

Revisiting the COCOMO II SCED Cost-Schedule Driver

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Outline

- **Background**
- **Approaches**
 - **Ideal Effort Multiplier Analysis on SCED driver**
 - **SCED Rating Quality Analysis**
- **Conclusions**

Background

- **COCOMO II calibrated to end-of-project actuals**
 - Size, personnel ratings, complexity
- **SCED ratings come from subjective judgments**
 - Actual compression computable but not done
 - Judgments often different from actuals
- **Analysis shows actuals are somewhat better predictors**
 - But not determinable in advance

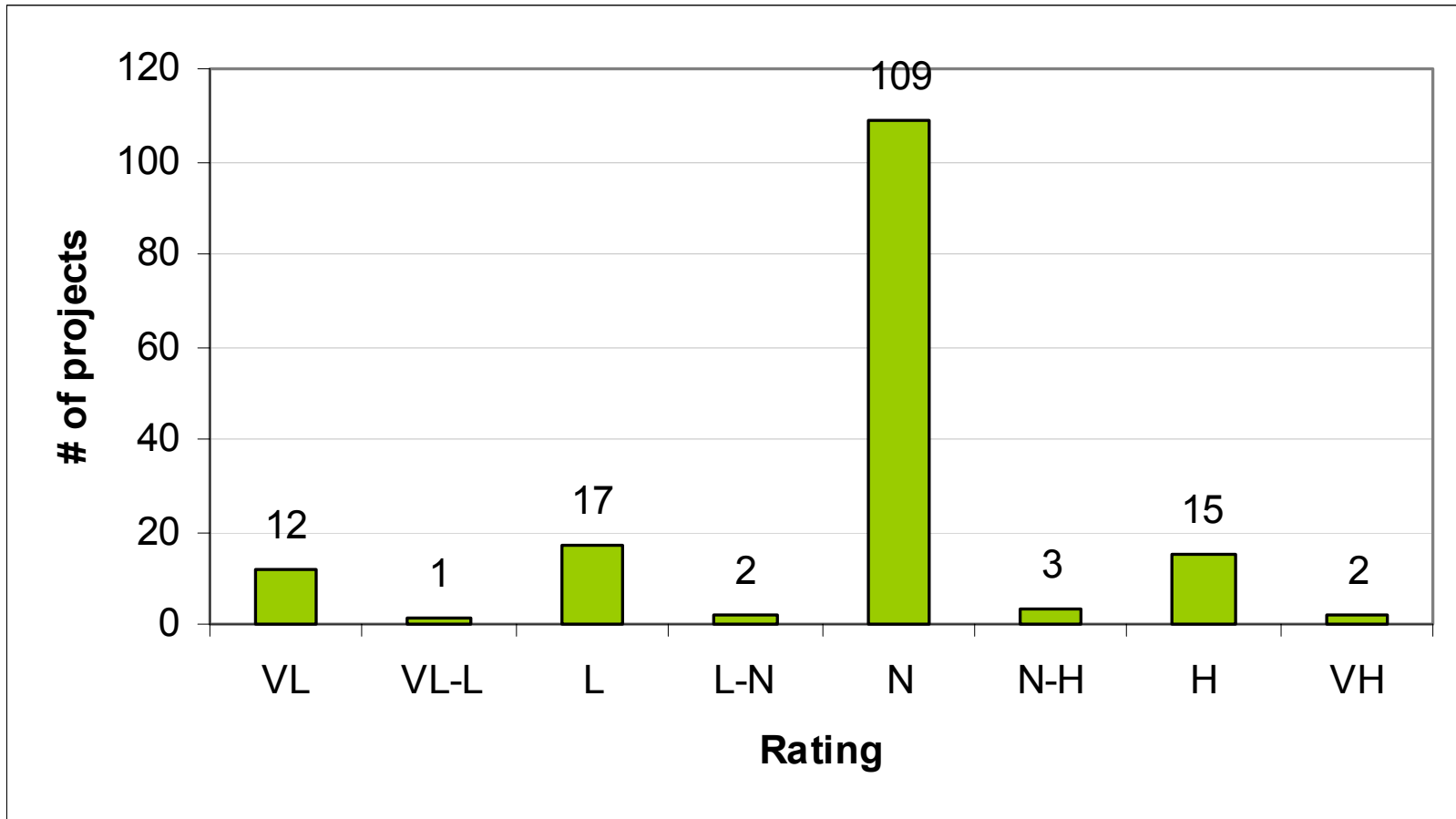
