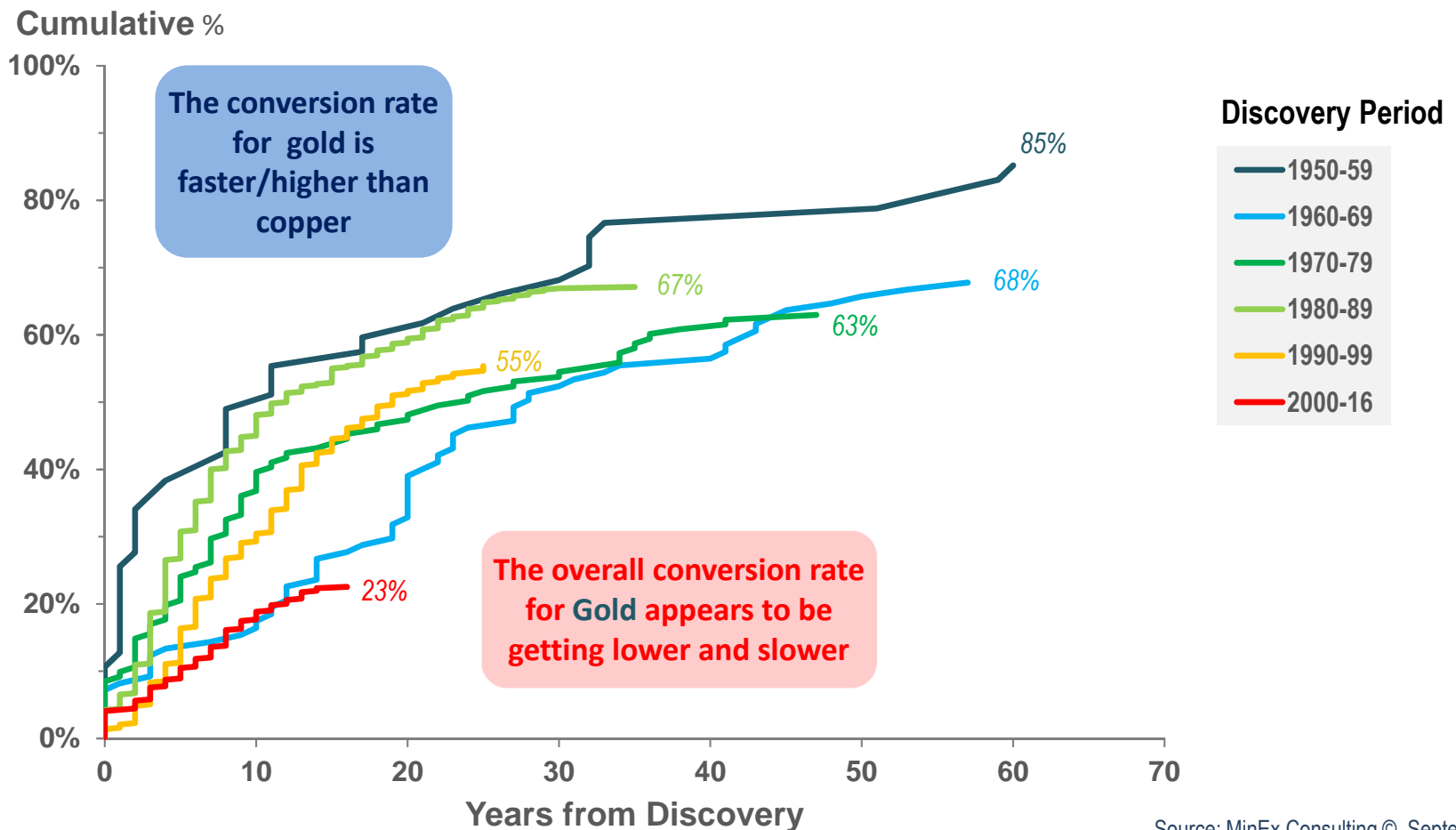
All Discoveries in the World  $\geq$ Moderate in size