COCOMO II SCED Multipliers

Required Development Schedule (SCED) has the following effort multipliers in COCOMO II:

<i>Rating</i>	Very low	Low	Nominal	High	Very High
<i>Multiplier</i>	1.43	1.14	1.00	1.00	1.00
<i>Descriptor</i>	75% of nominal	85% of nominal	100% of nominal	130% of nominal	160% of nominal

- Based on calibration to judgmental ratings

CII SCED Rating Distribution



Study Approaches

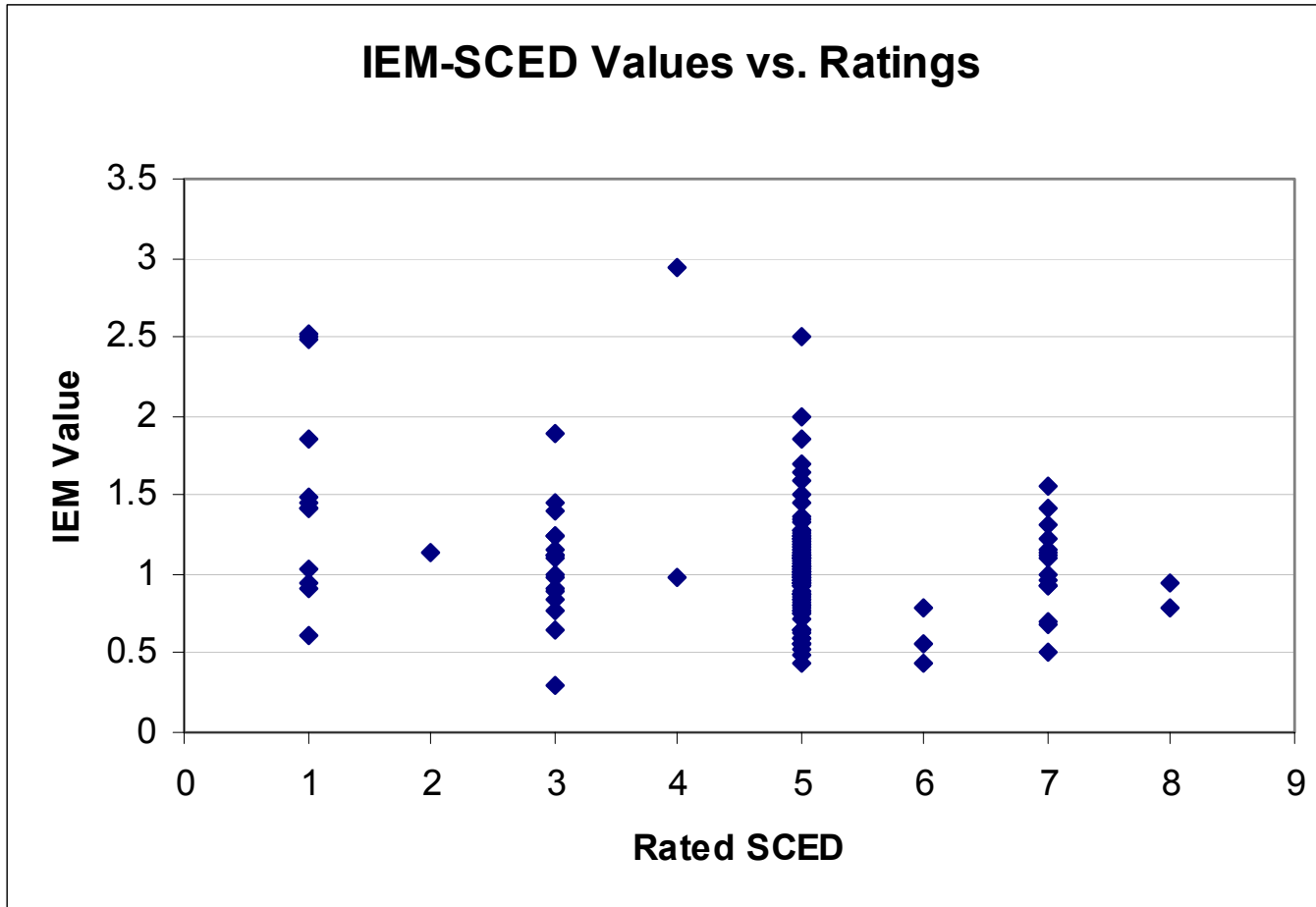
- 1. Perform the Ideal Effort Multiplier (IEM) analysis on SCED driver**
- 2. Propose new SCED effort multipliers**
- 3. Examine on SCED rating quality**

Ideal Effort Multiplier (IEM) Analysis on SCED

- **IEM**
 - a way to normalize out contaminating effects of other cost driver attributes as much as possible in order to get a clear picture of the contribution of a single cost driver
- **Equation**
 - $IEM(P, SCED) = PM(P, actual) / PM(P, SCED)$
 - $IEM(P, SCED)$: the ideal effort multiplier for project P
 - $PM(P, actual)$: project P's actual development effort
 - $PM(P, SCED)$: CII estimate excluding the SCED driver

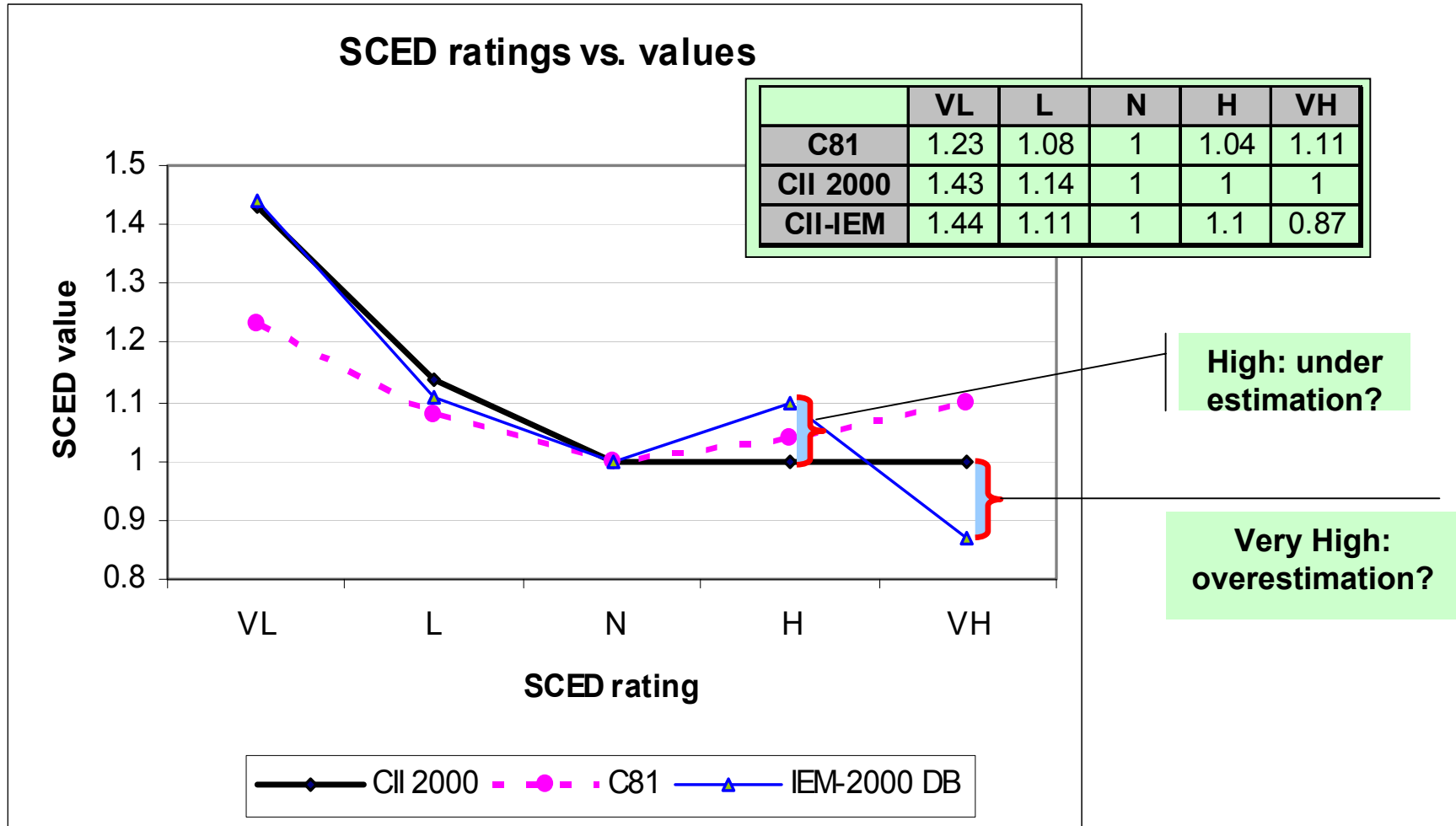
Steps

1. **Compute $PM(P, SCED)$ for each project in the repository**
2. **Compute $IEM(P, SCED)$ using equation:**
$$IEM(P, SCED) = PM(P, actual) / PM(P, SCED)$$
3. **Group $IEM(P, SCED)$ by the same SCED ratings**
4. **Compute median value for each rating**