Source: MinEx Consulting © September 2017

# Cumulative Number of Discoveries that become mines: **GOLD**

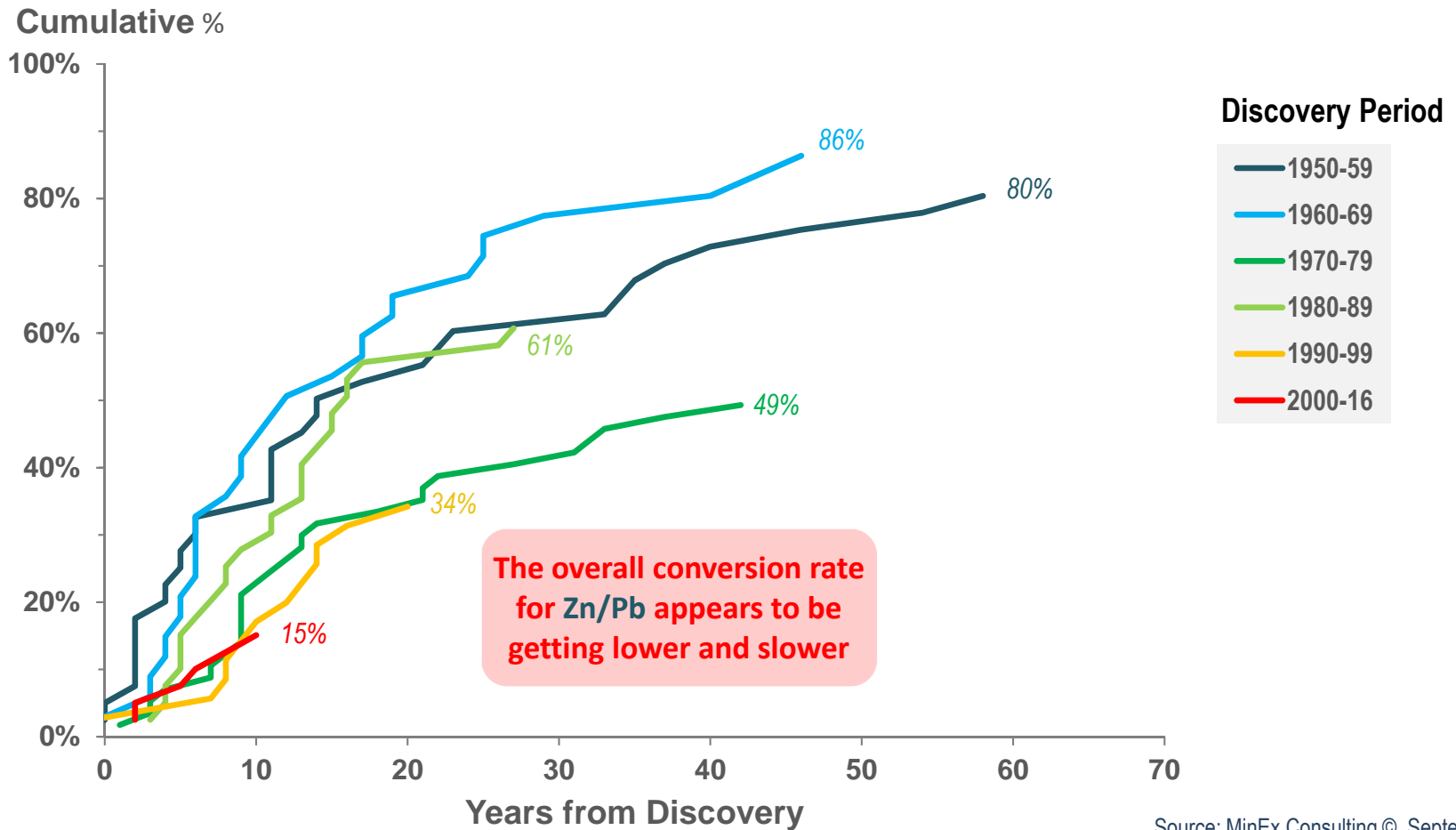
All Discoveries in the World  $\geq$ Moderate in size



Source: MinEx Consulting © September 2017

# Cumulative Number of Discoveries that become mines: Zn/Pb

All Discoveries in the World  $\geq$ Moderate in size

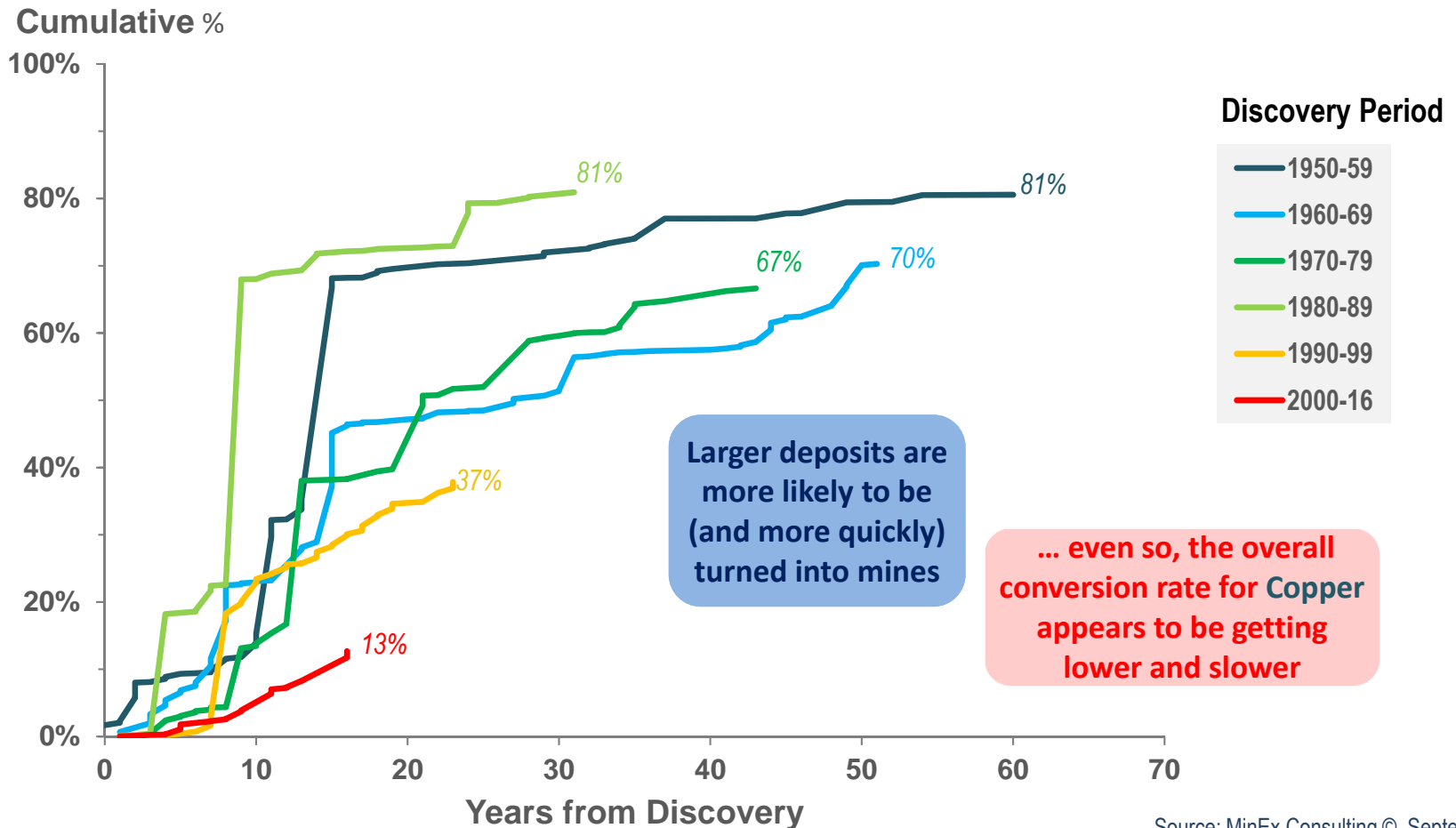


Larger deposits are more likely  
to be developed into mines

## Effect of deposit size

# Cumulative Metal in Discoveries that become mines: COPPER

All Discoveries in the World  $\geq$  Moderate in size

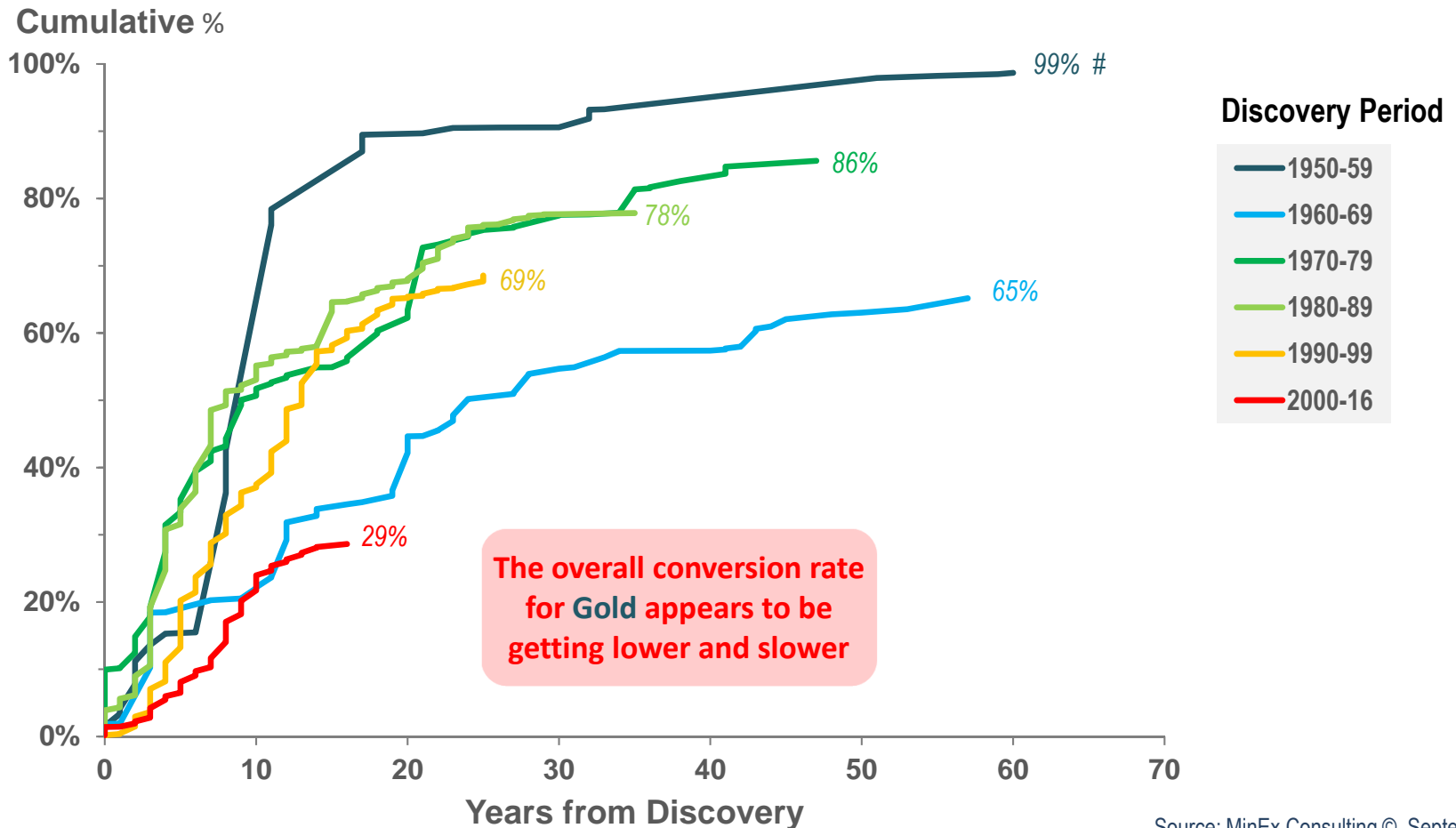


Source: MinEx Consulting © September 2017

CAUTION: Not all of the available resource will be recovered from a given mine

# Cumulative Metal in Discoveries that become mines: GOLD

## All Discoveries in the World $\geq$ Moderate in size



# Note: The very high metal conversion rate in the 1950s is due to very large (and economic) gold discoveries in the Witwatersrand in South Africa

Source: MinEx Consulting © September 2017



# 3. CONCLUSIONS

# Conclusions

- The conversion rate (from discovery to mine) varies by commodity and deposit size. Bigger deposits are more likely to be economic.
- In recent years it appears that the conversion rate has declined.
- MinEx estimates that the current long-term conversion rate will be:
  - 50-70% (by number)
  - 60-80% (by contained metal)
- For those deposits that do (eventually) turn into mines, it can take several years, if not decades, for this to happen.
- The time delay varies by commodity and is influenced by the business cycle / commodity prices. The historic average across all commodities was 12.4 years.
- In recent years it appears that the delay period has gotten longer
  - MinEx Consulting estimates that (depending on the commodity) the delay is now around 15-20 years

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