- 1: VL
- 2: VL-L
- 3: L
- 4: L-N
- 5: N
- 6: N-H
- 7: H
- 8: VH

IEM-SCED Values on CII DB



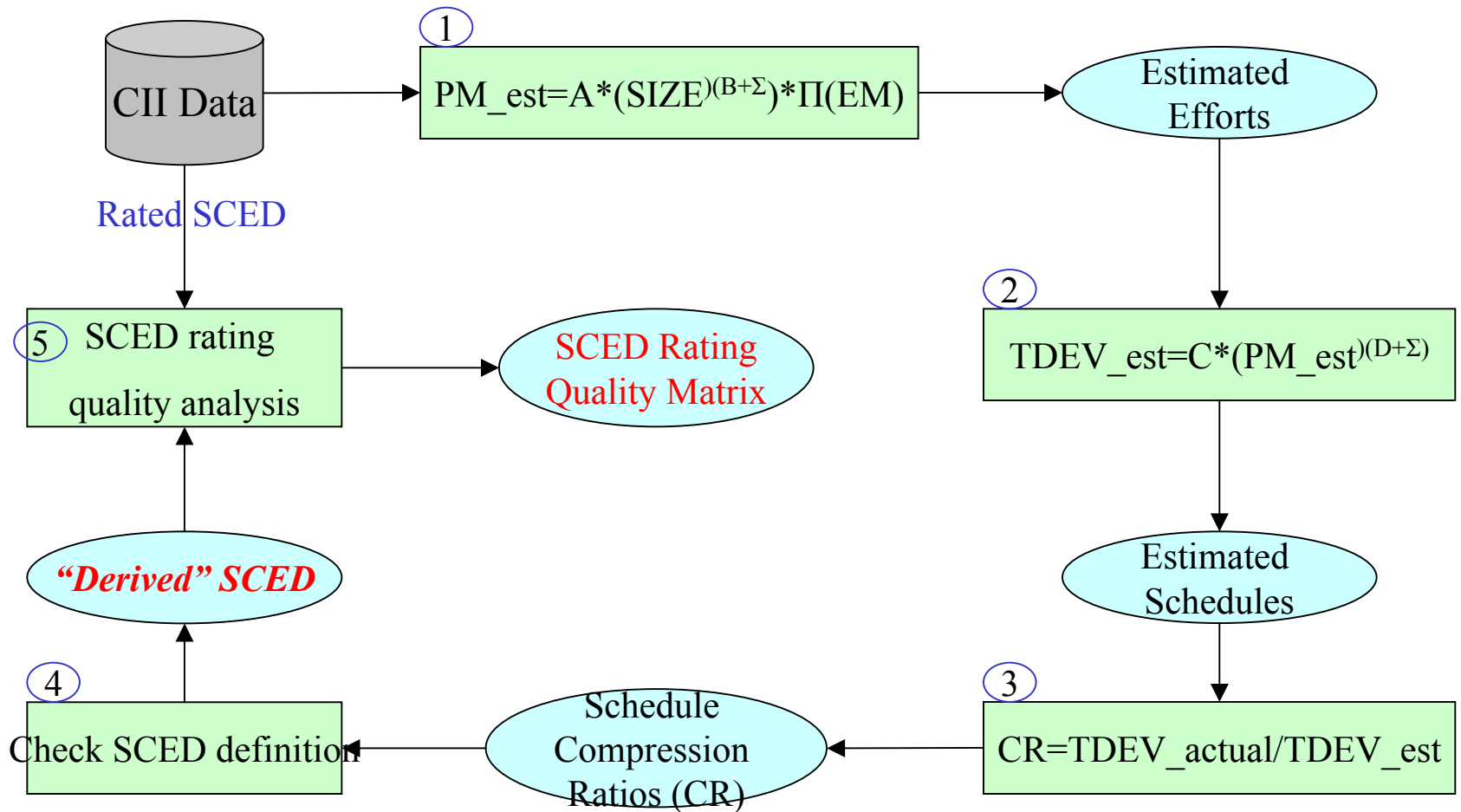
Model Accuracy Improvements

	CII	CII with IEM-SCED
Pred(.20)	63%	63%
Pred(.25)	68%	71%
Pred(.30)	75%	76%

SCED Rating Quality

- **“Rated” SCED**
 - Reported in data collection form
- **“Derived” SCED**
 - Analyzed from the actual schedule compression ratio, which is actual schedule/estimated schedule
- **SCED Rating Quality**
 - Compatibility between $SCED_{\text{-rated}}$ and $SCED_{\text{-derived}}$

Steps



SCED Rating Quality Matrix

- **Preliminary analysis result:**
 - **Compatibility: 21% (32 out of 155 data points)**

—————> **“Derived” SCED** <—————

↓
Rated
SCED
↓

CR	<77%	78%-82%	83%-90%	90%-95%	95%-110%	110%-122%	123%-137%	138%-152%	>153%
	VL	VL-L	L	L-N	N	N-H	H	H-VH	VH
VL	7		1			1			1
VL-L									
L	6		1	1	5		1		1
L-N									1
N	18	1	13	16	22	11	14	5	9
N-H	2						1		
H	4		1	1	2	2	2	1	2
H-VH									
VH	1				1				

Conclusion

- **Subjective SCED ratings often differ greatly from actuals**
 - **Acceleration reasons: smooth integration, well-jelled teams**
 - **Deceleration: requirements volatility, funding gaps, critical-path delays**
- **Actual SCED compression ratings give somewhat better results**
 - **But not determinable in advance**
- **Worth exploring in detailed rating scale workshop**